

4.3 Transportation Strategy

The ultimate objective of the transportation analysis is to identify the transportation network alternatives that could accommodate the projected travel demand of the proposed development beyond the future approved development and road network already identified in the former Region's Transportation Master Plan (TMP). To "initiate" the analysis of projected conditions, the transportation network as shown in the Concept Plan was assumed. This core transportation network represents a blend of committed road extensions (as confirmed by the City of Ottawa) and additional road/transit infrastructure opportunities envisioned by the team to provide a reasonable level of mobility to/from/within Kanata West.

The unique nature of the development envisioned for KWCP warranted developing an analytical approach that was sensitive to several key transportation planning objectives, including:

- capitalize on the high live-work synergies of the existing Kanata and Stittsville communities;
- provision for travel demand management (TDM) opportunities from the outset of development;
- target high transit modal shares through protection of a rapid transit corridor through the higher-density sectors of the development; and
- utilize the surplus counter-peak roadway capacity (west of Eagleson Road), including at the Highway 417/Palladium Drive interchange.

4.3.1 Analytical Approach

The analysis of transportation issues relating to KWCP was assessed at three levels:

Level 1. Regional Overview.

The macro overview was based on the analysis of projected vehicular traffic crossing defined screenlines, which are imaginary lines drawn across all major transportation facilities in a corridor. The focus at this level of analysis was total projected conditions (i.e., background traffic plus KWCP site traffic) at the Eagleson Road Screenline, which captures movements to/from the KWCP development that crosses the Greenbelt and the Terry Fox Drive Screenline that helps to identify general roadway capacity issues between Kanata and Stittsville.

Level 2. Internal Primary Road Network.

A transportation network within the KWCP development, consisting of primary roads and a rapid transit corridor, was assessed with regard to its ability to accommodate site traffic. Projected site generated volumes were used to determine the required number of lanes for each proposed roadway.

Level 3. Arterial Road / Internal Road Interface.

As a final level of analysis, the interface between the internal road network and the arterial road network (former Regional) was assessed. This involved assessing the contribution of KWCP site traffic on the future arterial road network in order to determine additional travel lanes on adjacent facilities such as Hazeldean Road and Terry Fox Drive.

To address the foregoing three levels of analysis for KWCP, the following ten-step approach was employed:

- Step 1.** The 19 land use blocks that compose the proposed development were categorized as either residential, office, or commercial.
- Step 2.** Three categories of trips were defined:
 - trips internal to the Kanata West site (defined as a percentage of the available workforce living in Kanata West);
 - external trips to/from Kanata-Stittsville; and
 - external trips to/from the balance of the National Capital Region.
- Step 3.** The *internal* trips (i.e., residents of Kanata West who would be assumed to work there as well) were set aside, but would be used later to help establish the internal road network.
- Step 4.** The total number of inbound and outbound person trips to/from the *external zones* was determined using the standard person trip generation rates and directional splits. This was done for both the AM and PM peak periods.
- Step 5.** Inbound and outbound modal shares (i.e., SOV, passenger, transit, cycle/walk) were estimated for external trips to/from Kanata-Stittsville and to/from the balance of the National Capital Region. The estimated modal share was sensitive to the direction of travel (peak versus off-peak) and proximity to the transit corridor (close versus not close).
- Step 6.** The resultant number of inbound and outbound vehicle trips was determined.
- Step 7.** Vehicle trip distribution (where are the vehicles going to/coming from) and assignment (on which road links) was performed.
- Step 8.** Projected background traffic volumes for the year 2021 (from the 1997 TMP and therefore in the absence of KWCP) were combined with projected KWCP site traffic to determine potential capacity issues crossing key study area screenlines.
- Step 9.** Internal road network requirements were determined based on KWCP site-generated traffic.

Step 10. Modifications to the committed arterial road network that are likely required, as a result of the KWCP development, were identified. Traffic projections presented in recent City of Ottawa endorsed planning studies were used as the basis for determining background traffic in the year 2021.

Step 11. Cost estimates for the identified transportation network requirements to support the proposed KWCP were developed.

The foregoing approach is summarised conceptually in Figure 4-34.

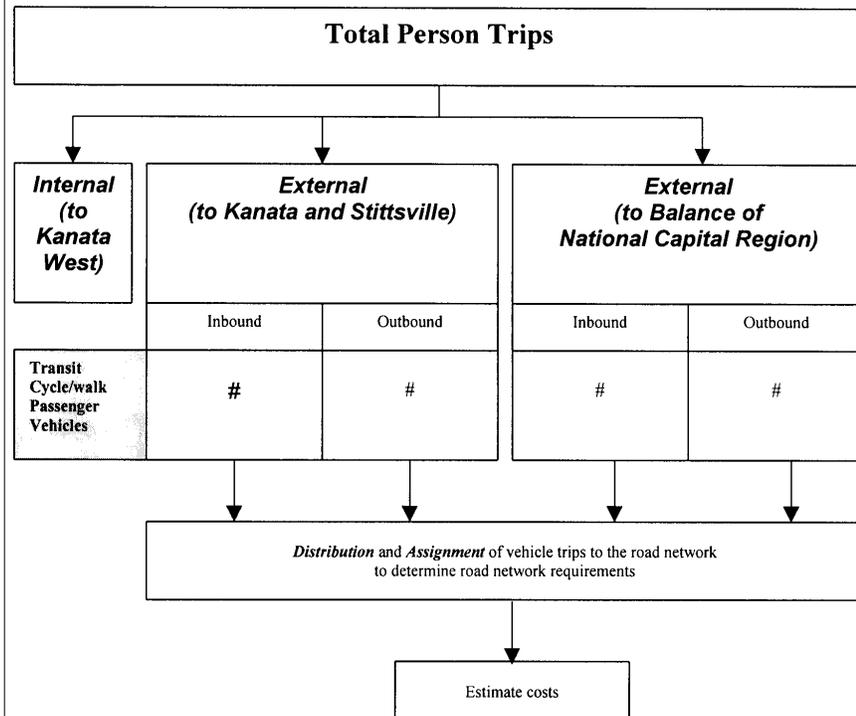


Figure 4-34
Conceptual Representation of Analytical Approach

4.3.2 Modelling Assumptions

A number of assumptions were made within the analysis regarding trip generation, trip distribution and assignment, and background traffic on the road network by the year 2021. It is important to note that the impact of overall development phasing was not assessed as part of this analysis, rather we have assumed complete build-out of the proposed KWCP by the year 2021. These are discussed as follows:

4.3.2(1) Trip Generation

A customized spreadsheet tool was developed to permit a sensitivity analysis of those variables that dictate the amount of site traffic (both persons and vehicles). Tables 4-1 and 4-2 that follow detail a “reasonable” set of input assumptions based on standard practices and professional judgement (Section 4.3.3 presents a sensitivity analysis in terms of more “conservative” and “optimistic” scenarios). Of particular impor-

tance in capturing the unique nature of the proposed development are the following three variables:

Percentage population internally employed

This is an important input variable as these trips remain internal to the development during peak periods and therefore are set-aside from the broader transportation analysis. As a base case, we have assumed that 30% of the employment pool (based on 1.1 workers per dwelling unit), who choose to live in Kanata West, will also work in Kanata West. This is moderately higher than the typical value of 25% observed elsewhere in the City (including the existing Kanata, which is at approximately 27% according to 1996 Census), but is reflective of the anticipated high live-work synergies for this development.

Kanata-Stittsville percentage of 2021 population and 2021 employment

These two variables dictate how many of the external trips are assigned to Kanata-Stittsville and how many are assigned to the balance of the National Capital Region (which have differing modal share characteristics). According to the most recent estimates provided by the City of Ottawa, the combined areas of Kanata-Stittsville will represent 15% of total population and 8% of the total employment opportunities within the entire City of Ottawa by 2021. As a base case, we have assumed slightly higher values of 20% and 10% respectively, which again are consistent with the anticipated high live-work synergies for this development.

Peak direction modal shares

The percentage of person trips assigned to each of the available travel modes will influence the actual number of vehicles on the road network. As a base case, we have assumed values of the non-SOV component (i.e., transit riders, cycle/walk and passengers) to range between 30% and 55% in the peak direction. Note that the percentage will vary depending on trip category (i.e., external to Kanata-Stittsville or balance of National Capital Region) and proximity to the proposed rapid transit corridor.

Land Use	AM Peak Hour	PM Peak Hour	Rationale
Residential			
Percentage Population Internally Employed	30%	30%	Assumed to be higher than typical value of 25%
Jobs / Dwelling Unit Ratio	1.1	1.1	Official Plan policy
Residential Person Trip Rate	1.1	1.2	TRANS Manual
Residential Counter Peak Factor	25%	38%	TRANS Manual
Kanata-Stittsville Residential % of 2021 Population	20%	20%	This value is between the 15% noted for 2021 in the current Official Plan and the 25% indicative of the ideal live-work scenario.
Office			
Employee Absenteeism	10%	10%	Standard practice
Peak Hour Factor	60%	50%	Standard practice, referenced in Nortel and other office traffic studies, used in MH Hazeldean report
Counter Peak Factor	10%	15%	Standard practice
Kanata-Stittsville Office % of 2021 Employment	10%	10%	This value is between the 8% noted for 2021 in the Official Plan and the 25% indicative of the ideal live-work scenario.
Retail			
Vehicle Trip Rate / 1,000 square feet	1.7	4.5	TRANS Manual for 500,000 square feet Shopping Centre
Counter Peak Factor	30%	50%	TRANS Manual for 500,000 square feet Shopping Centre
Pass-By Factor	100%	50%	Assumes AM is negligible, PM pass-by includes transit / bike / walk trips

Table 4-1: "Baseline" Trip Generation Input Variables:
(Note: Values based on standard practices and professional judgement)

Origin/Destination	Peak Direction				Counter-peak Direction			
	SOV	Transit	Cycle and Walk	Pass.	SOV	Transit	Cycle and Walk	Pass.
External to Kanata-Stittsville								
Not close to rapid transit	70%	5%	4%	21%	70%	5%	4%	21%
Close to rapid transit	62%	15%	4%	19%	66%	10%	4%	20%
External to balance of NCR								
Not close to rapid transit	57%	25%	1%	17%	68%	10%	1%	21%
Close to rapid transit	45%	40%	1%	14%	65%	15%	1%	19%

Table 4-2: "Baseline" Modal Share Input Variables:
(Note: Values based on professional judgement; SOV refers to single occupant vehicle)

For internal trips, we have assumed that 50% of all trips will be non-auto to reflect the increased feasibility of cycle/walk trips, ridesharing, and local transit.

4.3.2(2) Trip Distribution and Assignment

The trip distribution and assignment elements of the analysis of site-generated traffic were conducted using an “off-the-shelf” traffic impact analysis software package named *TRAFFIX*TM. A candidate *primary internal road network* was modelled in terms of links that connected traffic zones (representing each of the 19 land use blocks) and gates (representing access/egress points to the regional road network). Traffic was distributed between each zone and the surrounding gates and subsequently assigned to the road network based on the most likely travel routes¹. The most recent City of Ottawa population and employment projections for year 2021 were used as the basis for the distribution of traffic to the balance of the National Capital Region. Both the employment-based and residential-based distributions are summarised in Table 4-3.

¹ Note that capacity constraint issues were not considered in the assignment of site traffic to the primary internal road network. That is to say, drivers were assumed not to deviate from the shortest/fastest travel route as identified during uncongested conditions although in reality, some drivers may be tempted to select alternative travel routes if the shortest route is no longer competitive.

Origin/Destination	Trip Distribution	
	Employment-Based Trips	Residential-Based Trips
North via		
Huntmar	3%	1%
Terry Fox	2%	1%
South via		
Palladium	1%	0%
Huntmar	1%	1%
Terry Fox	14%	5%
East via		
Campeau	2%	1%
Highway 417	64%	83%
Palladium	2%	1%
Maple Grove	1%	1%
Hazeldean	7%	5%
West via		
Highway 417	2%	0%
Hazeldean	1%	1%
Total	100%	100%

Table 4-3:
Preliminary Trip Distribution

4.3.2(3) Background year 2021 traffic projections

Background traffic projections within the study area (i.e., projections in the absence of proposed KWCP traffic) for the year 2021 were obtained from two sources. Firstly, the person-trip estimates, used as the basis for the screenline analysis, were obtained from the PM peak hour results provided by the TRANS travel demand forecasting model, which is maintained by the City of Ottawa. Appropriate target modal shares, consistent with the study's objectives, were applied to determine projected vehicle demand and subsequently capacity surplus/deficit values across key study area screenlines (see Section 4.3.4).

A number of relevant transportation planning studies, recently completed for the City of Ottawa (or former Regional Municipality of Ottawa-Carleton), were referenced in order to estimate background traffic projections for the year 2021 on the existing arterial road network. These reports are:

- Terry Fox Drive: Highway 417 to Eagleson Road, Forecast Traffic Assessment (prepared by Morrison Herschfield, April 2001);
- Hazeldean Road: Carp Road to Terry Fox Drive, Forecast Traffic Assessment [draft] (prepared by Morrison Herschfield, June 2001); and
- Terry Fox Drive: Palladium Drive to Eagleson Road, Traffic Forecast Study (prepared by McLean Engineering, November 2001).

In all instances, we were required to finesse the traffic projections included in these reports to reflect conditions in year 2021 and in the absence of KWCP traffic².

Figure 4-35 is an excerpt from Hazeldean Road Study referred to above which shows the projected traffic volumes on that section of Hazeldean Road between Sweetnam Drive and Terry Fox Drive by 2016.

² The various traffic projections included in these reports were not necessarily for the year 2021, and the development scenarios for "Kanata West" were often considerably different from the scenario being evaluated in this particular study. Therefore, we were required to extract this source of traffic from the projections to establish baseline 2021 conditions.

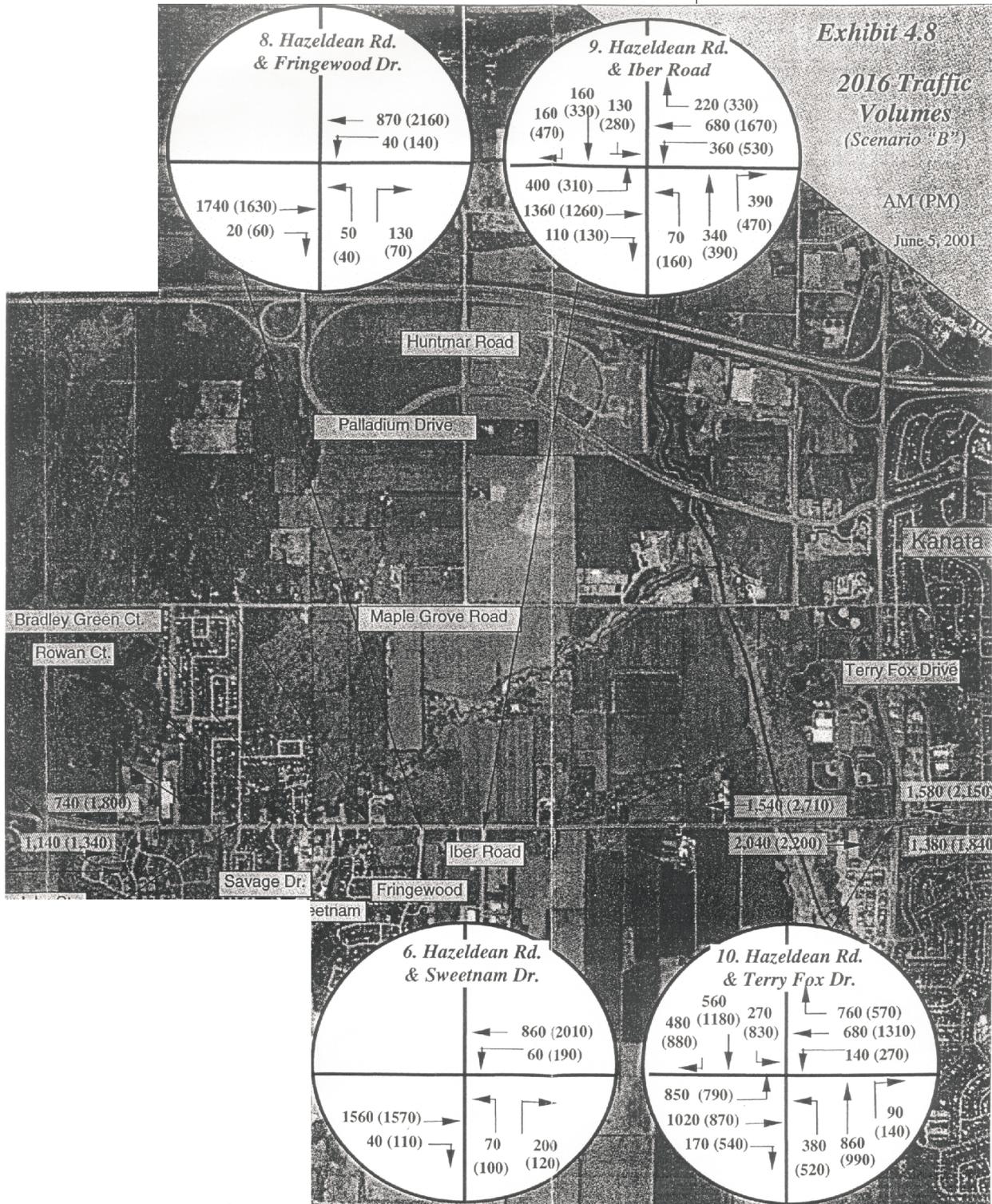


Figure 4-35:
Excerpt from Hazeldean Road Forecast
Traffic Assessment (Morrison Hershfield
Consultants)

As well as showing the projected AM and PM peak hour link volumes on Hazeldean Road, the figure also shows the peak hour turning volumes at the Terry Fox/Hazeldean intersection and the Iber/Hazeldean intersection. In preparing these traffic projections a certain amount of development was assumed to be in place in the KWCP and as shown at the Iber Road/Hazeldean Road intersection, traffic volumes have been projected to/from KWCP by way of the assumed Huntmar Road extension at Iber Road. As can be seen, the PM peak hour westbound traffic flow projected for Hazeldean Road west of Terry Fox Drive is 2710 veh/h with 2200 veh/h projected in the eastbound direction. These volumes imply a need for a six-lane cross-section west of Terry Fox Drive, protection for which has been recommended in the Hazeldean Road EA Report.

Figure 4-36 reflects the projected traffic volume on Hazeldean Road but with the effect of the KWCP traffic removed.

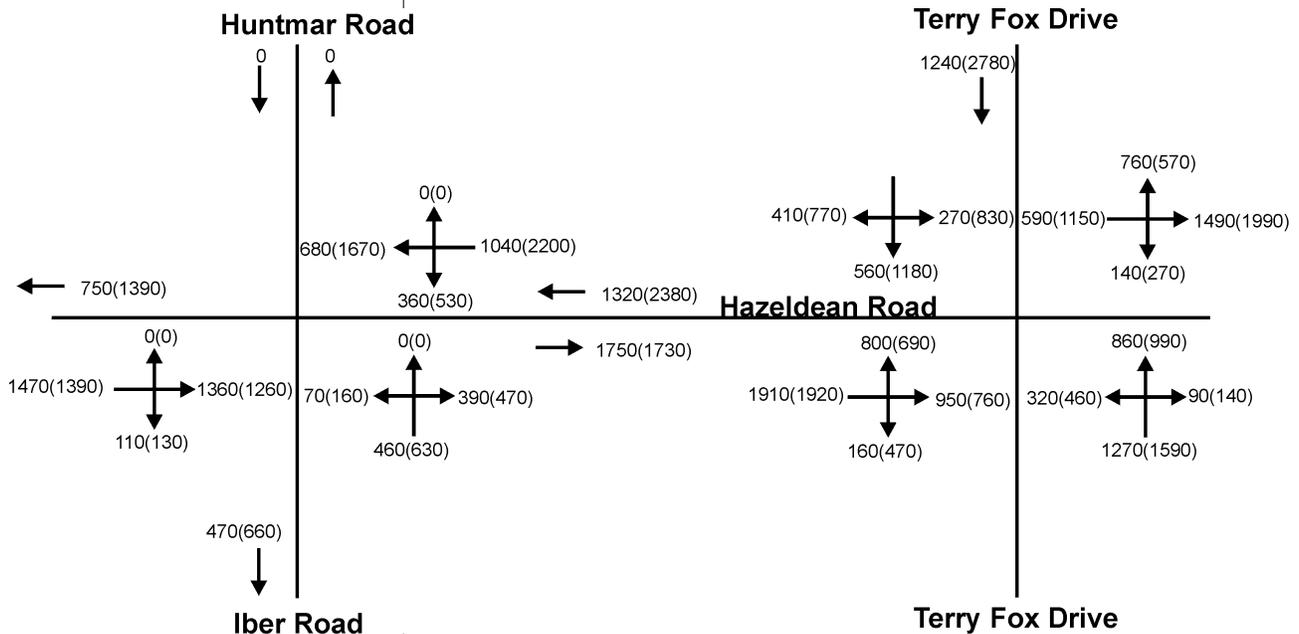


Figure 4-36: Hazeldean Road Traffic Projection for Year 2016 (PM Peak Hour) (Morrison Hershfield projection with KWCP effect removed)

As a result, the projected Hazeldean Road traffic volumes west of Terry Fox Drive range from 2380 veh/h to 2200 veh/h, westbound in the PM peak hour which is very close to warranting a six-lane cross-section. By 2021 there is no doubt that a six-lane cross section would be warranted without any effect of KWCP development.

Figure 4-37 is an excerpt from the *Terry Fox Drive: Palladium Drive to Eagleson Road Traffic Forecast Study* referred to above which shows that the projected PM peak hour traffic volumes on Terry Fox Drive north of Hazeldean Road (Hazeldean Road to Palladium Drive) are within the range of 2275 veh/h to 3280 veh/h per direction. Clearly these vol-

umes warrant a six-lane cross-section on Terry Fox Drive north of Hazeldean Road even without any impact of KWCP traffic.

As with the Hazeldean Road traffic projections, the Terry Fox Drive projections had also assumed development of KWCP.

Figure 4-38 on the next page is a modified version of the Terry Fox Drive projections with the effect of the assumed level of KWCP development removed.

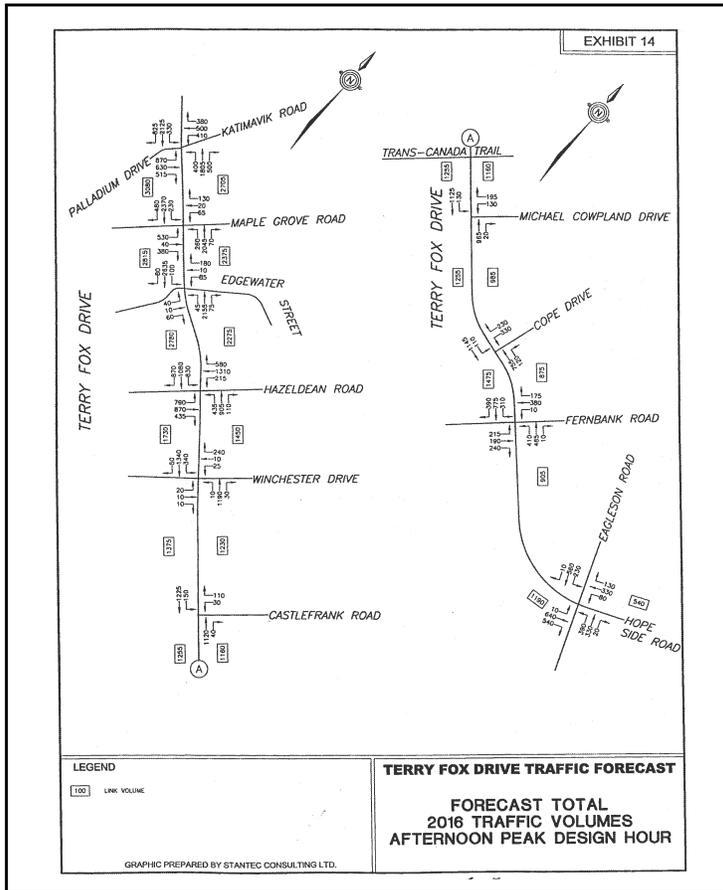


Figure 4-37
Terry Fox Traffic Projections for Year 2016
(PM Peak Hour)
[McLean Engineering projection that
includes KWCP effect]

Again, Figure 4-38 clearly shows that with a range of projected traffic volumes between 2175 veh/h and 3195 veh/h, there still is a clear need for Terry Fox Drive to become a six-lane arterial north of Hazeldean Road even without any impact of KWCP traffic.

The linkage between the findings included in these foregoing reports and the findings of this report is fundamental. For example, the relevant recommendations of these staff-endorsed reports (even in the absence of Kanata West) include:

- the need to widen Terry Fox Drive to ultimately six-lanes between Campeau Drive and Hazeldean Road; and
- the need to widen Hazeldean Road to four-lanes between Main Street (Stittsville) and Iber Road, and ultimately to six-lanes between Iber Road and Terry Fox Drive, by 2021.

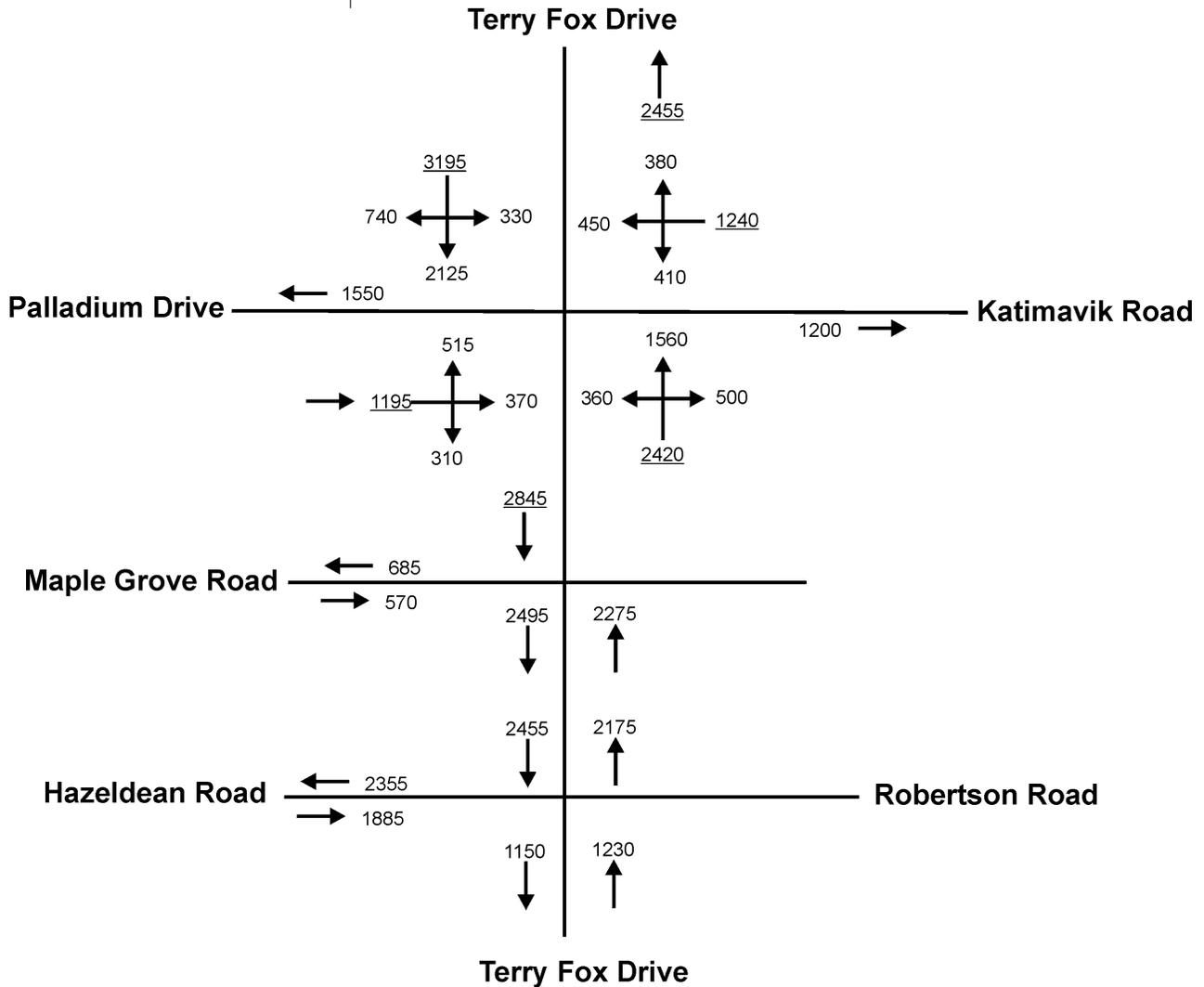


Figure 4-38:
Terry Fox Drive Traffic Projection for
Year 2016 (PM Peak Hour)
(McLean Engineering projection with
KWCP effect removed)

4.3.3 Trip Generation Analyses

As noted previously, three categories of trips were established for Kanata West, namely trips internal to the area, external trips to/from Kanata-Stittsville, and external trips to/from the balance of the National Capital Region. The discussion on preliminary trip generation findings will be presented in terms of external trips and internal trips.

4.3.3(1) External Trips

Table 4-4 provides a summary of “baseline” external person trips by each of the travel modes considered during the AM and PM peak hours. Note that single occupant vehicle (SOV) value represents the number of vehicle trips distributed and assigned to the road network. Based on the input variables presented in Tables 4-1 and 4-2, which are viewed as “reasonable”, the proposed development is projected to generate approximately 8,800 vehicle trips during the AM peak hour and 9,600 vehicle trips during the PM peak hour. As the majority of the planned development in the KWCP is employment-based, it will tend to generate more inbound

traffic (westbound) during the morning and more *outbound* traffic (eastbound) in the afternoon. This is **counter to the existing peak-period** loading on the road network which is expected to continue into the future. KWCP utilizes the spare capacity available in the non-peak direction of flow, particularly west of the Greenbelt³.

³ The peaks are practically in balance through the Greenbelt, although surplus capacity is available at present west of Eagleson Road.

Direction	AM Peak Hour				PM Peak Hour			
	SOV	Transit	Cycle and Walk	Pass.	SOV	Transit	Cycle and Walk	Pass.
Inbound (westbound)	6,424	3,502	193	1,927	3,166	1,019	54	719
Outbound (eastbound)	2,345	1,069	54	704	6,399	2,857	165	1,688
Two-Way	8,769	4,571	247	2,631	9,565	3,876	220	2,407

The above results indicate that the cycle and walk component of travel for external trips will be minimal, but that transit will play a major role. For example, assuming bus technology with capacity of 50 persons per bus, provision for 70 buses per hour in the westbound direction (AM peak hour) would be required on the rapid transit corridor to accommodate KWCP transit riders (3,500).

Table 4-4: “Baseline” Person (and Vehicle) Trip Generation Summary
(Note: Assumes input variables identical to those presented in Tables 1 and 2.)

Sensitivity Analysis

A sensitivity analysis was conducted on the key trip generation input assumption described previously. Two additional scenarios, reflecting more “conservative” and “optimistic” levels of trip generation and travel demand management (TDM), were assessed. These scenarios are summarized in Table 4-5 below, in terms of changes to input variables relative to the base case or “reasonable” scenario.

Input Variable	Scenario		
	“Conservative”	“Reasonable”	“Optimistic”
Percentage of Population Internally Employed	20%	30%	40%
Kanata-Stittsville Office % of 2021 Employment	8%	10%	12%
<i>Peak Direction Non-SOV Component</i>	22% to 42%	30% to 55%	40% to 66%

Table 4-5: Alternative Trip Generation Scenarios
(Note – “Reasonable” scenario represents the base case.)

Tables 4-6 and 4-7 respectively, provide trip generation summaries for the more conservative and optimistic TDM scenarios.

Direction	AM Peak Hour				PM Peak Hour			
	SOV	Transit	Cycle and Walk	Pass.	SOV	Transit	Cycle and Walk	Pass.
Inbound (westbound)	8,042	2,708	100	1,608	3,870	858	29	620
Outbound (eastbound)	3,069	911	29	614	7,851	2,202	86	1,416
Two-Way	11,111	3,620	128	2,222	11,722	3,059	115	2,036

Table 4-6: “Conservative” Person (and Vehicle) Trip Generation Summary

Direction	AM Peak Hour				PM Peak Hour			
	SOV	Transit	Cycle and Walk	Pass.	SOV	Transit	Cycle and Walk	Pass.
Inbound (westbound)	5,020	4,280	326	2,008	2,591	1,129	94	729
Outbound (eastbound)	1,757	1,169	92	703	5,145	3,491	277	1,749
Two-Way	6,777	5,449	418	2,711	7,736	4,620	370	2,478

Table 4-7: “Optimistic” Person (and Vehicle) Trip Generation Summary

If more conservative trip generation input assumptions are made, the proposed KWCP development is projected to generate approximately 11,000 vehicle trips during the morning peak hour (+27% relative to base case) and 12,000 vehicle trips during the afternoon peak hour (+23% relative to base case).

If more optimistic trip generation input assumptions are made, the proposed KWCP development is projected to generate approximately 6,800 vehicle trips during the morning peak hour (-23% relative to base case) and 7,700 vehicle trips during the afternoon peak hour (-19% relative to base case).

4.3.3(2) Internal Trips

The number of trips that remain internal to the KWCP plan is reflective of the percentage of population internally employed. As a “baseline”, a value of 30% has been used, although the impact of more “conservative” and “optimistic” percentages were also assessed. As noted previously, we have assumed that 50% of all internal trips will be non-auto trips (i.e., cycle, walk, transit). Table 4-8 provides a summary of trips associated with travel exclusively within the KWCP development for three levels of internalisation.

Percentage of Residents that work in KWCP	AM Peak Hour			PM Peak Hour		
	Total	Non-Auto	Auto	Total	Non-Auto	Auto
<i>Conservative (20%)</i>	1,120	560	560	1,220	610	610
<i>Baseline (30%)</i>	1,680	840	840	1,840	920	920
<i>Optimistic (40%)</i>	2,240	1,120	1,120	2,450	1,225	1,225

It is important to note that as the percentage of residents that work in Kanata West increases, the number of trips that remain internal will increase and therefore the number of external trips will decrease. Table 4-9 provides a summary of both internal and external trips associated with KWCP for the baseline scenario.

Table 4-8
Internal Person (and vehicle) Trip
Generation Summary

Source	AM Peak Hour			PM Peak Hour		
	Total	Non-Auto	Auto	Total	Non-Auto	Auto
External trips	16,218	7,449	8,769	16,080	6,503	9,565
Internal Trips	1,680	840	840	1,840	920	920
<i>Total</i>	17,898	8,289	9,609	17,920	7,423	10,485

Table 4-9: Total Person (and Vehicle)
Trip Generation Summary

4.3.4 Projected Traffic Conditions

The vehicle trips resulting from the foregoing analyses of trip generation were subsequently distributed and assigned to the proposed road network in order to determine the road network requirements associated with KWCP. The analyses of projected traffic volumes are presented in terms of the three levels discussed previously. These include a *Regional Overview*, the *Internal Transportation Network*, and *Arterial Road / Internal Road Interface*.

4.3.4(1) Regional Overview

The objective of this level of analysis is to assess, from a broad, macro perspective, the transportation infrastructure needs that may be required to support traffic generated by the proposed KWCP. The emphasis of this level of analysis is on identifying potential capacity deficits across primary travel corridors in Kanata. Projected traffic crossing two screenlines, which are imaginary lines drawn across all major transportation facilities in a corridor, were used as the basis of this assessment. The two screenlines analyzed were the Eagleson Road and Terry Fox Drive screenlines. It is important to note that all subsequent screenline analyses are based on the “baseline” trip generation scenario.

Eagleson Screenline

The Eagleson Screenline is located just to the east of Eagleson Road and captures the majority of the trips crossing the Greenbelt to and from Kanata-Stittsville. The location and important screenline characteristics are summarized in Figure 4-39.

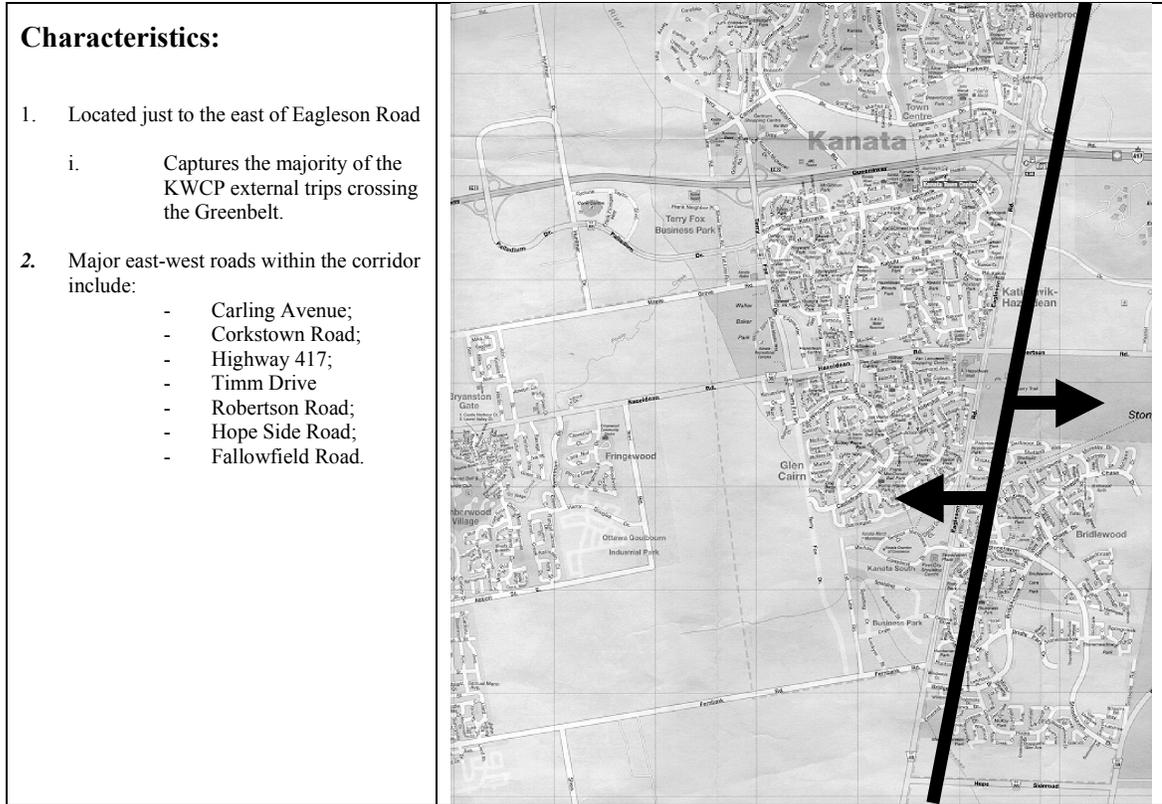


Figure 4-39: Eagleson Screenline Characteristics

KWCP Site-Generated Traffic Volumes

The results of the assignment of site-generated traffic across the Eagleson Screenline are presented in Table 4-10 in terms of both vehicles and passenger car units (PCU)⁴.

Direction	AM Peak Hour		PM Peak Hour	
	veh	PCU	veh	PCU
Inbound (westbound)	4,560	5,245	2,795	3,215
Outbound (eastbound)	2,015	2,315	4,770	5,485
Two-Way Total	6,575	7,560	7,565	8,700

Note: PCU are passenger car units = vehicles x 1.15

Table 4-10: Projected Site-Generated Vehicle Trips at Eagleson Screenline

Background Traffic Volumes

Travel demand forecasts for 2021 based on the current ROP indicate that a total of 19,750 person trips are projected to cross the Eagleson Road Screenline in the westbound direction during the critical PM peak hour⁵. These 1997 Official Plan travel demand projections break down as follows:

Person trips by mode:

• Walking (1%)	200
• Cycling (2%)	400
• TDM (4%)	800
• Transit (25%)	4,950
• Auto (68%)	<u>13,400</u>
Total	19,750

Vehicle trips:

- Auto (at 1.3 vehicle occupancy) = 13400 ÷ 1.3 = 10,300 veh
- PCU (assume 1.15 equivalency) = 10300 x 1.15 = 11,850 PCU

Screenline Capacity

By the year 2021, the current Official Plan assumes the following directional capacities across the Eagleson Road Screenline due to road widenings and other transportation system improvements:

Link:	Directional Capacity
• Carling Avenue (widen to four lanes)	2,200 PCU
• Corkstown Road (remains two lanes)	450 PCU
• Highway 417 (widen to six lanes)	6,600 PCU
• Timm Drive (remains two lanes)	450 PCU
• Robertson Road (remains four lanes)	2,200 PCU
• Hope Side Road (widen to four lanes)	2,200 PCU
• Fallowfield Road (remains two lanes)	<u>1,100 PCU</u>
	Sub-Total 15,200 PCU
• Plus allowance for Transportation System Management (5%)	<u>800 PCU</u>
Revised Total Capacity (one-way)	16,000 PCU

The 1997 Official Plan widenings and development scenario would leave **4,150 PCU** surplus capacity (16,000 – 11,850) available for KWCP traffic to use in both peak and off-peak directions as it is assumed that by 2021 there will be balanced flow through the Greenbelt without KWCP.

Additional Road Network Requirements

As noted in Table 4-10, the projected KWCP traffic to cross the Eagleson Screenline during the PM peak hour is **3,215 PCU** in the westbound direction and **5,485 PCU** in the eastbound direction. The combination of these KWCP site-generated volumes and the projected background traffic volumes yield a **capacity surplus** of **935 PCU** westbound and a **capacity deficit** of **1,335 PCU** eastbound.

⁴ The conversion to PCU is required to be consistent with terminology used within the Official Plan/Transportation Master Plan. Note that 1 vehicle is assumed equivalent to 1.15 passenger car units, reflecting the heavy vehicle component of total traffic on the road network.

⁵ The background land use assumptions for Kanata and Stittsville are contained in the 1997 (current) Regional Official Plan. It should be noted that a new City Official Plan is being prepared, which may see an even larger Kanata - Stittsville area. This larger area would require additional infrastructure in its own right over and above what is currently committed. Therefore, the analysis for the KWCP will assume the current (approved) development thresholds for Kanata - Stittsville. In the current plan, a total of 40,500 dwelling units and 46,500 jobs are projected for the area.

As this additional road capacity is over and above the residual attained through current committed widenings and improvements, the following are potential solutions to address this deficiency across the Eagleson Road Screenline:

- 1) **Increase Transit Share of Kanata – Stittsville Travel**
A 5 percentile increase in the projected transit share to 30% would reduce the projected traffic demand by 800 PCU.
- 2) **Interprovincial Bridge Between Kanata and Aylmer**
This measure could reduce peak hour directional flow through the Greenbelt by at least 5% (600 PCU).
- 3) **Widen Fallowfield Road to increase capacity at the Eagleson Screenline.**
This would cater to the existing/future travel to/from the South Nepean/Riverside South growth areas by way of the Strandherd/Armstrong corridor. A four-lane arterial would provide at least 1,200 additional PCU of capacity.
- 4) **Outer Ring Road to / from Highway 417 west of Stittsville.**
This measure could reduce peak hour directional flow on Highway 417 through Greenbelt by at least 5% (600 PCU).
- 5) **Widen Highway 417 between Kanata and Highway 416 from six to eight lanes.**
This would provide additional capacity in the order of 2,200 PCU per lane.

The combined effect of a 5% transit share increase and a new inter-provincial bridge at Kanata North (Items 1 and 2) could reduce the PM peak hour demand through the Greenbelt at the Eagleson Road Screenline by 1,400 PCU, leaving a net demand of 10,450 PCU by 2021, without KWCP. As the future potential capacity would be approximately 16,000 PCU, there would be a potential surplus of 5,550 PCU capacity available for KWCP. This surplus would just satisfy the projected PM peak hour demand for KWCP of 5,485 PCU. However, in order to ensure that all the road links crossing the Eagleson Road Screenline are not operating at capacity and as the delivery of a transit share target of 30% and the construction of a west end interprovincial bridge cannot be guaranteed with any certainty by 2021, the four-laning of Fallowfield Road which is within the control of the City of Ottawa, and which would cater to the increased travel demand between Nepean South/Riverside South and the KWCP, is recommended to be included as a requirement of the KWCP development at maturity.

Were Highway 417 to become an eight-lane freeway west of Moodie Drive, the need to widen Fallowfield Road to four-lanes would be removed and there would be surplus capacity in place for the additional traffic resulting from 'build-out' of Kanata/Stittsville.

Projected Traffic Distribution by 2021: Eagleson Road Screenline

As previously indicated, the projected PM peak hour demand at the Eagleson Road Screenline could be 11,850 PCU per direction, without any effect from KWBP. This demand could be reduced by up to 1,400 PCU by a combination of a 5% increase in transit share (800 pcu reduction) and a new Interprovincial Bridge (600 pcu reduction). Based on the assumption that only the transit share increase is achieved resulting in a future screenline demand of approximately 11,000 PCU, and that the available capacity has been increased by the four-laning of Fallowfield Road to give a total available capacity of approximately 17,100 PCU (16,000 + 1,100), the following exhibit, Figure 4-40, illustrates the assumed distribution of traffic at the Eagleson Road Screenline at 2021 with the effect of KWCP, in addition to the proposed growth of Kanata/Stittsville by that time in accordance with the current ROP.

Eagleson Road Screenline	Baseline Traffic (as per ROP)	KWCP Site Traffic	Total Traffic	
	1500	0	1500	Carling Avenue
	1900	100	2000	(4 lanes)
	300	100	400	Corkstown Road
	300	150	450	(2 lanes)
Highway 417	5200	1300	6500	Highway 417
(6 lanes)	4800	1900	6700	(6 lanes)
Katimavik Road	300	100	400	Timm Drive
(2 lanes)	300	150	450	(2 lanes)
Hazeldean Road	1400	500	1900	Robertson Road
(4 lanes)	1400	900	2300	(4 lanes)
	1300	500	1800	Hope Side Road
	1300	1000	2300	(4 lanes)
	1000	700	1700	Fallowfield Road
	1000	1300	2300	(4 lanes)

Figure 4-40:
Projected Traffic Distribution
Eagleson Road Screenline (six-lane
Highway 417) PCU PM Peak Hour

Figure 4-41, illustrates the projected distributions of traffic at the Eagleson Road Screenline by 2021 if Highway 417 were to be widened to eight-lanes, eliminating the need to four-lane Fallowfield Road related to KWCP development.

	<i>Baseline Traffic (as per ROP)</i>	<i>KWCP Site Traffic</i>	<i>Total Traffic</i>	
Eagleson Road Screenline	1400	0	1400	<i>Carling Avenue</i>
	1800	100	1900	<i>(4 lanes)</i>
	200	50	250	<i>Corkstown Road</i>
	200	100	300	<i>(2 lanes)</i>
Highway 417 (8 lanes)	5800	2200	8000	<i>Highway 417</i>
	5400	3400	8800	<i>(8 lanes)</i>
Katimavik Road (2 lanes)	200	50	250	<i>Timm Drive</i>
	200	100	300	<i>(2 lanes)</i>
Hazeldean Road (4 lanes)	1300	400	1700	<i>Robertson Road</i>
	1300	900	2200	<i>(4 lanes)</i>
	1200	300	1500	<i>Hope Side Road</i>
	1200	600	1800	<i>(4 lanes)</i>
	900	200	1100	<i>Fallowfield Road</i>
	900	300	1200	<i>(2 lanes)</i>

Figure 4-41:
Projected Traffic Distribution
Eagleson Road Screenline (eight-lane
Highway 417)
PCU PM Peak Hour

Terry Fox Screenline

The Terry Fox Screenline is located just to the west of Terry Fox Drive and captures the majority of external trips to and from the east, including those bound to other parts of Kanata (i.e., Kanata North and Kanata South Business Parks) and the balance of the National Capital Region. The location and important screenline characteristics are summarized in Figure 4-42.

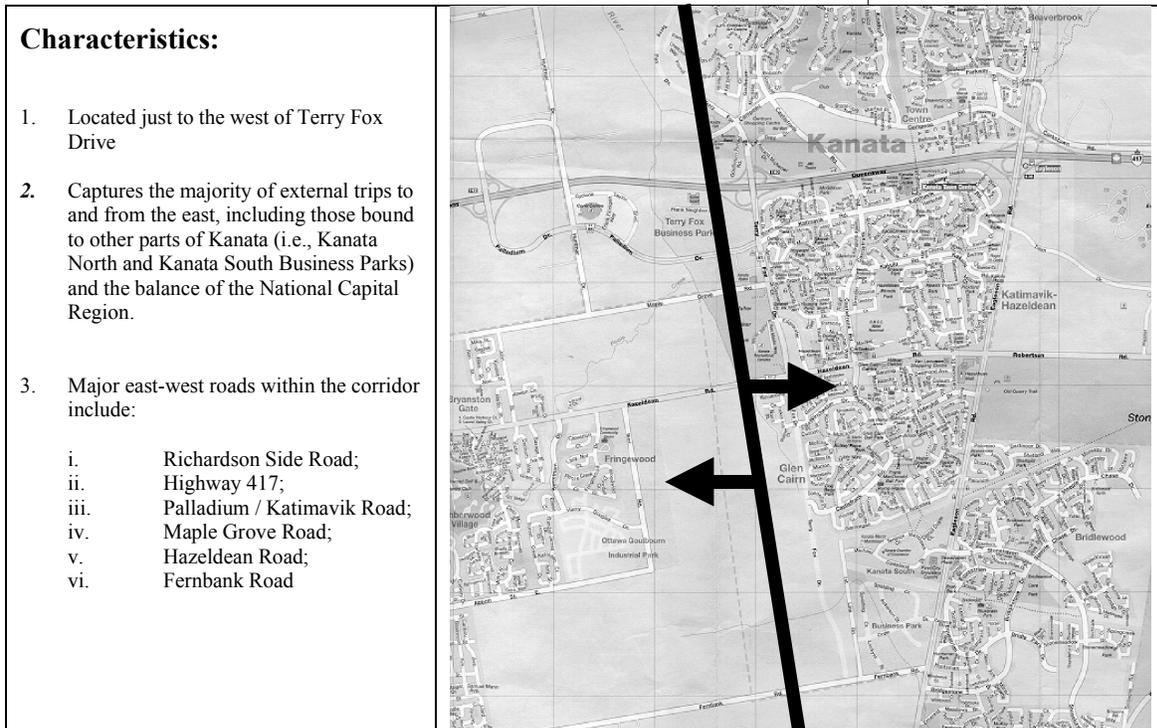
KWCP Site-Generated Traffic Volumes

The results of the assignment of site-generated traffic across the Terry Fox Drive Screenline are presented in Table 4-11.

Direction	AM Peak Hour		PM Peak Hour	
	veh	PCU	veh	PCU
Inbound (westbound)	5,945	6,835	2,980	3,425
Outbound (eastbound)	2,230	2,565	5,945	6,835
Two-Way Total	8,175	9,400	8,925	10,260

Note: PCU are passenger car units = vehicles x 1.15

Table 4-11: Projected Site-Generated Vehicle Trips at Terry Fox Screenline



Background Traffic Volumes

Unlike the Eagleson Road Screenline, no travel demand forecasts from the ROP/TMP analysis were available to represent background traffic generated by growth in Kanata – Stittsville. It was therefore assumed that the current total traffic volume crossing the screenline will double by 2021, as this would reflect the projected doubling of the Kanata – Stittsville population from its current levels by that time. The resultant PM peak hour background traffic demand by 2021 across the Terry Fox Screenline is, therefore, **10,000 PCU** westbound and **8,000 PCU** eastbound which corresponds to an average annual rate of growth of approximately 3.6% over the next 20 years.

Figure 4-42: Terry Fox Screenline Characteristics

Screenline Capacity

By the year 2021, the current Official Plan assumes the following directional capacities across the Terry Fox Drive Screenline due to road widenings and other transportation system improvements.

Link:	<u>Directional Capacity</u>
• Richardson Side Road (remains two lanes)	450 PCU
• Campeau Drive (provide four lanes)	2,200 PCU
• Highway 417 (widen to six lanes)	6,600 PCU
• Palladium Drive (remains four lanes)	2,200 PCU
• Maple Grove Road (remains two lanes)	1,000 PCU
• Hazeldean Road (widen to four lanes)	2,200 PCU
• Fernbank Road (remains two lanes)	<u>1,000 PCU</u>
	Sub-Total 15,650 PCU
• Plus allowance for Transportation System Management (5%)	<u>750 PCU</u>
	Revised Total Capacity (one-way) 16,400 PCU

The 1997 Official Plan widenings and development scenario would leave **6,400 PCU** surplus capacity (16,400 – 10,000) available for KWCP traffic to use in the westbound direction and **8,400 PCU** surplus capacity (16,400 – 8,000) in the eastbound direction during the PM peak hour at 2021.

Additional Road Network Requirements

As noted in Table 4-11, the projected KWCP traffic to cross the Terry Fox Drive Screenline during the PM peak hour is **3,425 PCU** in the westbound direction and **6,835 PCU** in the eastbound direction. The combination of these KWCP site-generated volumes and the projected background traffic volumes yield a **capacity surplus** of approximately **3,000 PCU** westbound and **1,550 PCU** eastbound.

The provision of a six-lane cross-section, as warranted by the projected traffic volumes for the Hazeldean Road Environmental Assessment, instead of the four-lane cross-section recommended in the ROP/TMP and assumed above, would add an additional 1,100 PCU approximately to the Terry Fox Drive Screenline capacity and would bring the total potential capacity available by 2021 to approximately 17,500 PCU per direction.

Projected Traffic Distribution by 2021: Terry Fox Drive Screenline

As indicated above, the projected PM peak hour traffic demand at the Terry Fox Drive Screenline by 2021 is 10,000 PCU westbound and 8,000 pcu eastbound - both without the effect of KWCP.

In the PM peak hour KWCP is projected to add a further 6,835 PCU to the eastbound flow and 3,425 PCU to the westbound flow resulting in a total eastbound demand of approximately 14,850 PCU and a total westbound demand of approximately 13,450 PCU.

Figure 4-43 illustrates the distribution of these projected traffic volumes on the various links which cross the Terry Fox Drive Screenline and is based on the assumption that Highway 417 will be widened to six-lanes and that Hazeldean Road will also be six-laned between Iber Road and Terry Fox Drive, as is recommended in the Hazeldean Road Environmental Study Report.

	Baseline Traffic (as per ROP)	KWCP Site Traffic	Total Traffic	
Richardson Side Road (2 lanes)	100 100	100 300	200 400	Terry Fox Screenline
Campeau Drive (4 lanes)	200 200	500 1500	700 1700	Campeau Drive (4 lanes)
Highway 417 (6 lanes)	4000 3400	1500 2350	5500 5750	Highway 417 (6 lanes)
Palladium Drive (4 lanes)	1600 1200	400 800	2000 2000	Katimavik Road (2 lanes)
Maple Grove Road (2 lanes)	700 600	300 400	1000 1000	
Hazeldean Road (6 lanes)	2400 1900	600 1100	3000 3000	Hazeldean Road (4 lanes)
Fernbank Road (2 lanes)	1000 600	50 400	1050 1000	Fernbank Road (2 lanes)

Figure 4-43:
Projected Traffic Distribution
Terry Fox Screenline (six-lane Highway
417 and Hazeldean Road)
PCU PM Peak Hour

Figure 4-44 illustrates the projected distribution of traffic on the various links crossing the Terry Fox Screenline, but assumes that Highway 417 has become an eight-lane freeway by 2021.

	Baseline Traffic (as per ROP)	KWCP Site Traffic	Total Traffic	Terry Fox Screenline
Richardson Side Road (2 lanes)	100	50	150	
Campeau Drive (4 lanes)	100	400	500	Campeau Drive (4 lanes)
Highway 417 (6 lanes)	5200	2300	7500	Highway 417 (6 lanes)
Palladium Drive (4 lanes)	1200	300	1500	Katimavik Road (2 lanes)
Maple Grove Road (2 lanes)	500	100	600	
Hazeldean Road (4 lanes)	2000	300	2300	Hazeldean Road (4 lanes)
Fernbank Road (2 lanes)	900	0	900	Fernbank Road (2 lanes)

Figure 4-44:
Projected Traffic Distribution
Terry Fox Screenline (eight-lane Highway
417)
PCU PM Peak Hour

If Highway 417 were widened to eight lanes as shown in Figure 4-40, the six-laning of Hazeldean Road would likely be postponed beyond 2021.

4.3.4(2) Internal Transportation Network

The internal transportation network required to support KWCP would consist of the following elements:

- Pedestrian and Bicycle Network
- Transit Network
- Road Network

Each of these elements are illustrated conceptually in Figure 1 and discussed as follows.

Pedestrian and Bicycle Network

Pedestrian and bicycle linkages have been identified within all river and creek corridors. In addition to those linkages within naturally occurring corridors that cater predominantly to recreational activities, a number of complementing linkages within road corridors have been identified.

The complete listing of pedestrian and bicycle linkages include:

- Carp River;
- Feedmill Creek;
- Poole Creek;
- Hazeldean Creek;
- Campeau Drive (between western site limit and the Carp River);
- Palladium Drive (between western site limit and the Carp River); and
- North-South Arterial (between Campeau Drive and Feedmill Creek and between Palladium Drive and Poole Creek).

In accordance with current ROP policy, all arterials and bus routes will be provided with sidewalks and on-road bicycle facilities.

Rapid Transit Network

The provision of a high-quality transit service to KWCP is essential to the development of a transportation servicing strategy and infrastructure network to support the amount of KWCP development being proposed. The foregoing analysis of trip generation indicates that in the order of 50 to 75 transit buses (or equivalent transit capacity) per hour would be required to achieve the desired levels of transit modal share. This level of transit vehicle activity warrants the provision of a dedicated transit corridor (bus or light-rail).

The currently planned terminus of the proposed West Transitway is Kanata Centrum, which is situated north of Highway 417 and east of Terry Fox Drive. While ROPA 9 did not identify a transitway corridor as part of the necessary transportation infrastructure needs, the extension of this dedicated transit facility from Kanata Centrum, through to the core of KWCP has been assumed. It is recognized that the planning and development of the KWCP should not preclude the possible longer-term rapid-transit plans to link Kanata to the suburban growth areas to the south and east (Kanata South, Nepean South, Riverside South and Leitrim). Accordingly, a dedicated transit corridor is provided in the KWCP extending from the core area south to Hazeldean Road. The following three distinct segments of this proposed corridor in support of KWCP have been identified:

Kanata Centrum to Huntmar (north of Highway 417)

This 2.0 km segment would be generally at-grade and would parallel Highway 417 to the north. Two stations would likely be required – one at the southwest corner of the community level retail zone and one at the entry to the high profile employment/entertainment/leisure hub.

Huntmar (north of Highway 417) to Palladium Drive

This 1.0km segment must cross over Highway 417 and continue grade-separated immediately to the west of the Corel Centre (to avoid conflict with the existing truck loading area). One landmark station at the Corel Centre would be required. The feasibility of a Park-and-Ride lot at the Corel Centre should be examined.

Palladium Drive to Hazeldean Road

This 1.5km segment will be a blend of grade-separated and at-grade construction. Transit stations would be located within the institutional/corporate campus zone, the major facilities zone, and immediately north of Hazeldean Road. The feasibility of a Park-and-Ride lot at the Hazeldean Road location should be examined.

Road Network

The internal road network required to accommodate the proposed KWCP would consist of upgrading the existing road network within the study limits, supplemented by a number of new arterial, collector and local roads.

Campeau Drive (four-lane minor arterial)

The extension of Campeau Drive westerly from Terry Fox Drive through to the western limit of the KWCP will be required. Note that the segment west of the proposed North-South Arterial (Stittsville By-pass) should be provided as a two-lane local subdivision road. The proposed road network should not preclude the possibility of further extending Campeau Drive from the western limit of the site to Carp Road (if future development warrants).

Palladium Drive (four-lane minor arterial / two-lane major collector)

The extension of Palladium Drive, westerly from Huntmar Drive through to the western limit of the KWCP will be required. Note that the segment west of the North-South Arterial should be provided as a two-lane local subdivision road. The proposed road network should not preclude the potential of further extending Palladium Drive southerly, as a two-lane major collector, linked to Main Street (Stittsville) should the City wish to do this at some time. This connection would provide a direct access to Highway 417 for Stittsville traffic, but is not required to support KWCP based on the projected traffic volumes for the proposed level of development.

Maple Grove Road (four-lane minor arterial)

The existing Maple Grove Road extends as a two-lane rural cross-section from Terry Fox Drive to just west of John Street. The proposed internal road network calls for upgrading the segment between Huntmar Road (extension) and Terry Fox Drive to a four-lane minor arterial. West of Huntmar Road, it is recommended that Maple Grove Road be offset 50m north to avoid alignment issues with the North-South Arterial, to minimize property impacts, and to minimize the

use of John Street. The segment between Huntmar Road and the North-South Arterial should be provided as a four-lane minor arterial, while the segment west of the North-South Arterial should be provided as a two-lane local subdivision road.

North-South Arterial (four-lane major arterial)

The North-South Arterial is envisioned to be a four-lane major arterial that links the KWCP with Highway 417 via the existing under-utilized Palladium Drive interchange (including the existing north/south segments of the Palladium Drive interchange loops). To support KWCP development, a four-lane cross section will be required only between Campeau Drive and Palladium Drive and two-lane cross section will be sufficient between Palladium Drive and Hazeldean Road. In the longer term, the By-pass could be extended southerly (beyond its required terminus at Hazeldean Road) to link into the South Urban Community at which time a four-lane cross section would be desirable. Furthermore, the proposed road network should not preclude the possibility of further extending the North-South Arterial northerly towards Richardson Side Road (if future development warrants).

A parkway type environment, including more limited access opportunities and well-landscaped berms, may be most suitable for this facility.

Huntmar Road (four-lane minor arterial)

The extension of Huntmar Road southerly from Maple Grove Road to Hazeldean Road will be required to provide access to Hazeldean Road and to alleviate the use of John Street by “through” traffic. Note that the connection at Hazeldean Road will be at Iber Road. Appropriate upgrading to a two-lane urban cross section north of Campeau Drive will be required, and provision of a four-lane urban cross-section will be required between Campeau Drive and the North-South Arterial. Between the North-South Arterial and Hazeldean Road, a two-lane cross-section will be sufficient.

Table 4-12 reflects the existing and recommended rights-of-way (ROWs) for KWCP’s proposed road system.

The above-noted road ROWs include median, vehicle lanes, bicycle accommodation, boulevard, sidewalk and a planting zone.

Road Link	Description	Existing ROW (as per ROP)	Recomm. Lane and ROW
Campeau Drive	<i>Eagleson to Terry Fox (existing)</i>	(40.0m)	
	Extension westerly from Terry Fox to Huntmar	-	4 (37.5m)
	Extension westerly from Huntmar to Stittsville By-pass	(40.0m)	4 (37.5m)
	Extension westerly from Stittsville By-pass to western site limit		4 (37.5m)
Palladium Drive	<i>Terry Fox to Silver Seven (existing)</i>	(26.0m)	
	<i>Silver Seven to Huntmar (existing)</i>	(40.0m)	
	Extension westerly from Huntmar to Stittsville By-pass	(40.0m)	4 (37.5m)
	Extension westerly from Stittsville By-pass to western site limit	-	2 (26.0m)
	Extension southerly from western site limit to Hazeldean (at Main St)	-	2 (26.0m)
Maple Grove Road	<i>Widening (2 to 4 lanes) between Terry Fox and Huntmar (existing)</i>	(37.5m)	4 (37.5m)
	Relocation between Huntmar and Stittsville By-pass	-	4 (37.5m)
	Relocation between Stittsville By-pass and western limit of site	-	2 (26.0m)
Hazeldean Road	<i>Eagleson to Main (existing)</i>	(34.0m)	
Hope Side Road	<i>Eagleson to Richmond (existing)</i>	(40.0m)	
Fallowfield Road	<i>Eagleson to Hwy 416 (existing)</i>	(34.0m)	
Carp Road	<i>Hazeldean to Hwy 417 (existing)</i>	(30.0m)	
Main Street	<i>Hazeldean to Carp (existing)</i>	(34.0m)	
	<i>Carp to Fernbank (existing)</i>	(23.0m)	
Stittsville By-pass	<i>Palladium Drive Interchange Loop (existing)</i>	(40.0m)	
	Extension southerly between Palladium (extension) and Huntmar	-	4 (37.5m)
	Extension southerly between Huntmar and Hazeldean	-	4 (37.5m)
	Extension southerly between Hazeldean and SUC	-	4 (37.5m)
Huntmar Road	Upgrading between Richardson and Campeau (extension)	(37.5m)	4 (37.5m)
	Widening (2 to 4 lanes) between Campeau (extension) and Palladium	(40.0m)	4 (37.5m)
	Extension southerly from Palladium to Stittsville By-pass	(37.5m)	4 (37.5m)
	Extension southerly from Stittsville By-pass to Hazeldean	-	4 (37.5m)
Terry Fox Drive	<i>Hazeldean to Hwy 417 (existing)</i>	(40.0m)	
Eagleson Road	<i>Fallowfield to Hope Side (existing)</i>	(34.0m)	
	<i>Hope Side to Hwy 417 (existing)</i>	(40.0m)	

Table 4-12:
Potential Road Right-of-Way (ROW)
Requirements

For a Transitway corridor, a 14.5m ROW is considered appropriate to accommodate the required number of travel lanes. At Transitway stations, ROW requirements are typically increased to between 30.0m and 40.0m (station length of 200m). ROW requirements for a light-rail corridor would be less than these.

Figure 4-45 illustrates the PM peak hour site traffic projections on the proposed internal concept plan road network, reflecting the Highway 417 widening to six-lanes.

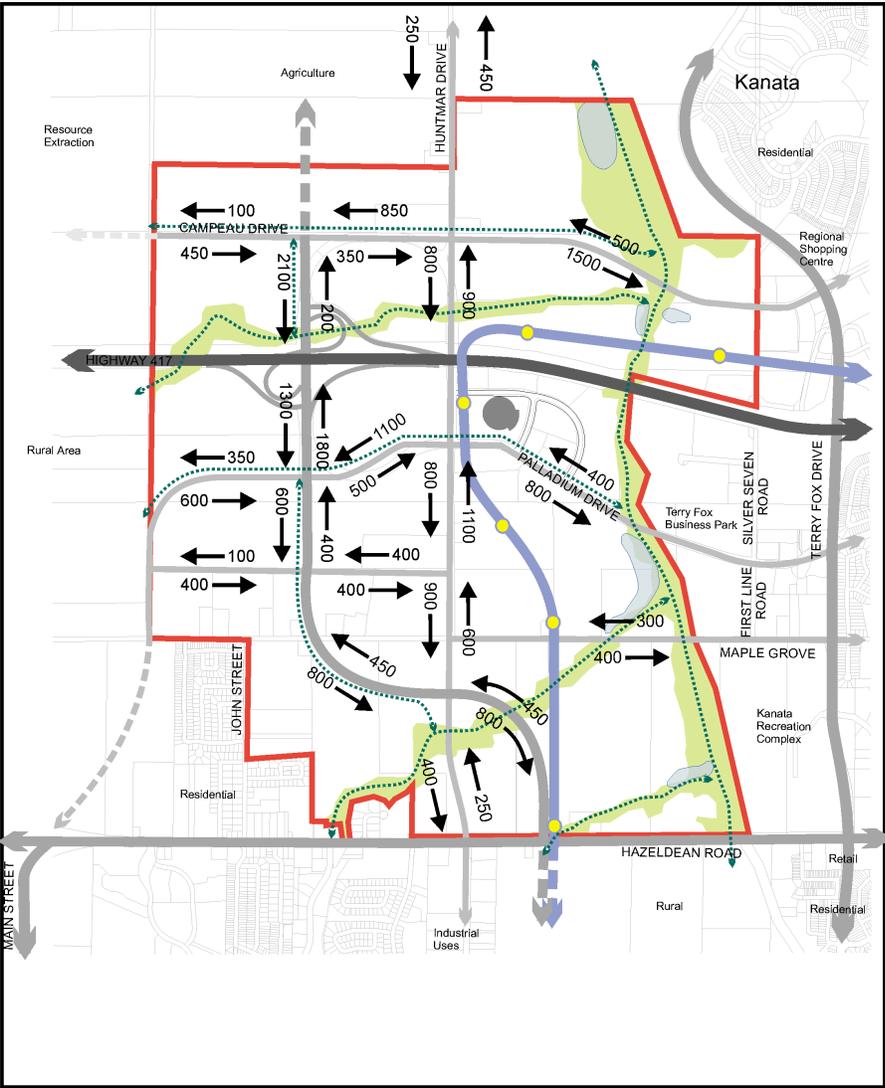


Figure 4-45: Projected Site Traffic Primary Internal Road Network (six-lane Highway 417) PCU PM Peak Hour

4.3.4(3) Implications for the City Road Network near KWCP

This section of the report elaborates on the potential implications of the proposed KWCP on a number of existing/proposed major roads in the vicinity of the inter-face between KWCP and Kanata.

The roads in question include Campeau Drive, Palladium Drive, Katimavik Road, Maple Grove Road, Hazeldean Road, Fernbank Road and Terry Fox Drive.

Campeau Drive

The extension of Campeau Drive westwards from Terry Fox Drive to the Huntmar Road interchange as a four-lane arterial will provide access and

capacity for that part of the development north of Highway 417. Due to the heavy traffic volumes that will eventually materialize on Terry Fox Drive as it becomes a six-lane corridor, there may be limited opportunities for traffic to turn to/from Terry Fox Drive and thus traffic is likely to continue through Kanata on Campeau Drive to the Castlefrank Road Corridor and to the March/Eagleson Corridor.

The likelihood of Campeau Drive having to be six-lanes between Terry Fox Drive and Castlefrank Road to deal with the combined traffic from KWCP and Kanata Centrum has been addressed and included in the infrastructure costs.

If Highway 417 is widened to eight lanes, it will remove the constraint on the use of Highway 417 east of Kanata through the Greenbelt and the consequent excess capacity available west of Terry Fox Drive will result in an easing of traffic volumes utilizing the other east/west corridors such as Campeau Drive, Palladium Drive and Hazeldean Road. Subject to the Huntmar Road Interchange being able to process the very large volumes of traffic to/from KWCP, the City road network will experience considerable benefits, and in such circumstances, the six-laning of Campeau Drive east of Terry Fox Drive is not likely to be needed for the KWCP development.

Palladium Drive

It has been assumed that Palladium Drive will remain as a four-lane arterial, providing a major component of the transportation service to the KWCP. Increasing traffic volumes on Palladium Drive will generate heavy turning volumes on Terry Fox Drive and the potential for increased traffic volumes on Katimavik Road as this roadway becomes increasingly used by work trips to/from Kanata, as well as, trips accessing Highway 417 by way of the proposed new Castlefrank Road Interchange.

Katimavik Road

Increasing traffic volumes on Palladium Drive and increasing congestion on the six-lane Terry Fox Drive will mean additional traffic flows on Katimavik Road as both Kanata and KWCP grow towards build-out, with a six-lane Highway 417.

The current ROP identifies Katimavik Road as a future arterial (Regional Road) and the TMP identified the four-laning from Castlefrank Road to Eagleson Road as a project required by 2021.

Widening of Katimavik Road between Terry Fox Drive and Castlefrank Road has not been identified as a requirement by 2021 for the KWCP development, although increasing congestion can be anticipated during peak periods.

As previously noted, an eight-laning Highway 417 will have a positive affect on the use of Katimavik Road by KWCP traffic.

Maple Grove Road

ROPA 9 had identified the potential widening of Maple Grove Road to a four-lane cross-section. However, the availability of capacity on Highway 417 (six-lanes), Palladium Drive (currently four-lanes) and the eventual six-laning of Hazeldean Road, will minimize traffic volumes on Maple Grove Road. Its eventual four-laning will depend very much on the eventual land uses that are developed along it and whether it will function as a main-street requiring on-street parking. Four-laning is not likely to be needed for capacity purposes, even if Highway 417 remains as a six-lane freeway.

Hazeldean Road

As mentioned above, the recently completed traffic projections prepared for the Hazeldean Road Environmental Assessment Study indicated sufficient traffic on Hazeldean Road between Iber Road and Terry Fox Drive (even without any Kanata West component) to warrant six-laning before 2021. This is a major finding in light of the conclusion reached in the 1997 ROP/TMP that four-laning would be sufficient by 2021.

This study has therefore assumed that Hazeldean Road will be six-laned between Terry Fox Drive and Iber Road and four-laned between Iber Road and Main Street by 2021 and has allocated traffic accordingly in the six-lane Highway 417 scenario.

Due to the considerable amount of projected traffic between Kanata, KWCP and the Nepean South and Riverside South growth centres, and the resultant use of east-west capacity through the Greenbelt in the Hope Side Road and Fallowfield Road corridors, along with Fallowfield Road being four-laned from Eagleson Road to Strandherd Drive, Hazeldean Road is assumed to provide a major amount to the road capacity needs for KWCP.

It is anticipated that due to KWCP development and increased traffic from Kanata/Stittsville growth, Hazeldean Road will be operating at, or near capacity, during peak periods by 2021. As shown in Figure 4-40 however, if Highway 417 were to be eight-laned, the need to widen Hazeldean Road between Iber Road and Terry Fox Drive to six-lanes can likely be postponed beyond 2021.

Fernbank Road

Increasing interaction between KWCP and suburban growth in Nepean South/Riverside South/Leitrim also requires Fernbank Road to provide some of the needed east-west capacity in the scenario where Highway 417 is only six-laned.

In order for this to happen, it is proposed to extend Iber Road south to Fernbank Road. Fernbank Road would remain a two-lane road, experiencing increasing traffic volumes up to its capacity.

The eight-lane Highway 417 scenario removes the need for Fernbank Road to be part of the KWCP solution.

Terry Fox Drive

The recently completed traffic forecast for Terry Fox Drive between Palladium Drive and Eagleson Road (prepared by McLean Transportation Engineering Consultant Ltd.) concluded that six-laning of Terry Fox Drive north of Hazeldean Road and four-laning south of Hazeldean Road was warranted.

City staff have recognized this change in conclusion compared to the current ROP/TMP. The additional traffic on Terry Fox Drive resulting from the KWCP development will add considerable turning volumes to/from Terry Fox Drive. As a result, any spare capacity provided eventually by the City of Ottawa (six-lanes) between Campeau Drive and Hazeldean Road will be largely utilized by KWCP traffic in the scenario where Highway 417 has only six-lanes.

South of Hazeldean Road, due to the increasing traffic flows through the Greenbelt by way of Hope Side Road and Fallowfield Road, sufficient additional traffic will utilize Terry Fox Drive to warrant expansion to six-lanes between Hazeldean Road and Eagleson Road by 2021.

These additional traffic volumes on the Kanata South arterial network will also require the four-laning of Eagleson Road from Hope Side Road to Fallowfield Road.

In the scenario where Highway 417 is eight-laned, the redirection of traffic to the Highway 417 corridor will ease the demands placed upon the City Road network and eliminate the need to four-lane Fallowfield Road east of Eagleson Road to serve the KWCP.

This redirection of emphasis away from the road network to the south of Kanata also removes the need for Terry Fox Drive to be six-laned south of Hazeldean Road due to KWCP traffic flows.

4.35 Cost Estimates**4.3.5(1) Total Transportation Infrastructure Cost Estimates**

Cost estimates have been prepared for the major transportation infrastructure deemed necessary to service KWCP at full development. These costs are based on “per kilometer” costs for the various types of facilities, and pertain to:

- (a) the primary internal road network;
- (b) widening external City of Ottawa roads; and
- (c) extending rapid transit from Kanata Centrum.

Base Construction Costs

The base roadway costs per kilometre reflect actual construction data for the year 2000 brought forward to a 2002 base by applying a construction cost annual inflation rate of 10% as determined by the City based on its

project data base. These 2002 base roadway unit construction costs are shown on Table 4 - 13.

Road Type	Base Unit Cost \$m per km (\$2002)
Two-lane urban (new)	1.0
Four-lane urban (new)	1.5
Two-lane widening	0.7

These roadway unit construction costs were then increased by various factors to reflect three major additional influences on overall project costs as recommended by City staff based on their recent project data base.

Additional Hard Costs

The first factor applied to base construction costs was one to reflect additional hard cost requirements such as lighting, traffic plant, trunk sewers, noise barriers, intersection turning lanes, and intersection modifications, as appropriate.

Were all such hard costs to apply to the KWCP roadway requirements, the base unit costs could be expected to increase by 100%. There are, however, a number of valid reasons why a reduced factor for hard costs ought to apply to a number of the major roadway requirements of KWCP.

With regard to the internal road network, the cost of trunk sewers is already determined to be a KWCP infrastructure cost and has been included in the piped servicing costs being attributed to the development.

Also, very few, if any, of the internal roads will require noise barriers as they will not be close to residential areas and where there may be residential development, adjacent to arterials, it is anticipated that urban design will preclude the need for noise barriers in the majority of cases.

In addition, as most of the internal roads will be new construction, there will be little extra cost associated with intersection improvements.

Finally, the cost of traffic signals (15 identified within KWCP) has been identified as a project specific cost isolated from the overall unit cost and applied specifically to a number of the individual roads in question.

With the above approach, it has been concluded that the appropriate factor to be added for hard costs is 50% in the case of the internal roadway network.

Table 4-13: Base Roadway Unit Construction Costs

A similar line of reasoning has been applied to the elements of the external road network, including Campeau Drive, Terry Fox Drive and Hazeldean Road, which have either been recently constructed or will soon be upgraded by the City of Ottawa to four-lanes and thus will be already provided with trunk sewers, lighting, noise barriers, etc. It is concluded that only in the case of the three external roads, Iber Road Extension, Eagleson Road and Fallowfield Road, which are specifically required as a consequence of KWCP should the full additional hard cost factor of 100% apply.

Engineering Costs

The second set of factors applied to the unit construction costs was one to reflect engineering costs, particularly preliminary and detailed design costs and construction supervision costs. Again, a range of figures was developed to apply to the KWCP roadway requirements.

The high end of the range, a 35% additional cost was assumed to be appropriate for all external roadway upgrades except Iber Road where 25% was applied as construction will occur in a “greenfields” situation.

For internal roadways the factors applied were within the range 20% to 25%. For new roads, due to their primarily “greenfields” construction situations, a factor of 20%, the low end of the range, was considered appropriate while in the case of the existing internal roadways which require upgrading such as Maple Grove Road and Huntmar Road, a factor of 25% was assumed. The 5 percentile increase reflects the extra related effort to maintain existing traffic flow.

Contingency

The third set of factors to be applied to the base unit costs was one to reflect a contingency for cost estimates developed at the very early concept stage in the absence of much detailed information (Class ‘D’ estimates).

As with the approach taken for engineering costs, a range of contingency costs from +30% to +20% was also established and applied in the same manner. The lower value was used where corridor information is recent and fairly extensive, and the chances for surprises in cost estimating are less.

The cumulative effect of each of the three foregoing factors was then applied to each base roadway unit cost which were then multiplied by the specific roadway length to arrive at an estimated construction cost for each link.

Project Specific Costs

In addition, a number of project specific costs were also identified for inclusion with certain roadways reflecting such items as traffic signals, Environmental Assessment costs, and specific bridge structure costs where roadways cross Highway 417, or the various creeks within the site.

A total of \$2.4M was added to cover the cost of installing up to 15 sets of traffic signals on internal roads, and \$6.5M was added for structures, including \$5.0M for an overpass and two culverts on Huntmar Road, \$1.5M for three culverts on Campeau Drive, Maple Grove Road and the North-South Arterial. A total of \$2.0M was also added to reflect EA studies for the Huntmar Road Extension (reflecting City Council's direction) and the requirement to have ESRs completed for the Fallowfield Road, Eagleson Road and Maple Grove Road widenings, which are existing City roads.

Rapid transit costs have been based on transitway construction costs and have been broken down to reflect at-grade, grade-separated (structure), and mixed grade construction.

The per kilometre rapid transit costs are shown in Table 4-14.

Construction Type	Unit Cost (\$ per km)
At-Grade	\$8.0M
Mixed-Grade	\$15.0M
Grade separated (structure)	\$30.0M

These rapid transit unit costs were then multiplied by the various lengths of rapid transit infrastructure to arrive at an overall cost for the individual segments.

Applying the factored unit costs per kilometre from Table 4-13 and the Rapid Transit Unit Construction Costs from Table 4-14 to the identified infrastructure improvements results in the estimated total transportation infrastructure costs summarized in Table 4-15. This table reflects the estimated construction costs of the internal and external roadway requirements and the extension of rapid transit from Kanata Centrum to Hazeldean Road.

For the scenario in which a six-laned Highway 417 is assumed between Moodie Drive and the Huntmar Interchange, the transportation infrastructure costs total approximately \$145M. For the scenario in which Highway 417 is widened to eight lanes west to the Huntmar Interchange, the transportation infrastructure costs total approximately \$119M.

Table 4-14: Rapid Transit Unit Construction Costs

Category/Link	Description	Estimated Cost (\$M)	
		If six-lane Highway 417 provided	If eight-lane Highway 417 provided
Internal Road Network			
<i>Campeau Drive</i>	Extension westerly from Terry Fox to Huntmar	\$6.3	\$6.3
	Extension westerly from Huntmar to North-South Arterial	\$1.6	\$1.6
<i>Palladium Drive</i>	Extension westerly from Huntmar to North-South Arterial	\$1.4	\$1.4
<i>Maple Grove Road</i>	Relocation between Huntmar and North-South Arterial	\$2.2	\$2.2
	Widening (2 to 4 lanes) between Huntmar and Terry Fox	\$4.2	\$4.2
<i>Huntmar Road</i>	Upgrading between Richardson and Campeau (extension)	\$3.3	\$3.3
	Widening (2 to 4 lanes) between Campeau (extension) and Maple Grove (includes \$4.5M structure)	\$7.7	\$7.7
	Extension southerly from Maple Grove to North-South Arterial	\$1.7	\$1.7
	Extension southerly from North-South Arterial to Hazeldean	\$2.0	\$2.0
<i>North-South Arterial</i>	Extension southerly between Palladium (extension) and Huntmar	\$3.9	\$3.9
	Extension southerly between Huntmar and Hazeldean	\$2.3	\$2.3
Sub-Total		\$36.6	\$36.6
External Road Network			
<i>Campeau Drive</i>	Widening (4 to 6 lanes) between Terry Fox and Castlefrank	\$0.7	-
<i>Iber Road</i>	Extension southerly to Fernbank	\$4.1	-
<i>Terry Fox Drive</i>	Widening (4 to 6 lanes) between Campeau and Hazeldean	\$4.7	\$4.7
	Widening (4 to 6 lanes) between Hazeldean and Eagleson	\$8.2	
<i>Hazeldean Road</i>	Widening (4 to 6 lanes) between Huntmar and Terry Fox	\$3.5	\$3.5
<i>Eagleson Road</i>	Widening (2 to 4 lanes) between Hope Side and Fallowfield	\$5.5	\$5.5
<i>Fallowfield Road</i>	Widening (2 to 4 lanes) between Eagleson and Hwy 416	\$12.9	
Sub-Total		\$39.7	\$13.7
Transit Network			
	Extension of Transitway corridor from Kanata Centrum to Huntmar (north of Hwy 417)	\$16.0	\$16.0
	Extension of Transitway corridor from Huntmar (north of Hwy 417) to Palladium	\$30.0	\$30.0
	Extension of Transitway corridor from Palladium to Hazeldean	\$22.5	\$22.5
Sub-Total		\$68.5	\$68.5
Grand Total		\$144.8	\$118.8

Table 4-15
Transportation Infrastructure Cost Estimates

As shown in Table 4-15, the estimated cost of the internal roadway requirements is approximately \$37M, while the estimated costs of external roadway requirements falls within the range of \$13.7M to \$39.7M, depending on which Highway 417 widening scenario occurs.

The extension of rapid transit from Kanata Centrum to the Corel Centre is estimated to cost approximately \$46M. This extent of rapid transit and an efficient supporting area bus service is necessary to achieve the high assumed KWCP modal splits. The section of rapid transit corridor from the Corel Centre south to Hazeldean Road, is not necessary for KWCP development. Its primary function is to extend rapid transit south through the lower density development to Hazeldean Road and beyond. It would provide the necessary connections to growth areas south of Hazeldean Road. The cost of this section is estimated at approximately \$23M.

For the scenario in which Highway 417 is eight-laned to the Huntmar Interchange, or beyond, the internal roadway costs and the rapid transit

costs do not change, but the external roadway requirements no longer include the six-laning of Campeau Drive, the six-laning of Terry Fox Drive south of Hazeldean Road, the four-laning of Fallowfield Road east of Eagleson Road or the southerly extension of Iber Road. As a result, the external roadway improvement costs are reduced from \$39.7M to \$13.7M.

4.3.5(2) Transportation Infrastructure Cost Allocation

An important aspect of the KWCP is the development of a strategy for the allocation of the cost of infrastructure required to service the proposed development in accordance with the financial policy, Clause 4.4.7, of ROPA #9.

There are a number of possible candidate strategies available for assigning infrastructure costs including:

- (i) Total allocation (100%) to KWCP;
- (ii) Allocation based on principles already established in the RDC Bylaw;
- (iii) Allocation based on an interpretation of the word “primarily” as used in Clause 4.4.7 of ROPA #9; and
- (iv) Allocation based on the usage of the peak direction utilization of the additional road capacity provided/required by KWCP generated traffic.

Method (iv) is the only strategy for roadway costs that has a technical basis. It is based on the premise that the cost of each internal concept plan roadway and each external road widening has been allocated to KWCP on the basis of the peak hour, peak directional traffic volume generated by KWCP as a percentage of the new directional capacity provided.

Table 4 -16 illustrates the results of the application of this methodology for the two scenarios of either six-lane or eight-lane Highway 417 from Moodie Drive west to the Huntmar Interchange.

Table 4-16
Roadway Cost Allocation to Kanata West
(Based on Kanata West PM peak hour
traffic / new directional capacity)

Highway 417 Widening Scenario	Internal Roads		External Roads	
	Total Cost	KWCP Allocated Cost	Total Cost	KWCP Allocated Cost
Six-lanes	\$36.6M	\$23.6M (65%)	\$39.7M	\$35.9M (91%)
Eight-lanes	\$36.6M	\$21.5M (59%)	\$13.7M	\$7.0M (51%)
Note: These allocation costs are based on the percentage peak direction utilization of the required new road capacity by KWCP traffic.				

As shown in Table 4-16, the attribution of internal road costs by this method falls within the range 59% to 65% while the attribution for the external roadway upgrades falls within the range 51% to 91%, dependant on the Highway 417 widening scenario that is implemented. The total internal plus external roadway costs attributed to KWCP is \$59.5M under

the 6-lane Highway 417 scenario and \$28.4M under the 8-lane Highway 417 scenario.

A technically based allocation strategy has not been developed for the rapid transit corridor costs as there is not a precedent in the City for development projects being responsible for constructing Rapid Transit extensions. The KWCP owners have agreed to provide the land for the transit corridor, but believe the cost of construction is a City responsibility. Accordingly, they have directed that the allocation cost tables not include transitway costs.

4.3.6 Transportation Demand Management (TDM) Strategy

At the heart of TDM is the combination of land use, infrastructure and programs that provide for all travel mode choices in a manner that maximizes walk, bicycle and transit and minimizes single-occupant vehicle travel.

The ways of achieving this have been presented in detail in Appendix A - Section 1.4.3. The following is a point form summary of how the recommended concept plan has incorporated these best practice guidelines:

- a mix of land use is proposed to encourage a local live-work relationship, which in turn, will minimize single occupant vehicle travel;
- higher land use densities are proposed in the core area and along the North-South Arterial to facilitate efficient and effective transit service;
- the higher density land uses are proposed adjacent to the rapid transit corridor. Eliminating the need for a bus transfer, will maximize the transit ridership between the KWCP and the rest of the City;
- buildings will be built close to the road edge and to the rapid transit corridor to encourage and facilitate non-auto travel modes;
- an internal road network has been proposed with many direct connections to the adjacent Kanata and Stittsville communities. These convenient linkages will facilitate provision of efficient transit service, and will maximize the opportunities for pedestrian and bicycle trips between communities;
- a grid-type road network will be implemented, where appropriate, to minimize walking distances throughout the KWCP;
- on-road and off-road bicycle and pedestrian systems are proposed that will provide attractive linkages with the KWCP, and also between the KWCP and the adjacent communities of Kanata and Stittsville. The off-road recreational path system should be a minimum of 3.0 m wide;

- a minimum 2.0 m sidewalk will be provided on both sides of all arterial roads and on at least one side of collector roads;
- the development will be phased in a manner that is a logical extension of existing transit service so as to provide the best, and most cost-effective transit service at all phases of development in the KWCP;
- transit priority measures will be determined by the City and will be provided if/when appropriate on study area roads and at intersections; and
- the Corel Centre parking lot can be made available for a park-and-ride lot, subject to the resolution of timing and other details between the City and owners of the Corel Centre.

The other aspects of TDM that relate to employer and employee programs cannot be dealt with at this concept planning stage. However, with the appropriate land use plan and transportation network, these programs will be much easier to implement when the development occurs.

4.3.7 Conclusions

Based on the foregoing analysis and findings, the following conclusions are offered:

1. The total number of vehicle trips generated by the proposed KWCP is sensitive to the many input variable assumptions. The findings presented herein are based on a “reasonable” assumption set, although a sensitivity analysis indicated that traffic volumes could vary up to 25% relative to this base. Our approach enables one to quickly assess the impact of changing any of these input assumptions.
2. A core transportation network, consisting of committed road extensions and additional road/transit infrastructure opportunities, was employed throughout the analysis. The basic findings would not be impacted by minor variations in the road layout that may enhance mobility within the KWCP site.
3. The presence of a rapid transit corridor to the vicinity of the Corel Centre, and an efficient supporting area bus service, is key to achieving the high transit modal shares assumed in the analysis.
4. The implications of the new Official Plan (currently being prepared) have not been considered explicitly in this analysis, but the increased growth potential for Kanata-Stittsville will likely be of significance to the amount of available surplus road capacity.
5. The most significant finding is the lack of the committed infrastructure to provide sufficient vehicle capacity across the

Greenbelt. A number of potential solutions were identified to address this projected deficiency.

6. The cost of the transportation infrastructure required to support the KWCP varies depending on whether Highway 417 is widened to six lanes or eight lanes from Moodie Drive west to the Huntmar Interchange. Road costs which include design, construction and contingency are approximately \$76M with a six-lane Highway 417 and \$50M with an eight-lane Highway 417. The cost of a transitway extension from Kanata Centrum to the Corel Centre are \$46M. The cost of the future extension from the Corel Centre south to Hazeldean Road is approximately \$23M.
7. The fundamental approach herein has been to identify the additional transportation infrastructure required to accommodate traffic from the KWCP beyond that infrastructure required and committed for approved growth to the year 2021. It is this new and widened infrastructure that is identified in Table 4-14. It is very noteworthy that with the provision of this additional infrastructure, there will be surplus capacity available for traffic other than that generated by KWCP. This is because while the KWCP requires many additional new lanes of roadway, it does not require all the capacity that these lanes provide in all directions at the same time.

Based on this projected condition, one approach for apportioning the transportation costs in Table 4-14 to the KWCP is the basis of how much of the newly provided transportation capacity is actually used by KWCP. The premise being that, it should not pay for surplus capacity, that will be available to others.

Using this approach, KWCP would be responsible for \$59.5M (78%) of the road cost assuming six-lane Highway 417, and \$28.4M (57%) of the road costs assuming an eight-lane Highway 417.

As there is not a precedent in the City (former Region) for development projects being responsible for constructing rapid transit corridors, the position of the KWCP owners is that they will dedicate the land for rapid transit through KWCP, but the costs of constructing the facility will be the City's responsibility.

8. The integration of the proposed land use mix, location and form with the proposed pedestrian, cycle, transit and road network within the Kanata West Concept Plan is responsive to the need for Transportation Demand Management (TDM). The resultant concept plan provides the opportunity to maximize all non-auto travel modes with the objectives being to provide attractive travel mode choices and to minimize single occupant vehicle travel. Details with regard to Transportation Systems Best Practices and TDM as may be applicable to the Kanata West Concept Plan are included in Appendix A - Section 1.4.3.