8.6 Evaluation Results

The evaluation of the alternative design concepts resulted in the identification of desirable design elements to be incorporated in the preferred alternative design. The evaluation results and desirable design elements are summarized in the following table.

Table 11: Evaluation of Alternative Design Concepts

Criteria	Concept A	Concept B	Concept C	Concept D
Transportation	✓ **Modified grid road pattern** • Three accesses to March Road ✓ **One access to Old Carp Road** • Central PNR; doesn't keep core active	• Curvilinear road pattern • Three accesses to March Road ✓ **One access to Old Carp Road** ✓ **PNR at north end, users from north don't traverse core**	• Loop road with unique identity • Three accesses to March Road ✓ **One access to Old Carp Road** • PNR north of KNUEA; users from north don't traverse core	• Collector road on top of ridge • Three accesses to March Road ✓ **One access to Old Carp Road** • PNR at south end; users from north traverse core
Land Use	✓ **Walkable neighbour-hoods** ✓ **Transit supportive**	✓ **Walkable neighbour-hoods** ✓ **Transit supportive**	✓ **Walkable neighbour-hoods** ✓ **Transit supportive**	✓ **Walkable neighbour-hoods** ✓ **Transit supportive**
Natural	✓ **Four new water crossings** • No retained Woodlot feature	• Three new water crossings ✓ **Retained Woodlot Feature**	✓ **Four new water crossings** • No retained Woodlot Feature	✓ **Four new water crossings** • No retained Woodlot Feature
Social	✓ **Existing church, school, cemetery accesses maintained** ✓ **Pedestrian/ cycling pathways** • Some residential exposure to March Rd noise	✓ **Existing church, school, cemetery accesses maintained** ✓ **Pedestrian/ cycling pathways** • Some residential exposure to March Rd noise	✓ **Existing church, school, cemetery accesses maintained** ✓ **Pedestrian/ cycling pathways** ✓ **Limited residential exposure to March Rd noise**	✓ **Existing church, school, cemetery accesses maintained** ✓ **Pedestrian/ cycling pathways** • Some residential exposure to March Rd noise

Criteria	Concept A	Concept B	Concept C	Concept D
Economic	• Four internal RABs (higher capital cost) ✓ **Signals on March (higher operating cost)**	✓ **Two internal RABs (medium capital cost)** • RABs on March (lower operating cost)	• One internal RAB (lower capital cost) ✓ **Signals on March (higher operating cost)**	• One internal RAB (lower capital cost) • RABs on March (lower operating cost)

* PNR denotes Park and Ride
** RAB denotes roundabout

The best elements of each of the four alternative design concepts were carried forward and combined, as shown in **Figure 23**, the Preferred Land Use Plan.

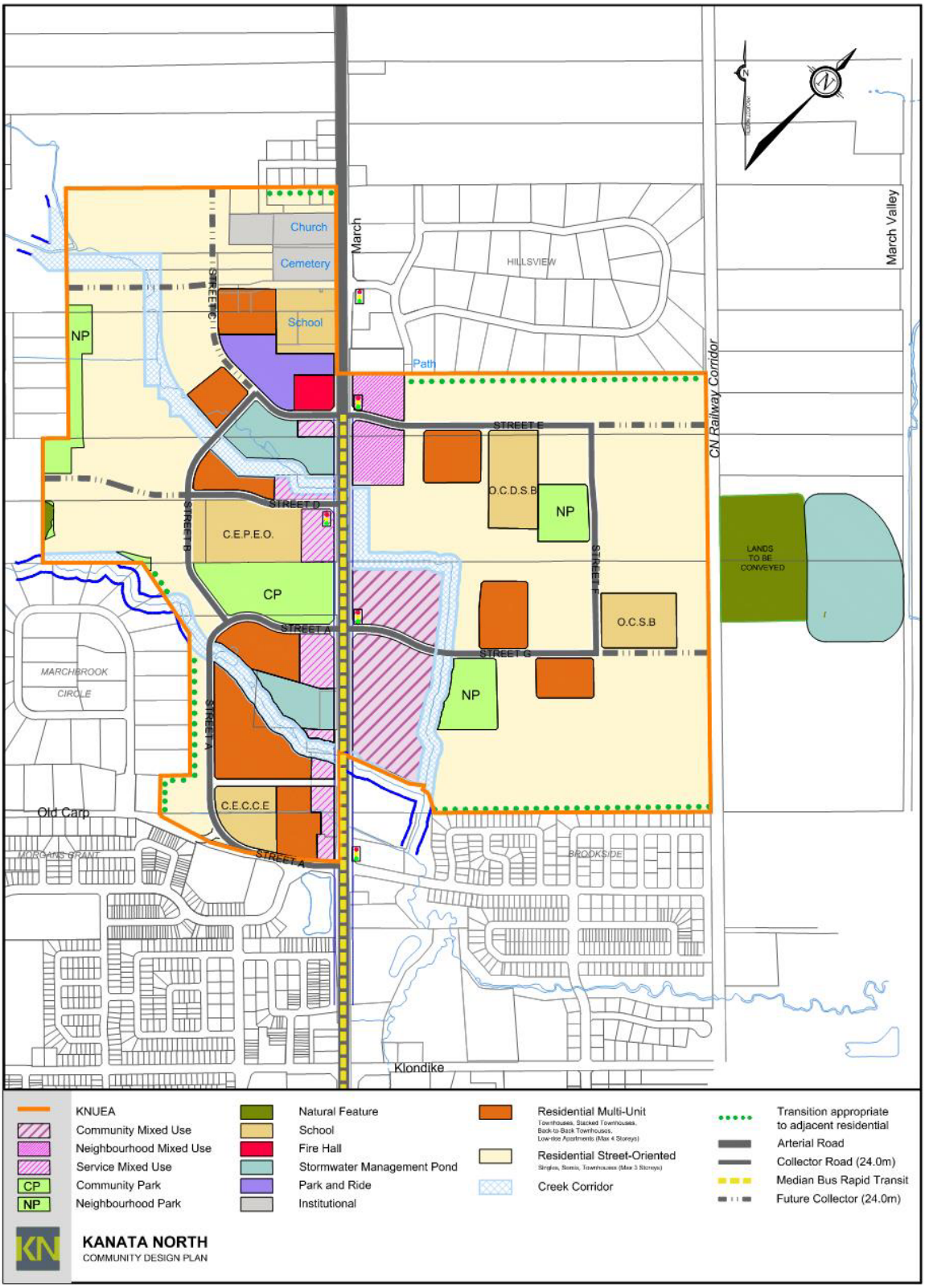


Figure 23 – Preferred Land Use Plan

9.0 RECOMMENDED PLAN

9.1 Plan of Roads

The Kanata North community will be well served by the adjacent arterial and collector road network, including March Road, Old Carp Road, Second Line Road and Terry Fox Drive. A network of seven collector roads is recommended to safely and adequately distribute traffic throughout the new community. Possible future road connections to the north, east and west allow for future connectivity.

The Preferred Land Use Plan includes four full movement signalized intersections and a right-in right-out intersection. Two right-in right-out driveways are assumed for the commercial uses along the east side of March Road. A full movement intersection on Old Carp Road is also included. These road connections will provide direct access to the new community.

9.1.1 Intersection Spacing

A detailed review of the proposed intersection spacing is provided in the November 25th, 2015 technical memorandum included in **Appendix D**. The memo also includes a review of the existing traffic signal spacing along March Road between Maxwell Bridge Road/Halton Terrace and Herzberg Road. The findings are summarized as follows:

- Transportation Association of Canada (TAC) Geometric Design Guidelines identify minimum spacing requirements along arterial roads. Table 2.3.1.1 of the TAC guidelines suggests a desirable spacing of 835m for signalized intersections with 100 second cycle lengths and a posted speed of 60km/hr to maintain traffic progression through successive intersections. It is noted that the benefits of signal progression are reduced for intersection spacings greater than 800m.

- The current traffic signal spacing along March Road does not meet TAC standards for traffic progression through successive intersections.

- Section 2.3.1.7 of the TAC guidelines indicates that in areas of intense development a typical minimum intersection spacing along arterial roadways is 200m. This 200m spacing allows for minimum lengths of back-to-back storage for left turning vehicles at adjacent intersections.

- The proposed intersection spacing along March Road through the KNUEA exceeds the minimum spacing of 200m, with the exception of the Midblock Collector (Street 'D') intersection which is approximately 190m south of the North Collector (Streets 'C' and 'E') intersection. Since this intersection is a tee intersection with a northbound, southbound and eastbound approach, a southbound left turn lane is not required. As such, the minimum intersection spacing can be less than 200m subject to projected queue lengths.

- The intersection capacity analysis shows that projected queue lengths are not anticipated to impact adjacent intersections.

9.1.2 Complete Streets

The City's 2013 Transportation Master Plan update includes policies and actions for providing safe and efficient roads by designing and building complete streets. Complete streets design elements have been considered for all roadways in the KNUEA.

Cross sections have been developed for March Road as well as the collector and local roadways within the KNUEA. The cross sections incorporate the following complete street principles.

- Pedestrians
  - Buffer between sidewalk and vehicular traffic on collector roadways and March Road
  - Sidewalks on both sides of collector roadways and March Road
- Cyclists
  - Multi-use pathway on one side of collector roadways
  - Raised cycle tracks on March Road
- Transit Users
  - Accessible transit stops
  - Transit shelters on inbound direction (towards downtown) of collector roadways
  - Future median BRT on March Road
- All Road Users
  - Street lighting on all roadways
  - Landscaping in boulevards and medians on all roadways

In addition to the above complete streets elements, a design speed of 40 kph is recommended for collector and local roads in the KNUEA. A lower design speed will help improve the viability of active transportation, especially for vulnerable road users and on local roads without sidewalks. A variety of physical measures could be considered at the Plan of Subdivision stage to ensure compliance with the desired design speed, including:

- Road narrowing at collector/local intersections,
- Midblock narrowing and signage at multi-use pathway crossings,
- Raised crosswalks on local streets (non-transit routes),
- Street trees, and
- On-street parking.

The recommended local, collector and future March Road cross sections are described in more detail in the following sections.

9.1.3 March Road Cross Section

March Road will be widened in two phases to accommodate the increase in vehicular traffic and extend the future Kanata North Transitway. A 44.5m right-of-way width is recommended along the March Road corridor between the current urban area boundary and the northern limit of the KNUEA. This right-of-way width will provide for the interim four lane widening of March Road and the ultimate widening to accommodate extension of the median BRT system.

The City of Ottawa's 2013 TMP identifies the median BRT system along March Road between Corkstown Road and Solandt Road in its 2031 Affordable Rapid Transit and Transit Priority Network. The 2013 TMP also identifies the future need to extend the median BRT system to Maxwell Bridge Road/Halton Terrace post 2031, with a conceptual future transit corridor extending

further north towards Dunrobin Road. The Kanata North CDP TMP satisfies the requirements of the Municipal Class EA process for the portion of the conceptual future transit corridor, as shown in the City's 2013 TMP, that extends between Maxwell Bridge Road/Halton Terrace and the North Collector (Streets 'C' and 'E'). Additional studies will need to be completed to fulfill the Municipal Class EA requirements for any further extension of the median BRT north of the March Road/North Collector intersection.

A median BRT station(s) will be identified along the corridor within the KNUEA, as development occurs and detailed BRT plans are developed. The identification of station location(s) will need to take into consideration the location of the most northerly planned station along the corridor (March/Klondike, as per the approved Kanata North Transitway EA) and the planned park and ride at March Road/North Collector (Streets 'C' and 'E', as per the Kanata North CDP process).

Subject to City and Development Charges funding, March Road will be widened to a four lane divided urban cross section. It is recommended that the City examine and implement interim transit priority measures as required through the study area as part of the initial widening from two to four lanes in preparation for the next City of Ottawa TMP update. Transit priority measures typically include dedicated bus lanes, transit signal priority treatments, and bus queue jumps.

Figure 24 shows the proposed interim cross section for March Road following the widening from two to four lanes. As shown, March Road will not be centred within the right-of-way under the interim condition. This will reduce the construction throwaway cost when the City widens March Road to extend the Kanata North Transitway. When the City of Ottawa extends the median BRT system further north through the KNUEA, the interim cross-section can be widened to the west to form the ultimate median BRT cross-section as shown in **Figure 25**.

The proposed cross sections are consistent with the recommendations of the 1994 March Road Reconstruction ESR and are addressed by the Kanata North Transitway EPR.

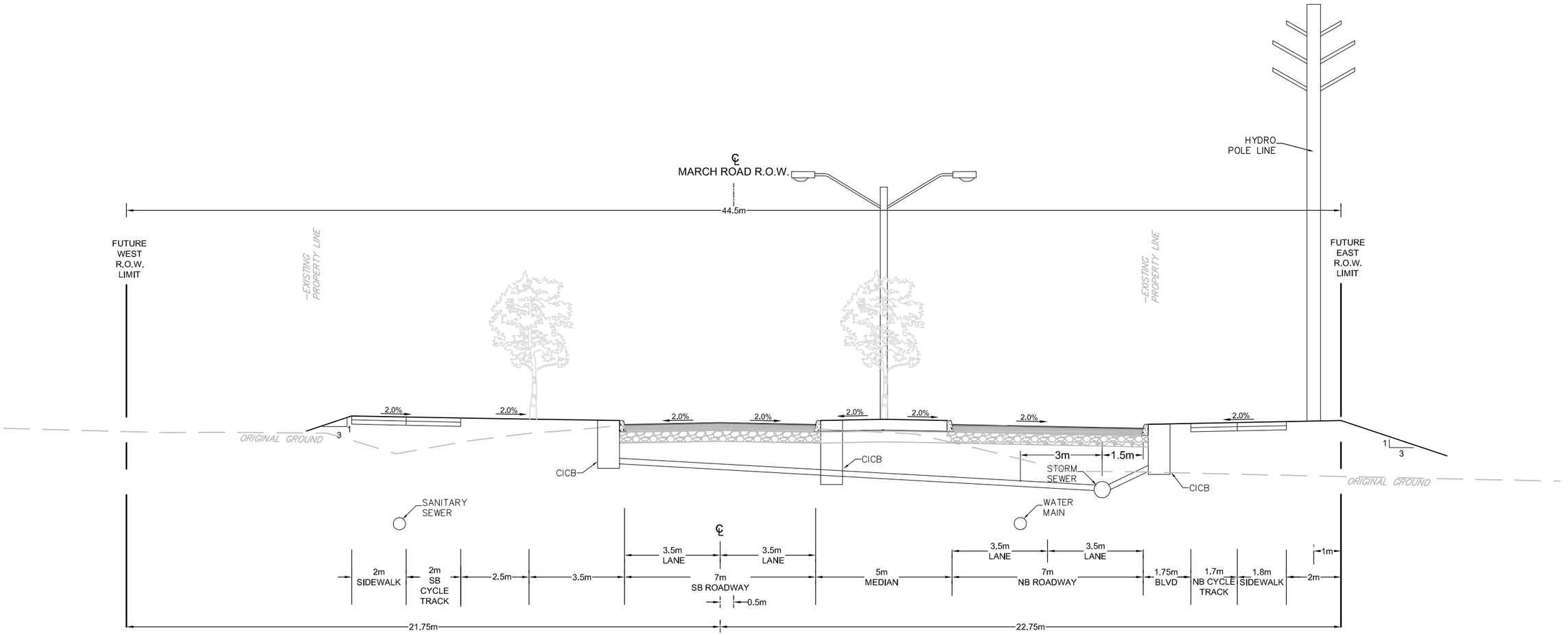
The interim and ultimate cross sections have geometric features (such as landscaping in the medians and narrow lane widths) that reflect a design speed of 60 kilometres per hour.

9.1.4 Collector Road Cross Section

Detailed discussions were held with the TAC to produce three collector roadway cross sections. The right-of-way to be protected along all collector roadways within the KNUEA will be 24m. Future collectors, identified with a dashed line on the Preferred Land Use Plan will be provided with a 24m right-of-way but will be built as local roads in the short term.

All collector roadways, excluding the Midblock Collector (Street 'D'), will have a 7m road platform with a 2.5m parking lane, a multi-use pathway on one side and a sidewalk on the other, as shown in **Figure 26**. Bus shelters will be located on the multi-use pathway side of these roadways, where the multi-use pathway will veer around the bus shelter, as shown in **Figure 27**.

The North-South Collector roadway (Street 'B' and the majority of Street 'A'), between the northern collector (Street 'C') and March Road, on the west side of the KNUEA will have a cross section as depicted in **Figure 28**. Bus shelters will be located on the sidewalk side of this roadway, where the sidewalk will veer in front of the bus shelter, as shown in **Figure 29**.



KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 24

MARCH ROAD - INTERIM
CROSS SECTION

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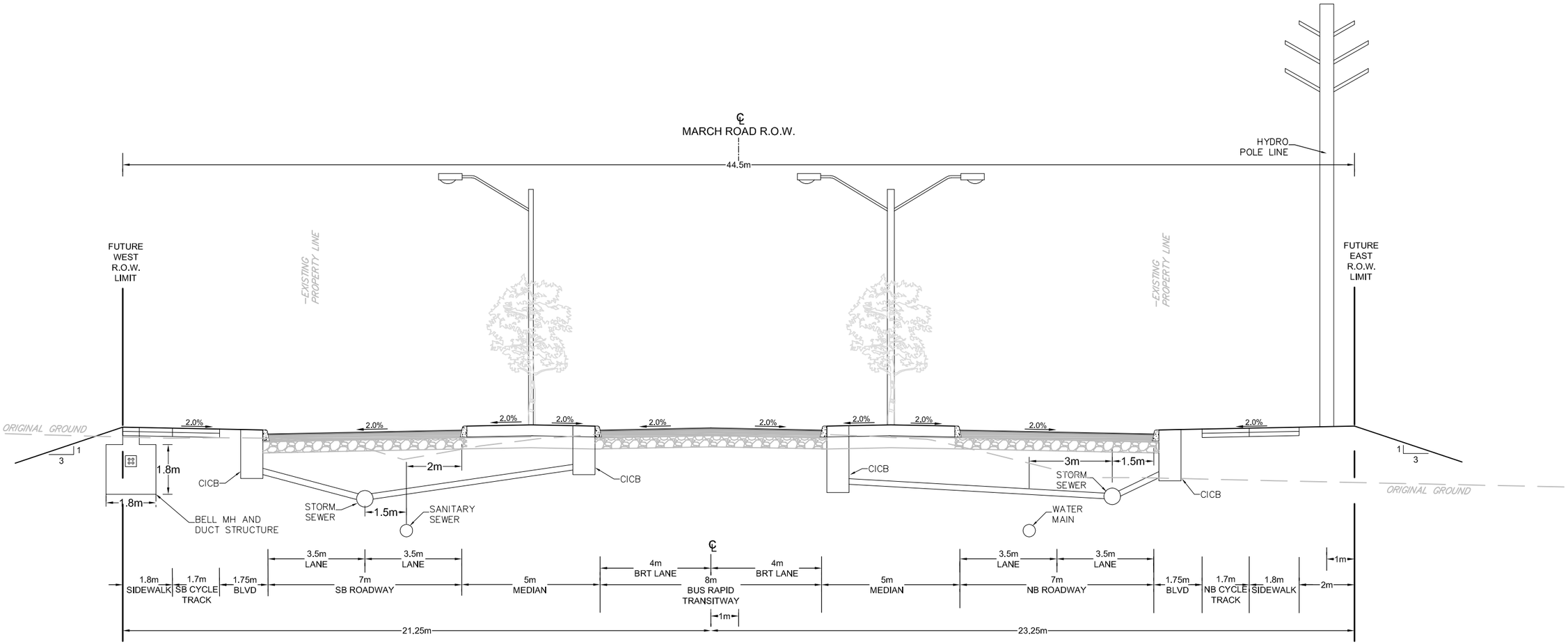

KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 25
MARCH ROAD - ULTIMATE
CROSS SECTION

DATE
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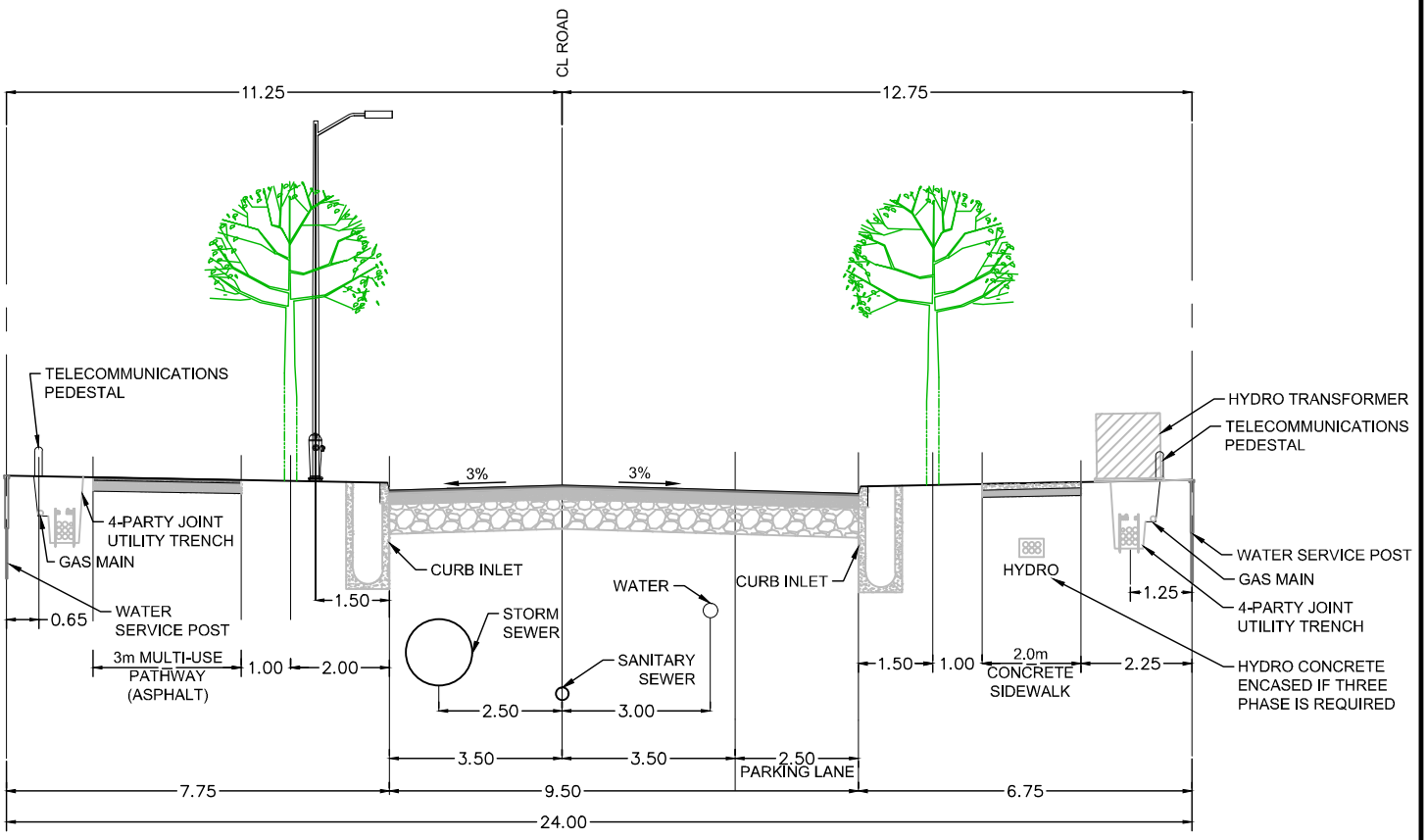

KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 26
COLLECTOR ROAD -
TYPICAL CROSS SECTION 1

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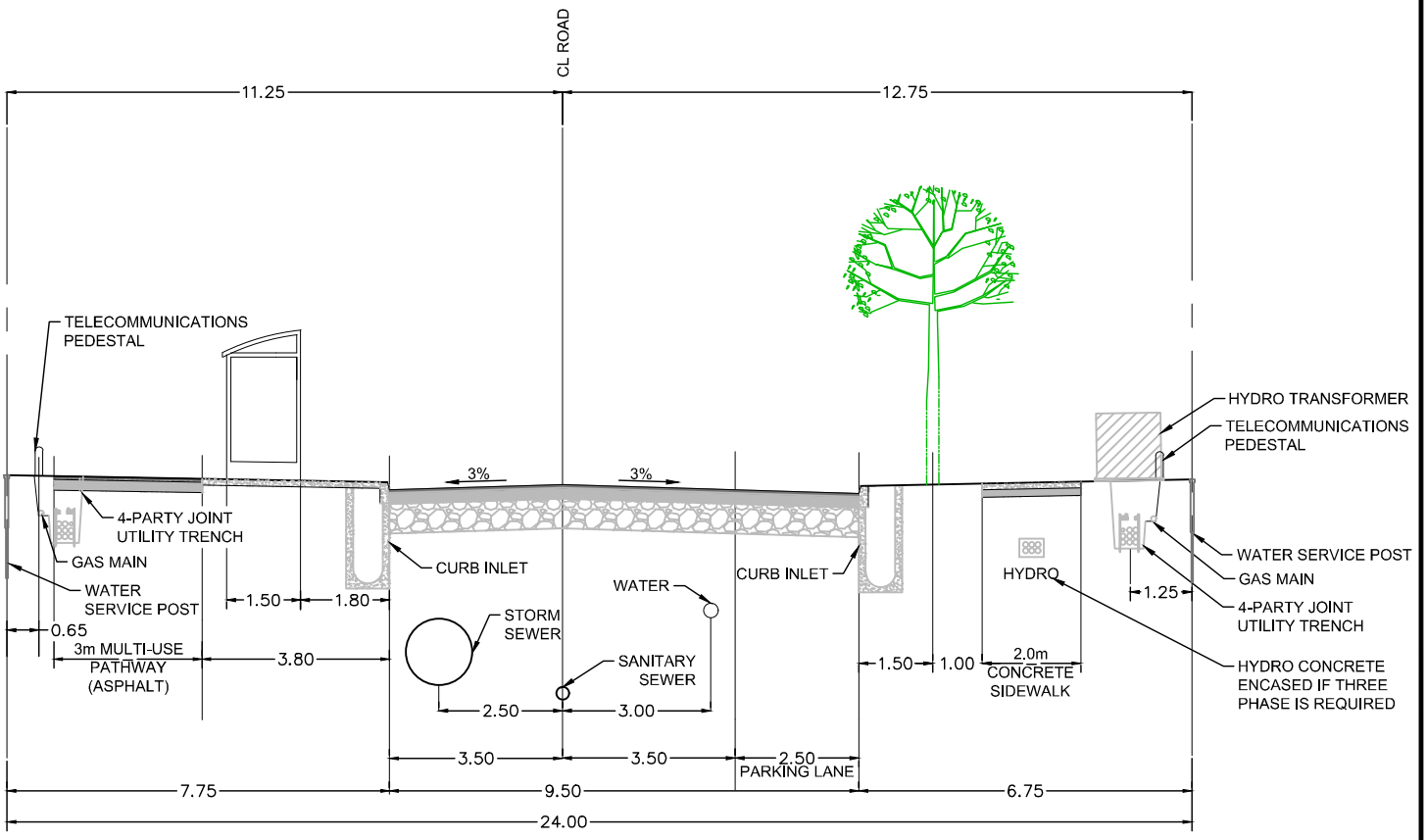

NOTES:

AT THE TIME OF PLAN OF SUBDIVISION OR SITE PLAN CONTROL WHEN BUS STOPS ARE IDENTIFIED, AT THESE LOCATIONS ON THE SIDEWALK SIDE OF THE STREET, THE SIDEWALK SHOULD BE RELOCATED TO BE ADJACENT TO THE CURB AND A BUS PAD (1.55m IN WIDTH), IF DETERMINED TO BE IMPLEMENTED, SHALL BE TO THE REAR OF THE SIDEWALK.

KANATA NORTH
COMMUNITY DESIGN PLAN

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FIGURE NO. 27
COLLECTOR ROAD -
TYPICAL CROSS SECTION 1
(WITH BUS STOP)

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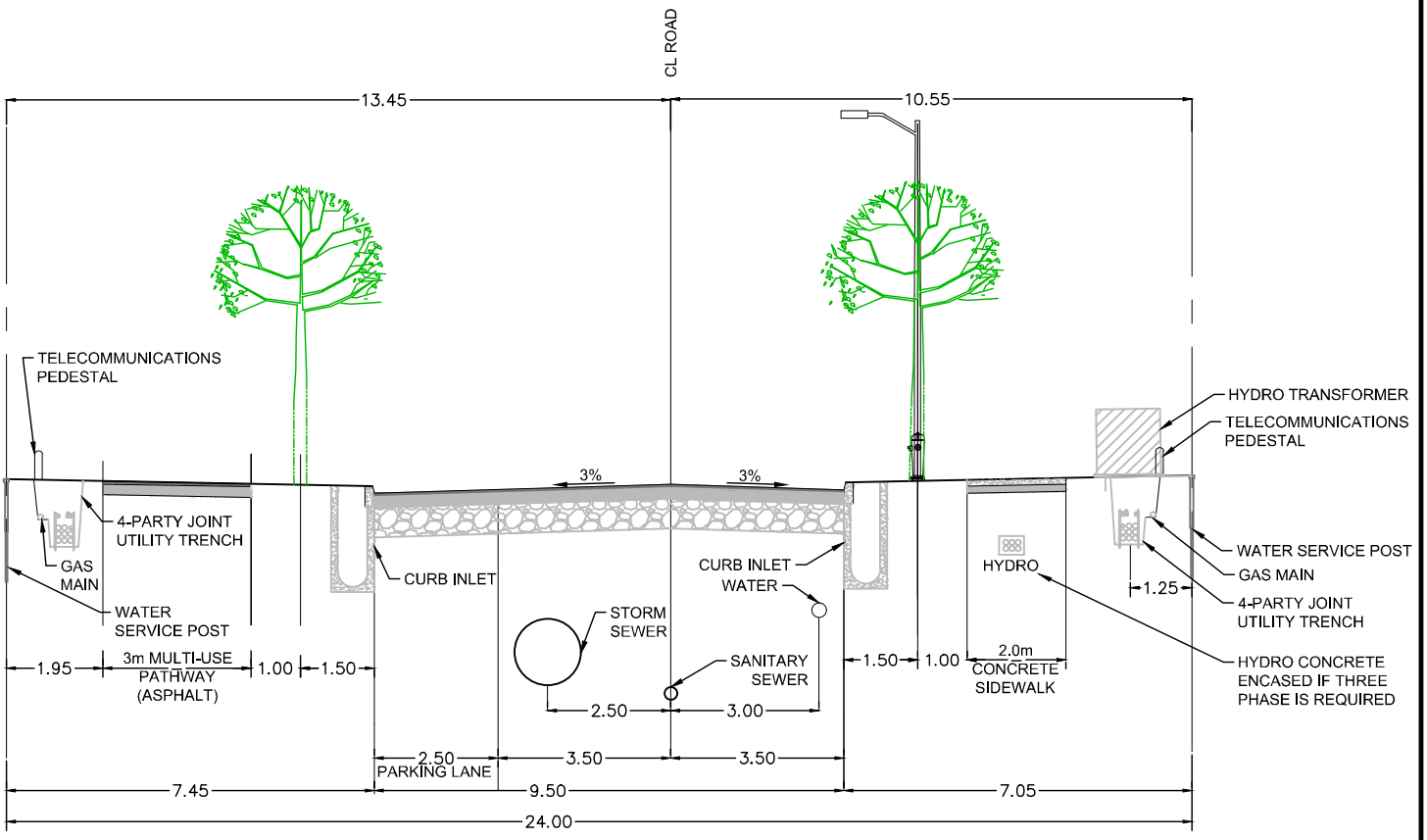

KANATA NORTH
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FIGURE NO. 28
COLLECTOR ROAD -
TYPICAL CROSS SECTION 2

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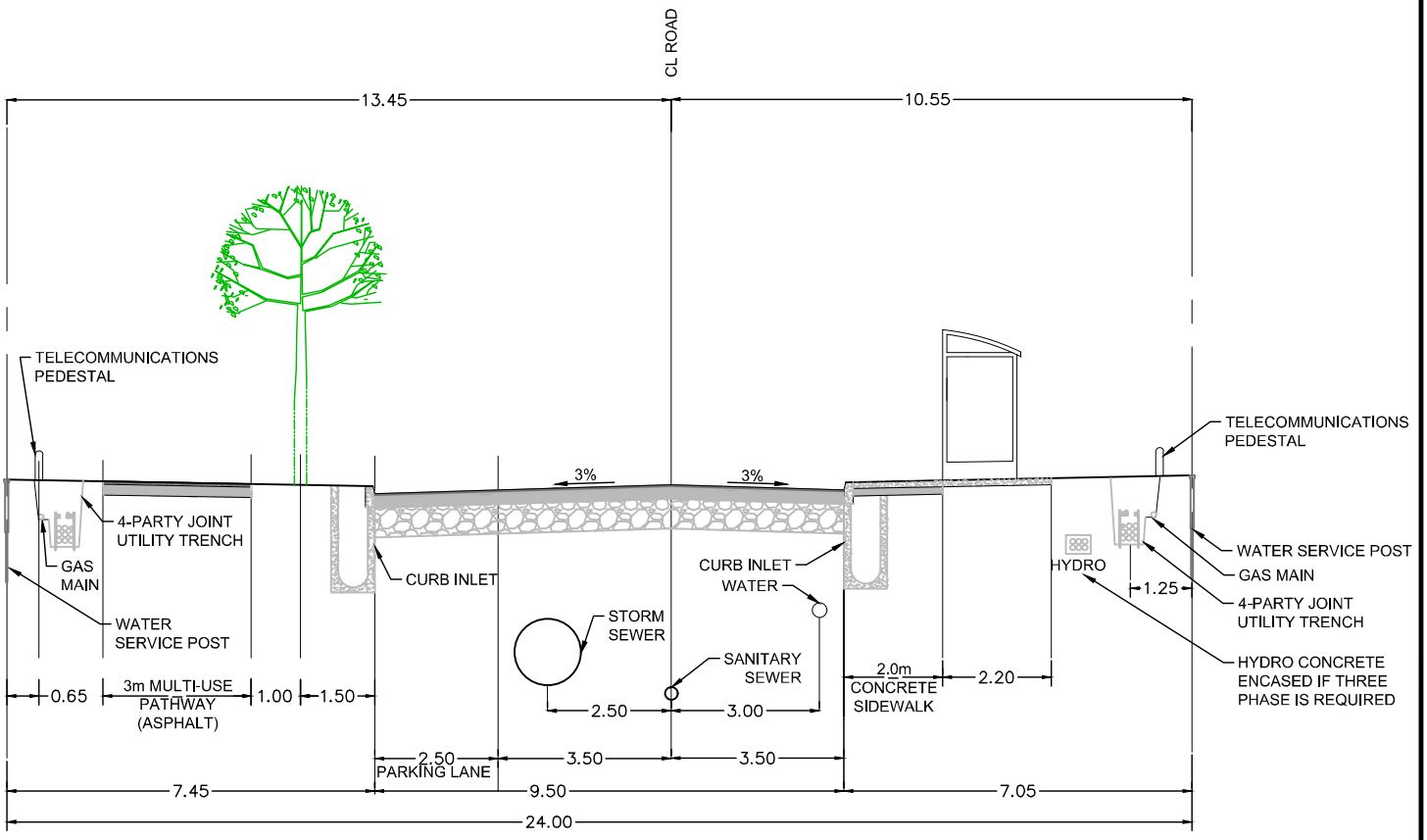

NOTES:

AT THE TIME OF PLAN OF SUBDIVISION OR SITE PLAN CONTROL WHEN BUS STOPS ARE IDENTIFIED, AT THESE LOCATIONS ON THE MULTI-USE PATHWAY SIDE OF THE STREET, BUS PLATFORMS (1.80m IN WIDTH) WILL BE PLANNED/IMPLEMENTED ADJACENT TO THE CURB.

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FIGURE NO. 29
COLLECTOR ROAD -
TYPICAL CROSS SECTION 2
(WITH BUS STOP)

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The Midblock Collector (Street 'D') will be designed to typical City of Ottawa standards for a 24m right-of-way collector roadway. The Midblock Collector (Street 'D') will have an 11m roadway platform and sidewalks on both sides of the roadway, as shown in **Figure 30**.

9.1.5 Local Road Cross Section

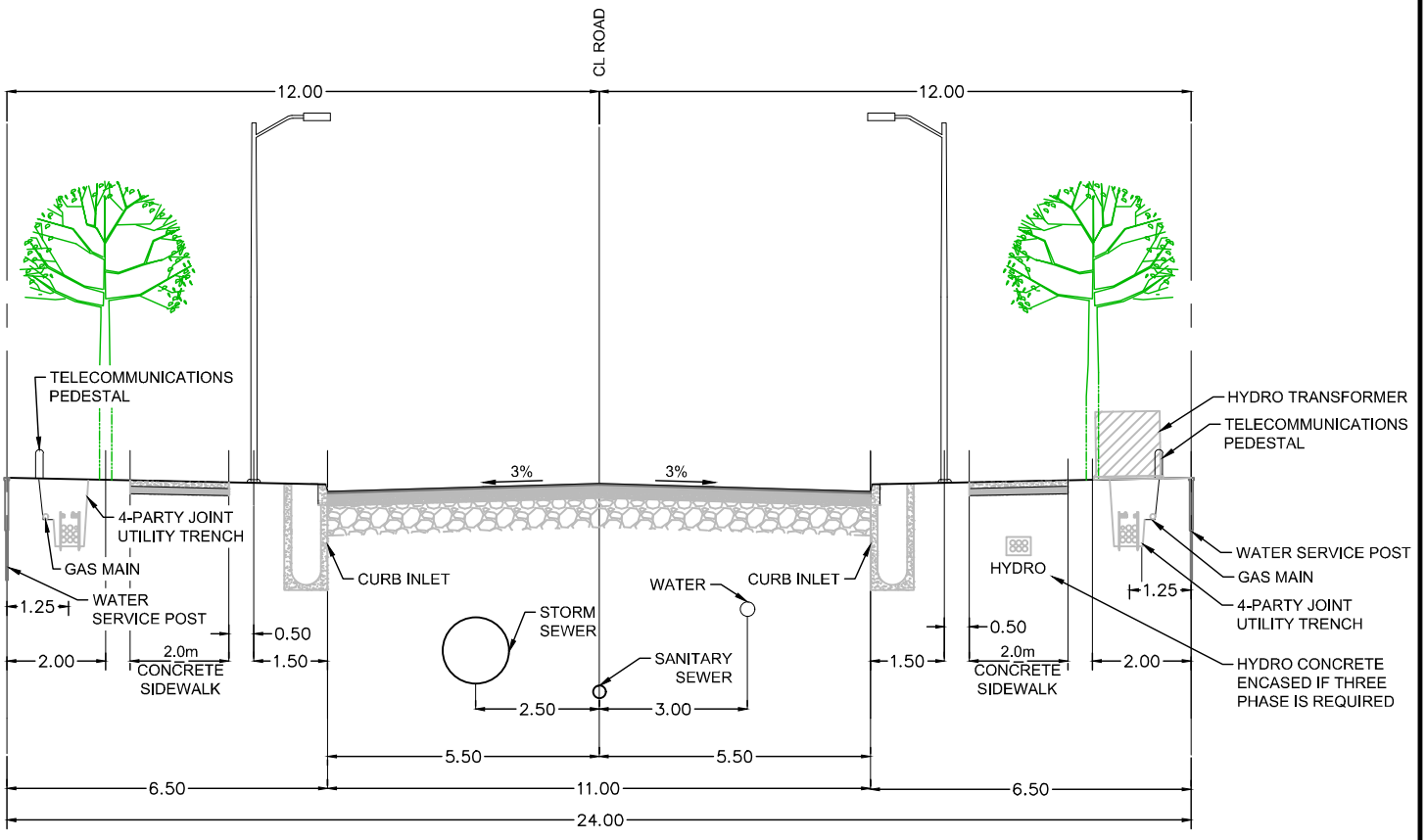
Local roads will have 18m, 16.5m and 14m rights-of-way, per standard City cross sections. The 18m and 16.5m right-of-way widths allow for the provision of sidewalk along local roads leading directly to transit, school, park, institution or retail/commercial/employment land uses, as shown in the Parks and Pathways Plan presented in **Section 9.2**. The 14m right-of-way width will be used for single loaded roads adjacent to open space.

Some local roads will have a sidewalk on one side of the road to provide additional connectivity. Trees will be located in a linear fashion on both sides of the roadway to assist in traffic calming. Local roadway cross sections are shown in **Figures 31, 32,** and **33**.

Local roads with possible future connections to the north, east, and west will be provided with 24m rights-of-way. The additional right-of-way will allow for a wider roadway platform and pedestrian facilities on both sides of the roadway.

9.2 Pedestrian and Cycling Plans

The Parks and Pathways Plan, shown in **Figure 34**, shows the pedestrian and cycling network composed of sidewalks, segregated cycle tracks, multi-use pathways, recreational paths, and 6m pathway corridors.



KANATA NORTH
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FIGURE NO. 30
MIDBLOCK COLLECTOR ROAD
- TYPICAL CROSS SECTION

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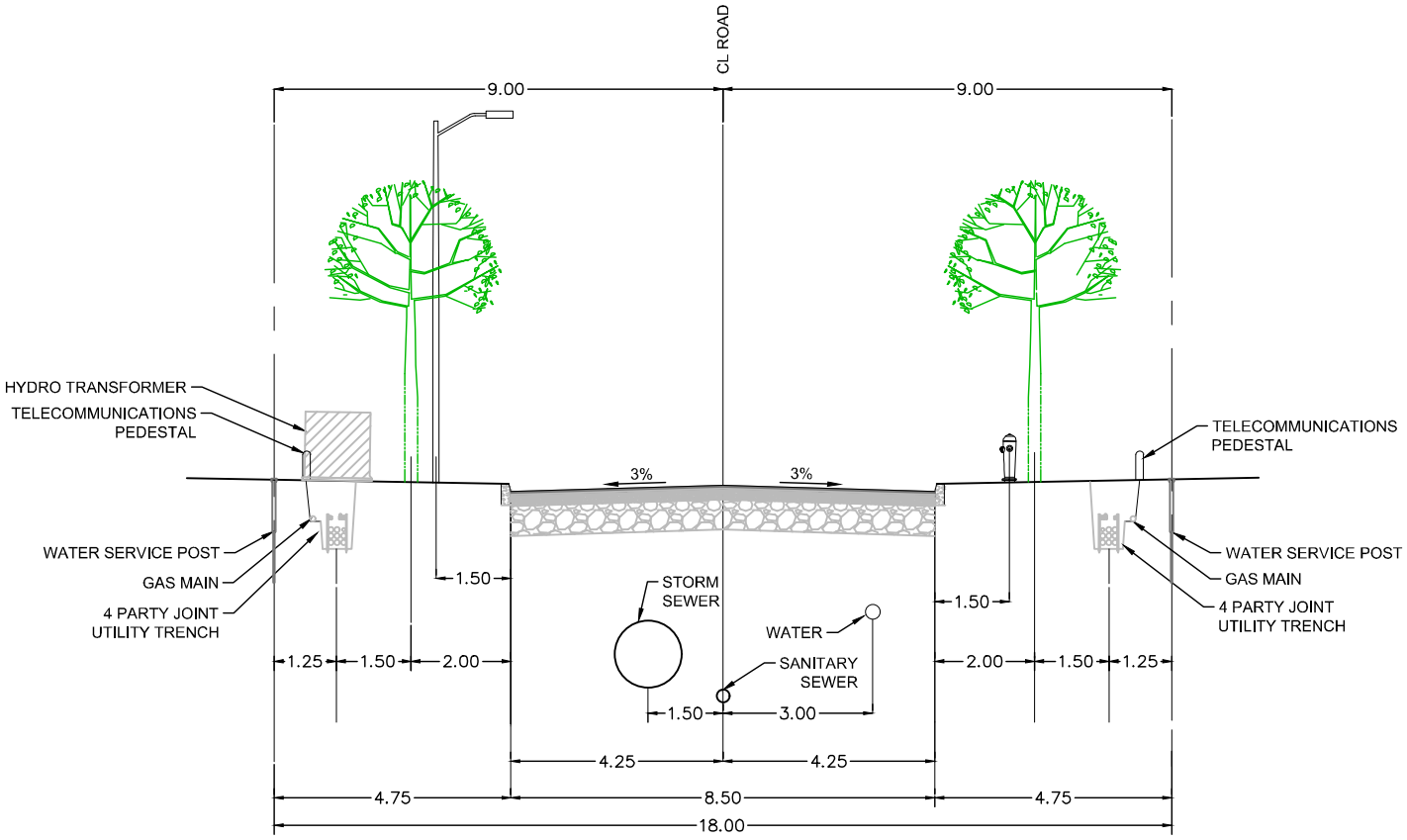

KANATA NORTH
COMMUNITY DESIGN PLAN

FIGURE NO. 31
LOCAL ROAD
- TYPICAL 18m ROW
CROSS SECTION

DATE
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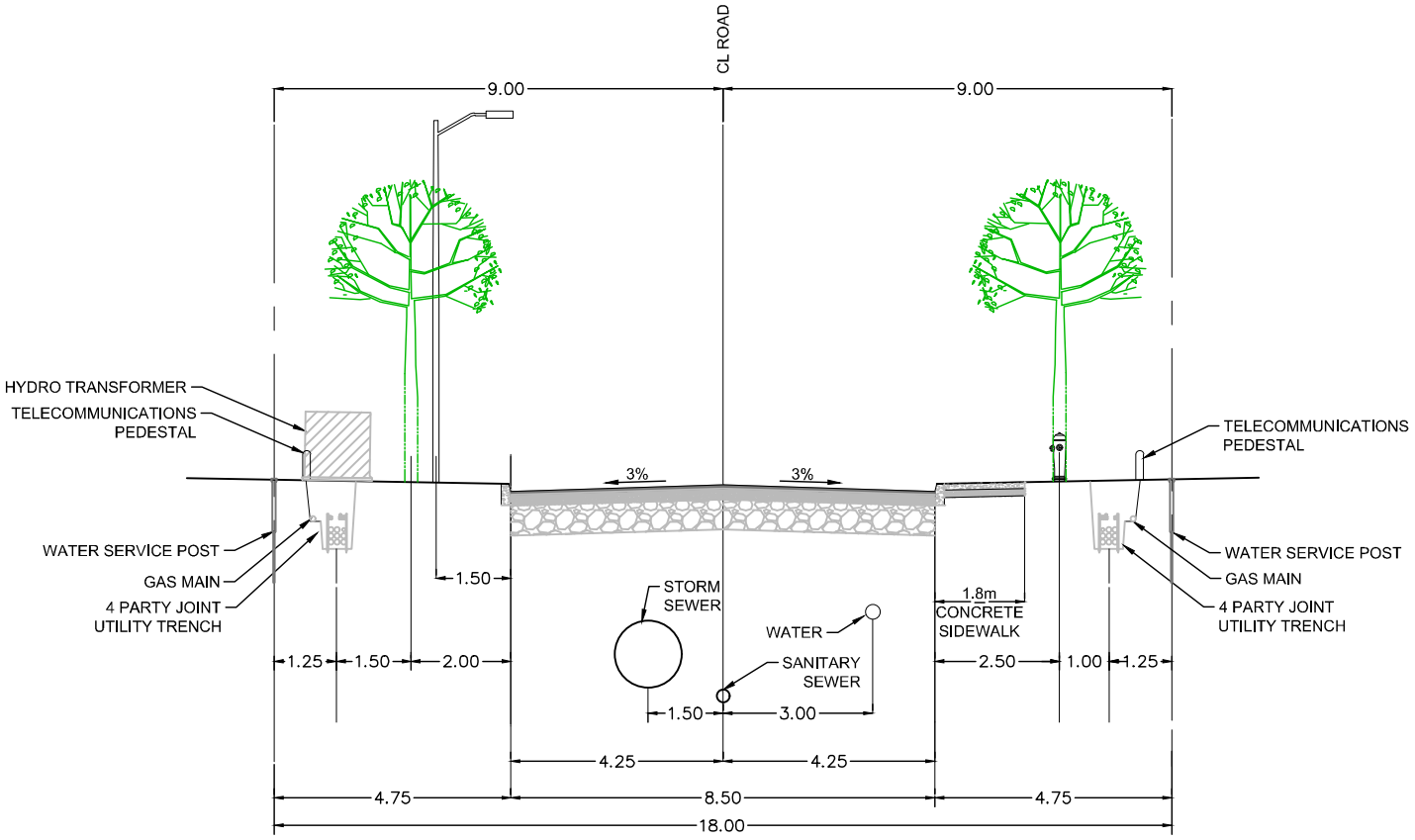

KANATA NORTH
COMMUNITY DESIGN PLAN

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FIGURE NO. 32

LOCAL ROAD
- TYPICAL 18m ROW CROSS SECTION WITH SIDEWALK

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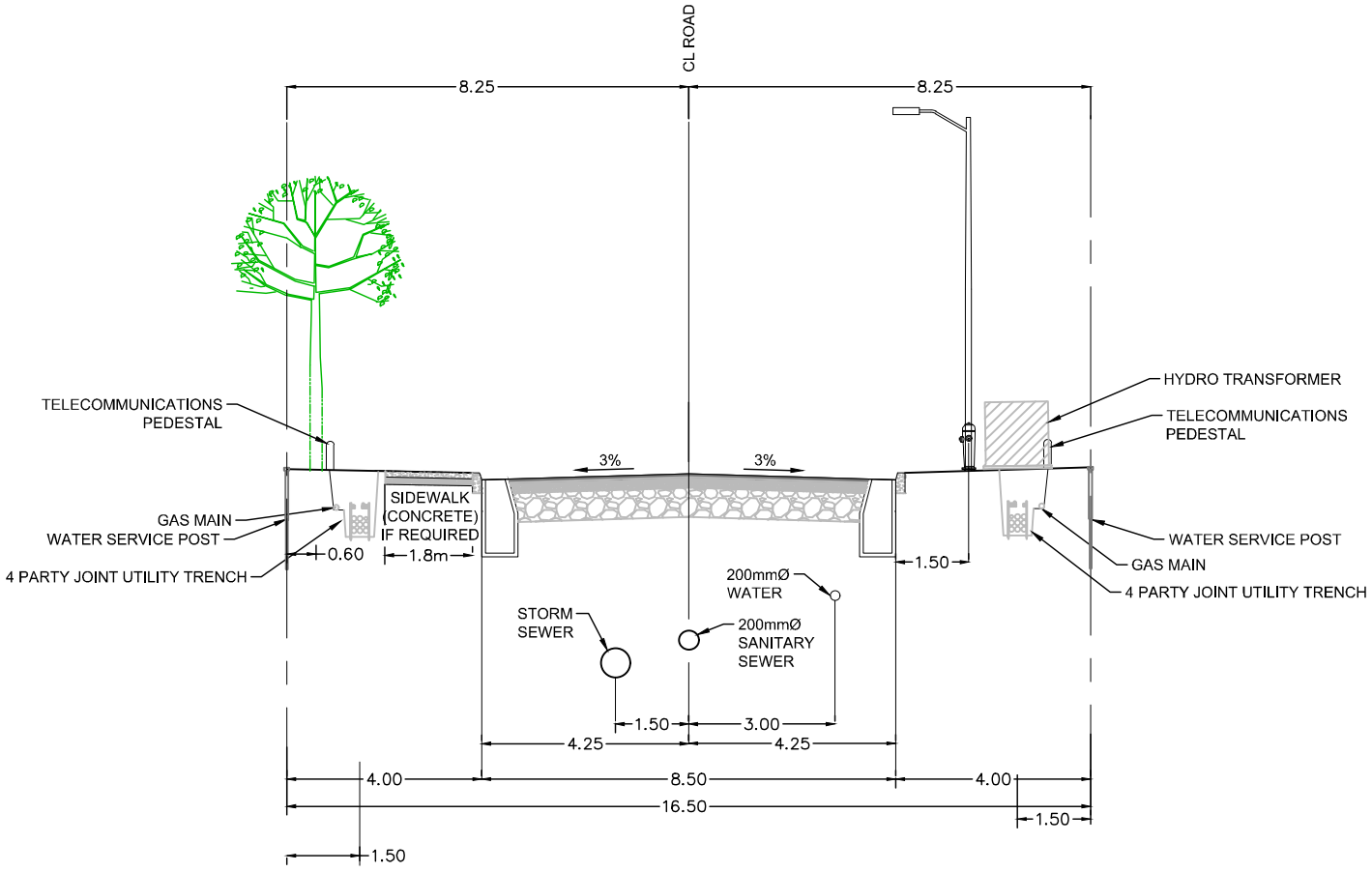

NOTES:

FOR SINGLE LOADED ROAD, BOULEVARD WITH NO HOUSING MAY BE REDUCED TO A MINIMUM OF 1.5m. HOUSING AND TREES TO BE LOCATED ON OPPOSITE SIDES OF THE STREET.

KANATA NORTH

COMMUNITY DESIGN PLAN

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FIGURE NO. 33

LOCAL ROAD
- TYPICAL 16.5m ROW
CROSS SECTION

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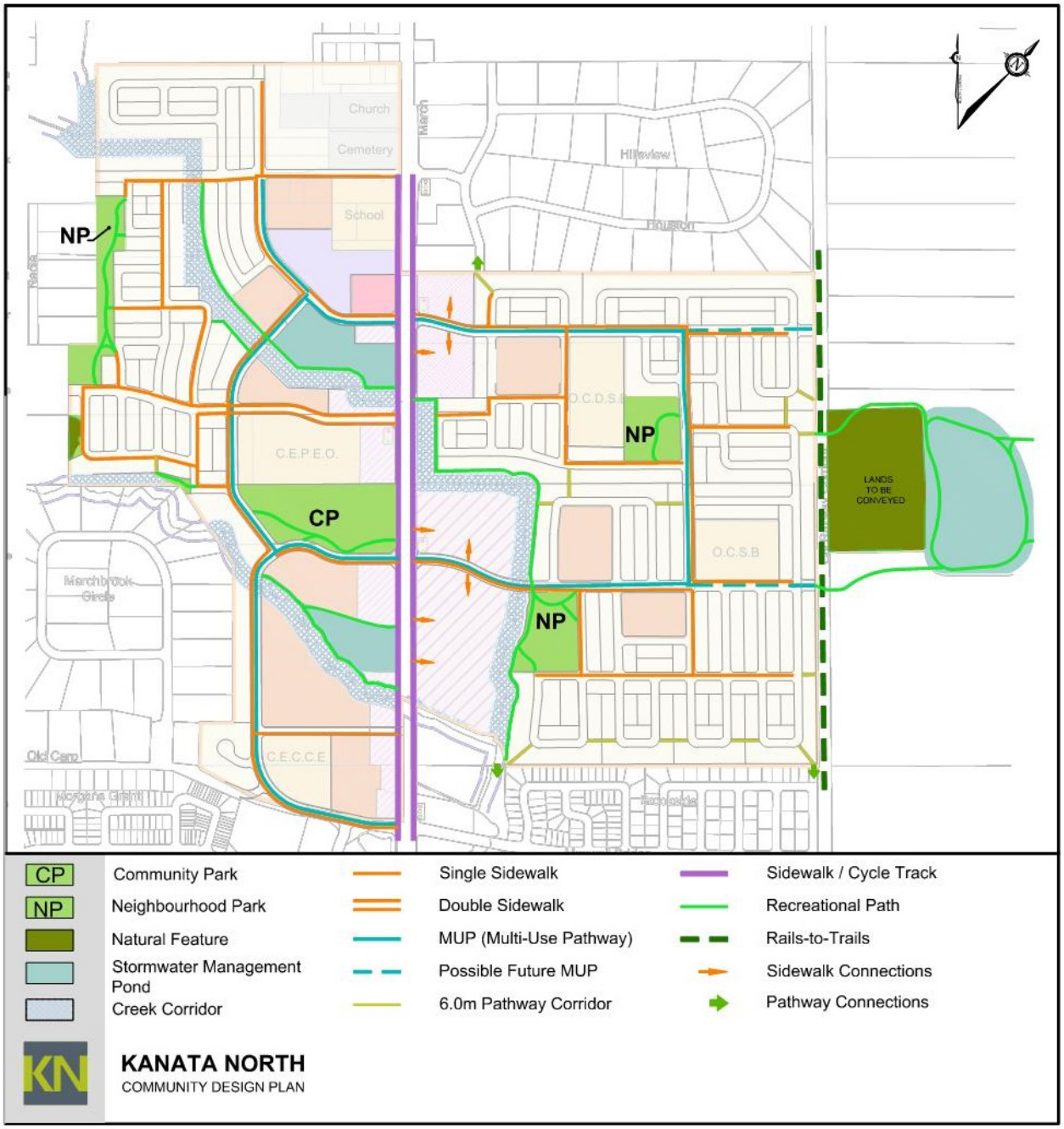


Figure 34 – Parks and Pathways Plan

The KNCDP TMP Existing Conditions Report indicated that active transportation modal shares within the TAI are significantly lower than the target modal shares identified in the City's 2013 TMP. Given the density of existing and planned residential development and the proximity of major employment areas, efforts should be made to further support and promote active transportation within the TAI.

The walking and cycling facilities shown in the Parks and Pathways Plan are anticipated to achieve the City's 2013 TMP targets for active transportation modal shares in the KNUEA.

On-Road Facilities

On-road walking and cycling facilities are described as follows:

- It is anticipated that sidewalks and raised cycle tracks will be provided along March Road as part of the planned widening from two to four lanes. This will provide improved connectivity to the existing bike lanes and sidewalks along March Road south of the KNUEA.
- Sidewalks and raised cycle tracks should be extend along March Road to the limit of the urban four-lane cross section and transition to a paved shoulder where the urban section transitions to rural (a point north of the Maxwell Road/St. Isidore intersection).
- Permeability across March Road will be provided via the four signalized access connections.
- The internal collector road network will include sidewalks and multi-use pathways (MUPs) to encourage the use of active transportation modes for utilitarian trips such as shopping, attending school, and visiting neighbours.
- Sidewalks will be provided along select local roadways connecting residential areas and other land uses.
- Sidewalk will be provided on Old Carp Road along the frontage of the KNUEA, providing improved connectivity to the Morgan's Grant community.

Off-Road Facilities

Off-road pedestrian and cycling facilities will include:

- Recreational pathways along the two creek corridors that extend through the community.
- A recreational pathway connection to the proposed stormwater management pond feature east of the former CN railway corridor.
- 6m pathway corridors providing direct pedestrian and cyclist connections throughout the community.
- 6m pathway corridors to the adjacent Hillsview Subdivision and other possible future pathway/road connections.

The off-road recreational pathways will connect to March Road, to the existing recreational pathway east of Shirley's Brook through the Brookside community, and to the internal collector and local road network as shown in the Preliminary Park and Pathway Plan. The off-road recreational pathways will be designed in accordance with the criteria identified in the City of Ottawa's *Park and Pathway Development Manual* for recreational paths.

Details of the on-road/off-road cycling and pedestrian connections should be reviewed as part of the subdivision process to ensure safe and easy access between the various features of the community.

The pedestrian and cycling network, as shown on the Parks and Pathways Plan, provides connections to all land-uses within the subject lands, as well as the existing communities to the north and south. The pedestrian and cycling network will be fully integrated with the City of Ottawa's existing pedestrian and cycling network.

9.3 Transit Servicing Plan

The park and ride location shown in alternative design Concept B was further refined and moved to the north side of the collector roadway. The park and ride parcel shown in the Preferred Land Use Plan wraps around the proposed fire hall in the northwest quadrant of the March Road intersection, providing frontage on both the collector road as well as March Road. This configuration provides the opportunity for an access on the collector road as well as March Road if desired. It also provides the opportunity to share staff facilities between the Park and Ride and the fire hall. A detailed design of the Park and Ride was not undertaken through the CDP process.

The collector roads within the KNUEA, as well as March Road, are identified as potential transit streets within the community. Final route(s) will be determined by OC Transpo. OC Transpo will provide input on the desired stop locations and service frequency as the site builds out. Provision for transit service in early phases of development will be encouraged through the creation of Early Service Agreements between developers and City of Ottawa, Transit Services. Early transit service will help achieve the projected ridership targets and minimize vehicular site traffic.

9.4 Parking Strategy

Parking will be permitted on one side of collector roadways except the Midblock Collector (Street 'D'), which will permit parking on both sides of the roadway. Parking will be permitted on both sides of all local roadways within the KNUEA.

Discussions were held with City staff regarding potential parking strategies that could be implemented to maximize on-street parking during the draft plan of subdivision stage. The following strategies should be considered during the draft plan of subdivision process.

- Construct townhouse blocks with either four or six units (all paired driveways);
- Wide and shallow townhouse lots;
- Multi-unit residential with rear-access parking;
- Multi-unit residential with basement-level parking;
- Communal parking areas;
- Visitor parking areas;
- Increased mixing with singles and townhouses.

10.0 TRANSPORTATION IMPACT ASSESSMENT

This section outlines the transportation impacts of the Preferred Land Use Plan and identifies recommended mitigation measures to minimize or offset negative effects and maximize positive effects.

The Demonstration Plan, shown in **Figure 35**, is based on the Preferred Land Use Plan and adds an additional level of detail to illustrate one way in which the Land Use Plan could be implemented. This plan provides guidance for the implementation of the Land Use Plan. It is conceptual and the lands do not have to develop precisely as shown.

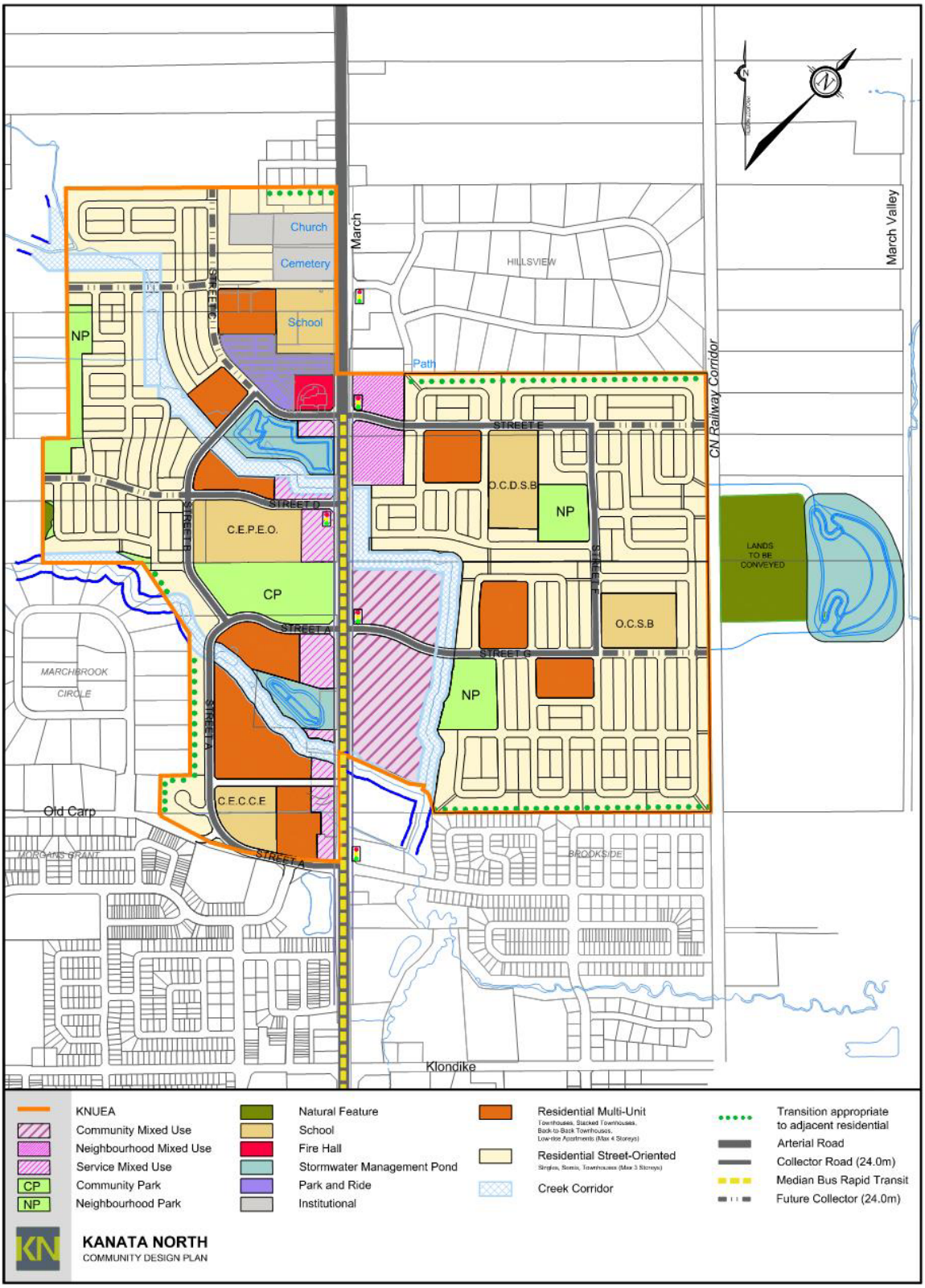


Figure 35 – Demonstration Plan

The Demonstration Plan has been used as the basis for estimating development related traffic and calculating total future traffic projections.

10.1 Trip Generation

Based on the Demonstration Plan, the development of the Kanata North lands has the potential to include 960 singles, 950 street townhouses, 1,040 multi-unit residential units, 300,000 square feet (GFA) of community commercial, 100,000 square feet (GFA) of neighbourhood commercial, three elementary schools, one high school and a park and ride lot consisting of approximately 500 spaces. For the purposes of this analysis, all residential units have been increased by approximately 10% to account for fluctuation in the overall number of units at build-out.

Trips generated by the KNUEA have been estimated using relevant peak hour rates identified in the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 9th Edition*. The ITE Land Use Code 230 Townhouse/Condominium has been used to estimate the trips generated by street townhouses and the multi-unit residential units.

The peak hour trips generated by the KNUEA are outlined in the following table.

Table 12: ITE Trip Generation

Land Use	ITE Code	Units / GFA / Parking Spaces	AM Peak (vph[1])			PM Peak (vph)		
			In	Out	Total	In	Out	Total
Single Detached Dwellings	210	1,070	190	570	760	560	329	889
Townhouse / Condominium	230	2,270	107	520	627	521	256	777
Residential Total			***297***	***1,090***	***1,387***	***1,081***	***585***	***1,666***
Shopping Center	820	300,000s.f.	179	109	288	600	651	1,251
Specialty Retail Center	826	100,000s.f.	42	26	68	115	146	261
Commercial Total			***221***	***135***	***356***	***715***	***797***	***1,512***
Elementary School #1	520	580	144	117	261	43	44	87
Elementary School #2	520	580	144	117	261	43	44	87
Elementary School #3	520	580	144	117	261	43	44	87
High School	530	800	189	155	344	49	55	104
Institutional Total			***621***	***506***	***1,127***	***178***	***187***	***365***
Park and Ride	090	500	299	80	379	78	233	311
Total			**1,513**	**2,003**	**3,516**	**2,192**	**1,901**	**4,093**

1. vph = vehicles per hour

The trip generation surveys compiled in the *ITE Trip Generation Manual* only record vehicle trips, and the sites surveyed are typically located in suburban locations in the United States where non-auto modes of transportation typically have a modal share of 10% or less. Where multiple modes

of transportation are readily available, it is considered good practice to express projected trip generation volumes in terms of person trips, instead of vehicle trips. To convert ITE vehicle trip rates to person trip rates, two adjustment factors have been applied:

- Vehicle occupancy factor: 1.29 (taken from the 2011 TRANS O-D Survey Report)
- Non-auto usage factor: 1.1 (non-auto trips not counted in ITE surveys, assumed 10%)

Combining the two factors gives an overall vehicle trip to person trip adjustment factor of approximately 1.42. It should be noted that all trips generated by the proposed schools are anticipated to be vehicle trips and have not been adjusted to reflect person trips. The person trip generation is summarized in the following table.

Table 13: Peak Hour Person Trip Generation (Residential and Commercial)

Land Use	Vehicle Trips (ITE)			Person Trip Factor	Person Trips		
	In	Out	Total		In	Out	Total
Single Detached Dwellings	190 (560)	570 (329)	760 (889)	x 1.42 →	270 (795)	810 (467)	1,080 (1,262)
Townhouse / Condominium	107 (521)	520 (256)	627 (777)		151 (739)	739 (364)	890 (1,103)
Residential Total					**421 (1,534)**	**1,549 (831)**	**1,970 (2,365)**
Shopping Center	179 (600)	109 (651)	288 (1,251)	x 1.42 →	254 (852)	155 (924)	409 (1,776)
Specialty Retail Center	42 (115)	26 (146)	68 (261)		60 (163)	37 (208)	97 (371)
Commercial Total					**314 (1,015)**	**192 (1,132)**	**506 (2,147)**
Total					**735 (2,549)**	**1,741 (1,963)**	**2,476 (4,512)**

XX = AM Peak
(XX) = PM Peak

The number of car trips that the site will generate has been estimated by categorizing the person trips by modal share. The modal shares identified in the *2011 TRANS O-D Survey Report* for the Kanata/Stittsville Region were adjusted to reflect the increased transit modal share of 21%, with the auto driver share reduced accordingly. The 21% transit modal share will be achieved through the implementation of the planned transit projects outlined in the City's 2013 TMP affordable plan for the Kanata North area.

The modal share values applied to the trips generated by the KNUEA relate specifically to observed trips having an origin and destination beyond the Kanata/Stittsville region. A full breakdown of the trips generated by the KNUEA is shown in the following table.

Table 14: Peak Hour Person Trips by Modal Share (Residential and Commercial)

Travel Mode	Modal Share	Residential			Commercial		
		In	Out	Total	In	Out	Total
Total Person Trips		**421 (1,534)**	**1,549 (831)**	**1,970 (2,365)**	**314 (1,015)**	**192 (1,132)**	**506 (2,147)**
Auto Driver	59%	248 (905)	914 (490)	1,162 (1,395)	186 (599)	113 (668)	299 (1,267)
Auto Passenger	15%	63 (230)	233 (125)	296 (355)	47 (152)	29 (170)	76 (322)
Transit	21%	89 (322)	325 (175)	414 (497)	66 (213)	40 (238)	106 (451)
Non-Motorized	5%	21 (77)	77 (41)	98 (118)	15 (51)	10 (56)	25 (107)

XX = AM Peak
(XX) = PM Peak

Due to the nature of the proposed land uses, it is anticipated that a certain percentage of the trips generated by the residential and commercial land uses will be internally captured within the site. In this case a typical example of an internally captured trip would be someone shopping at the proposed retail and returning home afterwards, without having to use March Road.

The ITE Trip Generation Handbook, 9th Edition identifies a 20% reduction to the total trips between the retail and residential developments. Internally captured trips are summarized in the following table.

Table 15: Peak Hour Internally Captured Trips (Residential and Commercial)

Trip Type	Residential			Commercial		
	In	Out	Total	In	Out	Total
Total Vehicle Trips	**248 (905)**	**914 (490)**	**1,162 (1,395)**	**186 (599)**	**113 (668)**	**299 (1,267)**
External	131 (764)	797 (349)	928 (1,113)	155 (472)	82 (541)	237 (1,013)
Internal	117 (141)	117 (141)	234 (282)	31 (127)	31 (127)	62 (254)

XX = AM Peak
(XX) = PM Peak

The commercial land uses are expected to generate two types of external peak hour trips: primary and pass-by trips. Primary trips are made for the specific purpose of visiting the site and pass-by trips are made as intermediate stops on the way to another destination. Peak hour pass-by trips have been estimated based on a pass-by rate of 34%. The *ITE Trip Generation Handbook, 9th Edition* identifies this percentage as an average rate for the Shopping Centre land use. The pass-by trips generated by the retail developments are part of the observed background traffic and do not constitute 'new' trips on the adjacent road network. The primary and pass-by trip generation is summarized in the following table.

Table 16: Primary and Pass-by Trips (Commercial)

Trip Type	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
External Vehicle Trips	**155**	**82**	**237**	**472**	**541**	**1,013**
Primary	114	41	155	299	368	667
Pass-by	41	41	82	173	173	346

Based on the calculations presented above, the multi-modal trip generation characteristics for the proposed residential, commercial and institutional land uses within the KNUEA can be summarized as follows:

- The KNUEA is anticipated to generate a total of **2,671** and **2,802** external auto driver trips during the weekday AM and PM peak hours respectively.
- The KNUEA is anticipated to generate a total of **372** and **677** auto passenger trips during the weekday AM and PM peak hours respectively.
- The KNUEA is anticipated to generate a total of **520** and **948** transit trips during the weekday AM and PM peak hours respectively.
- The KNUEA is anticipated to generate a total of **123** and **225** non-motorized trips during the weekday AM and PM peak hours respectively.

10.2 Trip Distribution

The projected distribution of primary and pass-by vehicular trips generated by the KNUEA has been derived with appropriate consideration given to several key factors, including:

- Existing traffic patterns;
- The location of the site accesses with respect to the adjacent roadway system; and
- The principles of logical trip routing.

The distribution of vehicular trips generated by the KNUEA during the weekday AM and PM peak hours can be summarized as follows:

Residential/Institutional

- 85% to/from the south;
  - 65% to/from the south via March Road;
  - 10% to/from the east via Terry Fox Drive;
  - 10% to/from the west via Terry Fox Drive;
- 15% to/from the north;
  - 10% to/from the north via Dunrobin Road;
  - 5% to/from the west via March Road.

Commercial

- 85% to/from the south;
  - 10% to/from the east via Maxwell Bridge Road;
  - 10% to/from the east via Klondike Road;
  - 10% to/from the east via Shirley's Brook Drive;

  - 5% to/from the west via Old Carp Road;
  - 10% to/from the west via Halton Terrace;
  - 20% to/from the west via Klondike Road
  - 15% to/from the west via Morgan's Grant Way
  - 5% to/from the south via March Road;

- 15% to/from the north;
  - 10% to/from the north via Dunrobin Road;
  - 5% to/from the west via March Road.

Park and Ride

- 70% to/from the KNUEA;
- 20% to/from the north;
  - 15% to/from the north via Dunrobin Road;
  - 5% to/from the west via March Road;
- 10% to/from the south;
  - 5% to/from the east via Maxwell Bridge Road;
  - 5% to/from the west via Halton Terrace.

The distribution of pass-by trips generated by the commercial developments has been estimated based on the existing peak hour traffic patterns along March Road. It has been conservatively assumed that half of the intra-community trips generated by the proposed residential, commercial and institutional developments will cross March Road using the nearest intersection.

Year 2026 and 2031 total traffic volumes have been calculated by adding the site generated traffic volumes to the background traffic volumes. Total traffic volumes for the 2026 build-out and 2031 horizon years are shown in **Figures 36** and **37**.

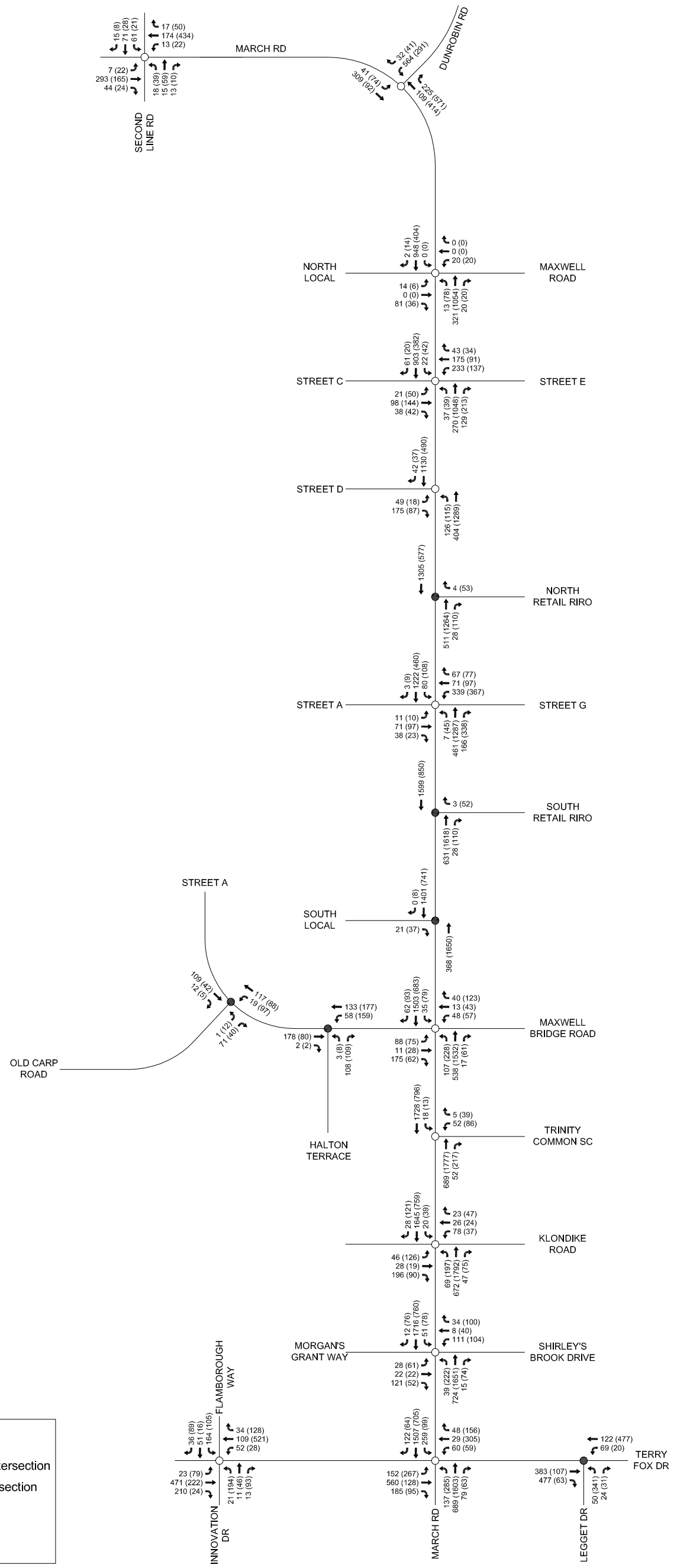
10.3 Total Screenline Analysis

The following screenline analysis has been completed at the TAI screenline and March Road screenline for the 2026 and 2031 total traffic conditions. The lane capacities at the screenlines are based on the network lane capacities presented in **Section 5.4**. For the purposes of this analysis, March Road is assumed to be widened from two to four lanes through the KNUEA, increasing the overall capacity at the March Road screenline to 1800 vehicles per hour.

Commercial vehicle volumes at the screenlines were accounted for by the application of a 1.16 commercial vehicle factor (5% heavy goods, 6% light goods) to the peak hour directional traffic volumes. Outside the urban core, the City of Ottawa screenline operational standard is LOS 'D' (v/c ≤ 0.90).

10.3.1 2026 Total Screenline Analysis

The 2026 total traffic volumes crossing the TAI and March Road screenlines during the weekday AM and PM peak hours are shown in **Figure 38**. The following table shows the LOS available at the screenlines during the AM and PM peak hours under the 2026 total traffic condition.



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

KANATA NORTH

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FIGURE NO. 36

2026 TOTAL TRAFFIC VOLUMES

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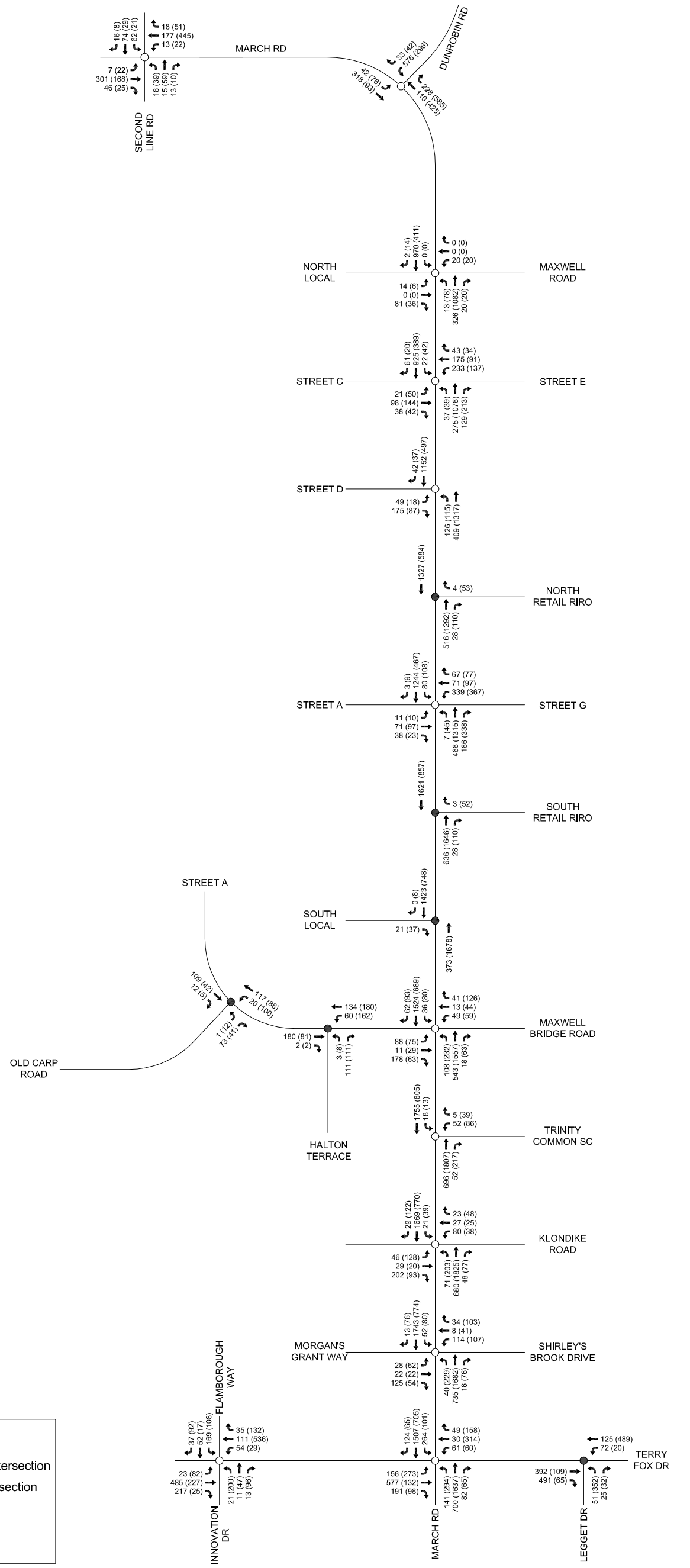

LEGEND

- Unsignalized Intersection
- Signalized Intersection
- xx VPH AM Peak Hour
- (xx) VPH PM Peak Hour

KANATA NORTH

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FIGURE NO.37

2031 TOTAL TRAFFIC VOLUMES

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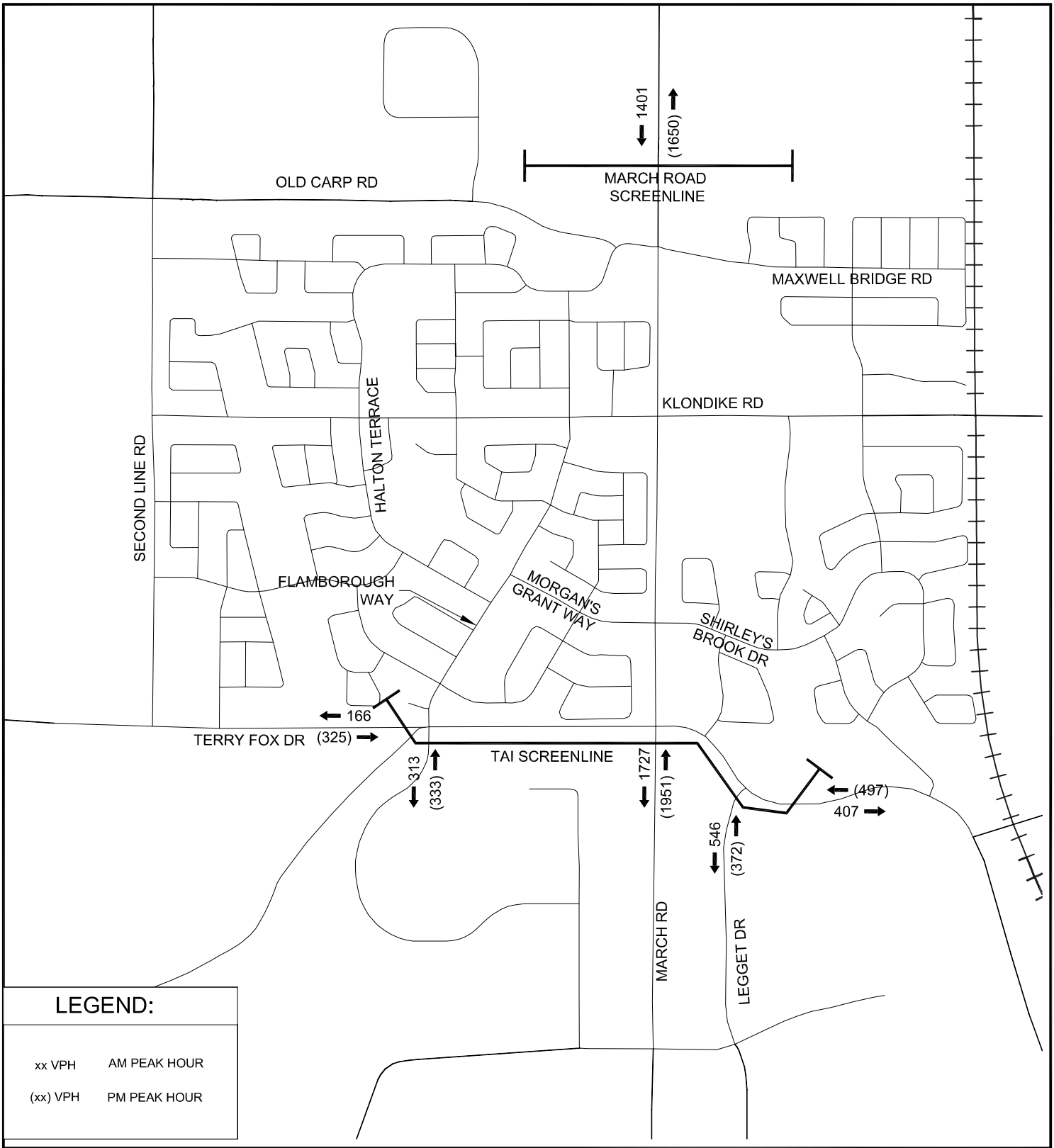

KANATA NORTH

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FIGURE NO. 38

SCREENLINE - 2026 TOTAL
TRAFFIC VOLUMES

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Table 17: 2026 Total Screenline Performance, AM and PM Peak Hours

Road	Directional Capacity (PCU's)	Peak Directional Traffic Volumes		Peak Directional PCU's		v/c Ratios and LOS				Current Directional Capacity @ LOS 'D'	Deficiencies	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak		PM Peak			AM Peak	PM Peak
						v/c	LOS	v/c	LOS			
TAI Screenline												
Terry Fox (west of Innovation)	900	166	325	192	377	0.21	A	0.42	A	810	None	None
Innovation	900	313	333	363	386	0.40	A	0.43	A	810	None	None
March	2700	1,727	1,951	2,003	2,263	0.74	C	0.84	D	2,430	None	None
Legget	900	546	372	633	432	0.70	B	0.48	A	810	None	None
Terry Fox (east of Legget)	900	407	497	472	576	0.52	A	0.64	B	810	None	None
Overall	**6300**	**3,159**	**3,478**	**3,663**	**4,034**	**0.58**	**A**	**0.64**	**B**	**5,670**	**None**	**None**
March Road Screenline												
March	1800	1,401	1,650	1,625	1,914	**0.90**	**E**	**1.06**	**F**	1,620	**5**	**294**

The TAI screenline is anticipated to continue to operate below capacity during the AM and PM peak hours under the 2026 total traffic condition. The TAI screenline is anticipated to operate with a v/c ratio of 0.58 during the AM peak hour and 0.64 during the PM peak hour.

With the addition of traffic generated by the KNUEA and widening of March Road in place, the March Road screenline is anticipated to operate with a v/c ratio of 0.90 and 1.06 during the AM and PM peak hours respectively. This suggests that additional through lane capacity is required along March Road following the full development of the KNUEA.

It should be noted that screenline analysis is a high-level comparison of forecasted demands and lane capacities on the major road network. All projected traffic is assigned to mainline through lanes with no consideration for the additional capacity provided by auxiliary turning lanes. Intersection capacity analysis is a more detailed evaluation tool and more accurately reflects the existing and future operating conditions.

Notwithstanding the differences between the two methods of evaluation, other corridors in the greater Kanata North area apart from the KNUEA may need to be investigated by the City or through other long-term planning studies to provide additional capacity in the future.

The intersection analysis presented in **Section 10.4** Total Intersection Analysis evaluates the ability of study area intersections to operate at an acceptable level based on the planned four-lane cross section.

10.3.2 2031 Total Screenline Analysis

The 2031 total traffic volumes crossing the TAI and March Road screenlines during the weekday AM and PM peak hours are shown in **Figure 39**. The following table shows the LOS available at the screenlines during the AM and PM peak hours under the 2031 total traffic condition.

Table 18: 2031 Total Screenline Performance, AM and PM Peak Hours

Road	Directional Capacity (PCU's)	Peak Directional Traffic Volumes		Peak Directional PCU's		v/c Ratios and LOS				Current Directional Capacity @ LOS 'D'	Deficiencies	
		AM Peak	PM Peak	AM Peak	PM Peak	AM Peak		PM Peak			AM Peak	PM Peak
						v/c	LOS	v/c	LOS			
TAI Screenline												
Terry Fox (west of Innovation)	900	169	334	196	387	0.21	A	0.43	A	810	None	None
Innovation	900	323	343	375	398	0.42	A	0.44	A	810	None	None
March	2700	1,759	1,996	2,040	2,315	0.65	D	0.86	D	2,430	None	None
Legget	900	563	384	653	445	0.73	C	0.49	A	810	None	None
Terry Fox (east of Legget)	900	417	509	483	590	0.54	A	0.66	B	810	None	None
Overall	**6300**	**3,231**	**3,566**	**3,747**	**4,135**	**0.59**	**A**	**0.66**	**B**	**5,670**	**None**	**None**
March Road Screenline												
March	1800	1,423	1,678	1,650	1,946	**0.92**	**E**	**1.08**	**F**	1,620	**30**	**326**

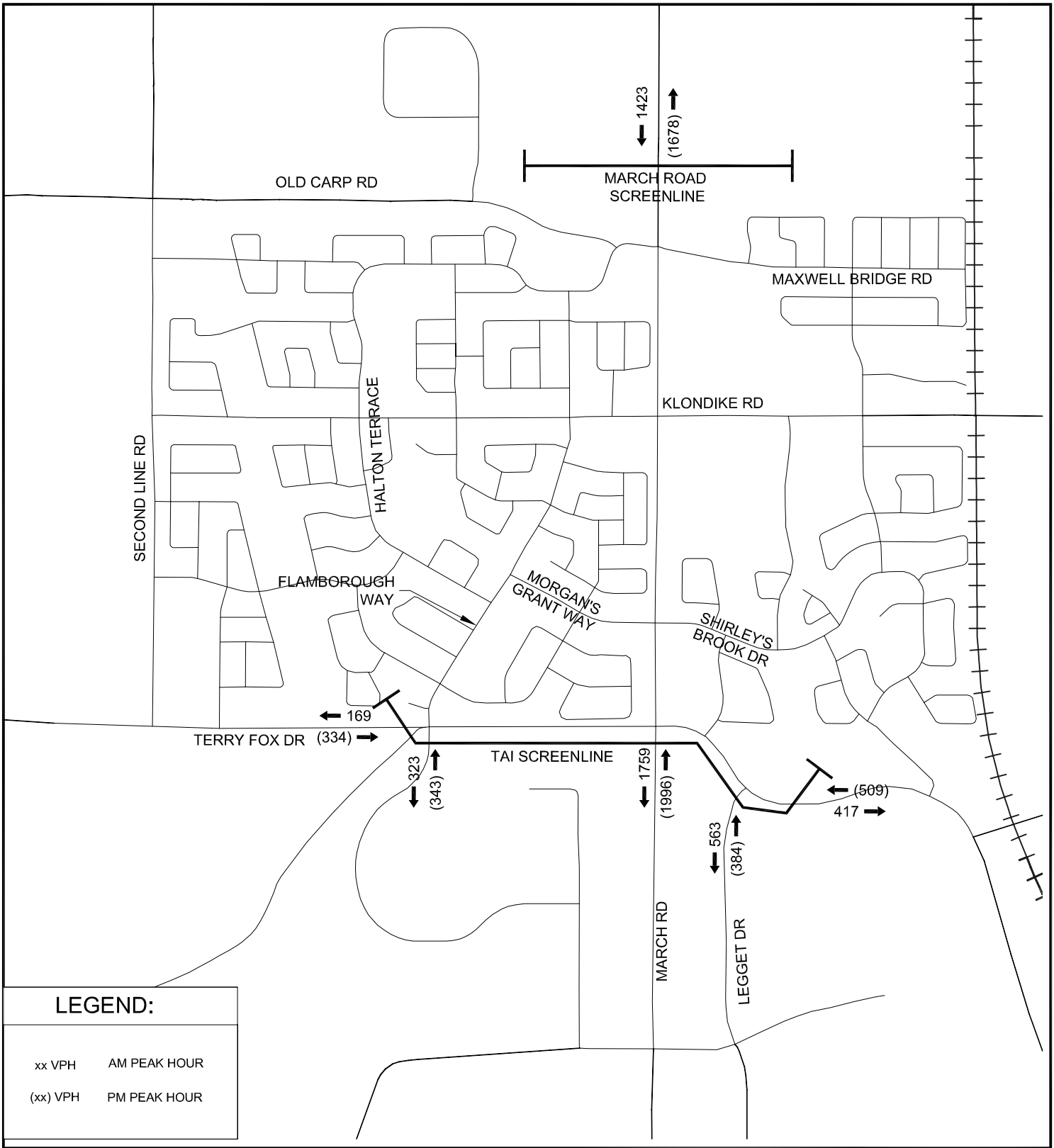
The TAI screenline is anticipated to operate below capacity during the AM and PM peak hours under the 2026 total traffic condition. The TAI screenline is anticipated to operate with a v/c ratio of 0.59 during the AM peak hour and 0.66 during the PM peak hour.

With the addition of traffic generated by the KNUEA and widening of March Road in place, the March Road screenline is anticipated to operate with a v/c ratio of 0.92 and 1.08 during the AM and PM peak hours respectively. This suggests that additional lane capacity is required along March Road following the full development of the KNUEA.

Once again, it should be noted that screenline analysis is a high-level comparison of forecasted demands and lane capacities on the major road network. Intersection capacity analysis is a more detailed evaluation tool and more accurately reflects the existing and future operating conditions.

Nevertheless, other corridors in the Kanata North area may need to be investigated to provide additional capacity in the future.

The intersection analysis presented in **Section 10.4** Total Intersection Analysis evaluates the ability of study area intersections to operate at an acceptable level based on the planned four-lane cross section.



KANATA NORTH

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FIGURE NO. 39

SCREENLINE - 2031 TOTAL
TRAFFIC VOLUMES

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10.4 Total Intersection Analysis

Intersection capacity analysis has been completed for the projected 2026 and 2031 total traffic conditions. For the purposes of this analysis, March Road is assumed to be widened from two to four lanes through the KNUEA.

The analysis is based on traffic signal control at the following accesses:

- March Road / South Collector (Streets 'A' and 'G')
- March Road / Midblock Collector (Street 'D')
- March Road / North Collector (Streets 'C' and 'E')
- March Road / Maxwell Road / North Local

Side street stop control is recommended on Old Carp Road and on Halton Terrace at their respective intersections along the North-South Collector (Street 'A'). Side street stop control is also recommended at the southern local right-in right-out connection on the west side of March Road.

Auxiliary lanes at the KNUEA access intersections are assumed as follows:

- March Road / South Collector (Streets 'A' and 'G')
  - Northbound, southbound and eastbound left turn lanes
  - Dual westbound left turn lanes
- March Road / Midblock Collector (Street 'D')
  - Northbound and eastbound left turn lane
- March Road / North Collector (Streets 'C' and 'E')
  - Northbound, southbound, eastbound and westbound left turn lanes
- March Road / North Local / Maxwell Road
  - Northbound, southbound, eastbound and westbound left turn lanes
- Old Carp Road / North-South Collector (Street 'A')
  - Westbound left turn lane
- Halton Terrace / North-South Collector (Street 'A')
  - Westbound left turn lane

10.4.1 2026 Total Traffic

The signal timing plans for all intersections within the urban area have been optimized and coordinated to demonstrate the overall capacity of the network. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix E**.

Table 19: Intersection Capacity Analysis – 2026 Total Traffic

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Movement	Max v/c or Delay	LOS	Movement
March Road / Second Line Road[1]	0.40	A	SB	0.46	A	WBT
March Road / Dunrobin Road[1]	0.68	B	SBL	0.64	B	WBT
March Road / Maxwell Road / North Local[1]	0.35	A	SBT/R	0.38	A	NBT/R
March Road / Street C / Street E[1]	0.84	D	WBL	0.73	C	EBT/R
March Road / Street D[1]	0.71	C	EBR	0.51	A	EBR
March Road / North Retail RIRO	9 sec	A	WB	11 sec	B	WB
March Road / Street A / Street G[1]	0.79	C	WBL	**1.02**	**F**	**NBT/R**
March Road / South Retail RIRO[2]	10 sec	A	WB	11 sec	B	WB
March Road / South Local[2]	10 sec	A	EB	11 sec	B	EB
Old Carp Road / Street A[2]	9 sec	A	NB	9 sec	A	NB
Halton Terrace / Street A[2]	10 sec	A	NB	10 sec	A	NB
March Road / Maxwell Bridge Road / Street A[1]	0.77	C	SBT	0.81	D	EBL
March Road / Trinity Common SC[1]	0.65	B	SBT	0.55	A	NBT/R
March Road / Klondike Road[1]	0.64	B	SBT/R	0.77	C	EBL
March Road / Morgan's Grant Way / Shirley's Brook Drive[1]	0.63	B	WBL	0.65	B	WBL
March Road / Terry Fox Drive[1]	0.82	D	SBL	0.85	D	EBL
Terry Fox Drive / Flamborough Way / Innovation Drive[1]	0.75	C	SBL	0.72	C	NBL
Terry Fox Drive / Legget Drive[2]	21 sec	C	NB	**58 sec**	**F**	**NB**

1. Signalized Intersection
2. Unsignalized Intersection

The March Road/Street A/Street G intersection is expected to operate with a v/c ratio of 1.02 during the PM peak hour. The northbound right turn volumes greatly exceed the warrant threshold of 60 vehicles per hour or 10% of the adjacent through traffic. This intersection is anticipated to operate with a v/c ratio of 0.88 during the PM peak hour with the addition of a northbound right turn lane. Based on these results, a northbound right turn lane is recommended at the March Road/Street A/Street G intersection.

Additional right-of-way will be required beyond the recommended 44.5m corridor to accommodate the recommended northbound right turn lane. The additional right-of-way requirement will be confirmed at the Plan of Subdivision stage.

The Terry Fox Drive/Legget Drive intersection is expected to operate with a 58 second delay, corresponding to a LOS F, during the PM peak hour. It should be noted that the majority of traffic creating this delay is attributable to background growth along the study area roadways.

The MTO criteria for traffic signal control were reviewed to determine the extent to which warrants are met at the Terry Fox Drive/Legget Drive intersection in the 2031 horizon year. The results show that the warrants will be 45% justified. Traffic signal warrant calculations are provided in **Appendix F**.

Based on the projected volumes at this intersection an eastbound right turn lane is warranted. It is notable that this right turn lane is also warranted under the background traffic scenario. With the addition of an eastbound right turn lane, this intersection is anticipated to operate with a delay of 49 seconds, corresponding to a LOS E, during the PM peak hour.

Monitoring of the Terry Fox Drive/Legget Drive intersection is recommended following the development of the KNCDP lands. If projected delays are realized during the PM peak hour, consideration should be given to the development of an eastbound right turn lane.

All other study area intersections are anticipated to operate under acceptable conditions during the weekday AM and PM peak hours. The maximum (i.e. 95th percentile) queue lengths at intersections within the TAI are anticipated to increase slightly, but do not result in any adverse traffic related impacts.

10.4.2 2031 Total Traffic

The signal timing plans for all intersections within the urban area have been optimized and coordinated to demonstrate the overall capacity of the network. The results of the analysis are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix E**.

Table 20: Intersection Capacity Analysis – 2031 Total Traffic

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	LOS	Movement	Max v/c or Delay	LOS	Movement
March Road / Second Line Road[1]	0.45	A	EBT/R	0.47	A	WBT
March Road / Dunrobin Road[1]	0.68	B	SBL	0.65	B	WBT

Intersection	AM Peak			PM Peak		
	Max v/c or Delay	**LOS**	**Movement**	**Max v/c or Delay**	**LOS**	**Movement**
March Road / Maxwell Road / North Local[1]	0.35	A	SBT/R	0.39	A	NBT/R
March Road / Street C / Street E[1]	0.84	D	WBL	0.73	C	EBT/R
March Road / Street D[1]	0.72	C	EBR	0.51	A	EBR
March Road / North Retail RIRO	9 sec	A	WB	11 sec	B	WB
March Road / Street A / Street G[1]	0.79	C	WBL	0.88	D	WBL
March Road / South Retail RIRO[2]	11 sec	B	WB	11 sec	B	WB
March Road / South Local[2]	10 sec	A	EB	11 sec	B	EB
Old Carp Road / Street A[2]	9 sec	A	NB	9 sec	A	NB
Halton Terrace / Street A[2]	10 sec	A	NB	10 sec	A	NB
March Road / Maxwell Bridge Road / Street A[1]	0.78	C	SBT	0.83	D	EBL
March Road / Trinity Common SC[1]	0.66	B	SBT	0.56	A	NBT/R
March Road / Klondike Road[1]	0.66	B	SBT/R	0.78	C	EBL
March Road / Morgan's Grant Way / Shirley's Brook Drive[1]	0.64	B	WBL	0.66	B	WBL
March Road / Terry Fox Drive[1]	0.83	D	SBL	0.87	D	EBL
Terry Fox Drive / Flamborough Way / Innovation Drive[1]	0.76	C	SBL	0.75	C	NBL
Terry Fox Drive / Legget Drive[2]	22 sec	C	NB	**69 sec**	**F**	**NB**

1. Signalized Intersection
2. Unsignalized Intersection

The Terry Fox Drive / Legget Drive intersection is expected to operate with a 69 second delay, corresponding to a LOS F, during the PM peak hour. It should be noted that the majority of traffic creating this delay is attributable to background growth along the study area roadways. Monitoring of the Terry Fox Drive/Legget Drive intersection continues to be recommended following the development of the KNUEA. If projected delays are realized during the PM peak hour, consideration should be given to the development of an eastbound right turn lane.

All other study area intersections are anticipated to operate under acceptable conditions during the weekday AM and PM peak hours. The maximum (i.e. 95th percentile) queue lengths at intersections within the TAI are anticipated to increase slightly, but do not result in any adverse traffic related impacts.

10.5 Interim Traffic

Intersection capacity analysis has been completed to determine how much development can proceed in the KNUEA before any adverse impacts are realized to the existing two-lane March Road.

For the purpose of the interim analysis, it is assumed that the initial phases of development will include the collector road network, collector access connections to March Road and predominantly residential land uses. Any initial commercial development would reduce the assumed amount of residential development.

Dedicated left turn lanes are assumed on all approaches of the new collector intersections on March Road.

The background traffic volumes along March Road were based on the 2026 projections. Analysis results will be conservative from this perspective.

It was assumed that initial phases of development will occur evenly along both sides of March Road. Trips were distributed evenly across the access connections. Consistent with the ultimate trip distribution assumptions, it is assumed that 85% of all residential trips generated by the KNUEA will arrive/depart to the south, while the remaining 15% will arrive/depart to the north.

The critical movements at the March Road/South Collector (Streets 'A' and 'G') intersection were increased to determine the number of trips that can be accommodated prior to reaching Level of Service F operating conditions. The number of trips was then converted back to dwelling units, using similar methodology as presented in **Section 10.1**, to determine the amount of residential development within the KNUEA that can be accommodated without adverse effect on March Road.

The signal timing plans for the collector intersections along March Road were optimized with 130 second cycle lengths. The analysis results for the critical March Road/South Collector (Streets 'A' and 'G') intersection are summarized in the following table for the weekday AM and PM peak hours. Detailed reports are included in **Appendix E**.

Table 21: Interim Intersection Analysis

Intersection	AM Peak			PM Peak		
	Max v/c	LOS	Movement	Max v/c	LOS	Movement
March Road / Street A / Street G	0.89	E	WBL	0.90	E	NBT/R

The analysis suggests that approximately 1,650 units can be constructed without any adverse effect on the existing two-lane March Road.

The table below relates the projected interim traffic to number of units.

Table 22: Interim Development Traffic

Units	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
1650	438	214	652	134	502	636

As previously noted, the timing of the March Road widening from two to four lanes will be determined by the City of Ottawa through future TMP updates when the urban portion of the project is brought into the affordable plan.

Consistent with the current policies of the City of Ottawa's 2014 Development Charges (DC) Background Study regarding the widening of existing arterial roads, the required roadway modifications at the interim access connections to March Road should be eligible for DC funding.

11.0 ENVIRONMENTAL IMPACTS AND MITIGATION

This section outlines the transportation-related environmental impacts of the Preferred Land Use Plan and identifies recommended mitigation measures to minimize or offset negative effects and maximize positive effects.

11.1 Natural Environment

A summary of the existing natural features within the KNUEA lands is provided in the Environmental Management Plan (EMP) prepared for the Kanata North CDP (Novatech, 2016). Elements assessed include:

- geology
- groundwater
- surface water and fish habitat
- terrestrial features and habitat
- species at risk
- woodlots

Potential transportation-related impacts to the natural environment and recommended mitigation measures are outlined as follows.

Tree Retention

The development of the KNUEA lands will impact the wooded areas identified as Woodlots S12, S20, and S23 on the Environmental Features Plan, **Drawing 112117-ENV** of the Kanata North EMP. The Demonstration Plan illustrates how the collector and local road pattern can be configured to retain portions of Woodlots S12 and S20 within the boundary of the development lands. Outside of the development, a portion of Woodlot S23 is also to be retained and conveyed to the City of Ottawa.

Blanding's Turtle Habitat

The development of the KNUEA may result in potential impacts to Blanding's Turtle habitat. Part of the recommended compensation plan includes the construction of a turtle exclusion fence to be installed along both sides of the 40 metre creek corridor, except where adjacent to park blocks. The fencing will help control and mitigate the risk of road related turtle mortality.

Culvert Crossings

The recommended collector road pattern will result in a total of three new culvert crossings of Tributaries 2 and 3, as identified in the Recommended Environmental Management Plan, **Drawing 112117-EMP** of the Kanata North EMP. Two new culvert crossings are proposed along March Road and one crossing is proposed along March Valley Road. All new crossings of Tributary 2 and 3 will be designed to meet industry standards for the following categories:

- flow/hydraulics
- fish passage
- turtle passage
- geomorphology

Stream Realignments

A portion of the Shirley's Brook main branch is located within the March Valley Road right-of-way. To mitigate any potential adverse impact of the KNUEA development on erosion and washout of the roadway embankment, it is recommended that this reach of Shirley's Brook is redesigned and relocated onto the adjacent federal lands (Department of National Defense gun range) managed by the National Capital Commission (NCC). Relocating Shirley's Brook outside the right-of-way also opens the opportunity for future improvements to March Valley Road. As noted in the Kanata North EMP, this approach has been approved in principle by the NCC and the DND.

Similarly, a portion of Tributary 2 is located within the March Road right-of-way. As shown on the Recommended Environmental Management Plan, **Drawing 112117-EMP** of the Kanata North EMP, it is recommended that this portion of Tributary 2 be realigned onto KNUEA lands as part of the planned widening of March Road from two to four lanes. The relocation will mitigate any potential erosion or washout of the roadway embankment.

11.2 Social Environment

Key considerations of the social environment include:

- existing communities,
- residential property and access,
- community facilities and access,
- recreational facilities and access,
- pedestrians and cyclists,
- noise impacts and air quality.

Potential transportation-related impacts to the social environment and recommended mitigation measures are outlined as follows.

Old Carp Road Connection

The recommended transportation network for the KNUEA lands includes a road connection to Old Carp Road. This connection provides an additional point of access to March Road via the signalized Halton Terrace/Maxwell Bridge Road intersection, as well as vehicular connectivity to the Morgan's Grant community. With the addition of Kanata North development traffic, projected volumes along Old Carp Road west of the proposed connection and along Halton Terrace south of Old Carp Road are well below the estimated capacities of each roadway. If actual volumes prove to be inconsistent with the projections of this report over time and as development progresses, additional traffic control measures could be evaluated and implemented by the City's Area Traffic Management group, as required. Possible mitigation measures could include peak hour turn restrictions.

Emergency Services

Following the preparation of the alternative design concepts, Ottawa Fire Services requested a fire station within the KNUEA for the provision of adequate emergency services. The nearest existing fire stations are on Riddell Drive at Dunrobin Road (Fire Station 45) and on Teron Road at Beaverbrook Road (Fire Station 42). The recommended location allows for full movement access to a collector road with easy access to a signalized intersection on March Road. The new fire station will be the closest location for the surrounding communities of Marchbrook Circle, Hillsview Estates, Panandrick Estates and portions of Morgan's Grant, Briarbrook and Brookside.

Pedestrians and Cyclists

The KNCDP TMP Existing Conditions Report indicated that active transportation modal shares within the TAI are significantly lower than the target modal shares identified in the City's 2013 TMP, which may be in part due to deficiencies in the existing cycling network. As noted in previous sections, the recommended pedestrian and cycling network provides connections to all land-uses within the subject lands, as well as the existing communities to the north and south.

In addition to the facilities identified in the Parks and Pathways Plan, the following measures will help achieve the targeted active transportation modal share in the KNUEA:

- a modified grid road pattern with a high degree of permeability and accessibility
- a complete streets approach for all roads within the KNUEA
- passive traffic calming features such as road narrowings and pathway crossing signage
- integration of recreational pathways around stormwater ponds and parks with the overall pedestrian and cycling network
- provision of on-street parking and street trees to assist in traffic calming
- future consideration of the former CN railway corridor as a recreational trail to enhance north-south connectivity

Noise

Street oriented housing will be used as means of mitigating any road related noise impact on new residents in the KNUEA community. As shown in the Preferred Land Use Plan, primarily non-residential land uses are recommended along either side of March Road to further buffer the residential development from road-related noise. The recommended land uses adjacent to March Road include community mixed use, service mixed use, neighbourhood mixed use, stormwater management ponds, a community park, a fire station and the park and ride.

A small amount of residential development is identified adjacent to March Road at the north end of the KNUEA. Any road related noise impacts and recommended mitigation measures will be addressed in accordance with the Environmental Noise Control Guidelines (2006) at the Plan of Subdivision stage.

Lighting

Cut-off streetlighting will be used to reduce light pollution and mitigate any negative impact on neighbouring properties.

11.3 Cultural Environment

A Phase 1 Archeological Assessment was prepared by Patterson Group in March 2013 and concluded that the subject property has archaeological potential based on its early settlement (1828), and the distance to historic roads and topographic features. The report recommended a Phase 2 Archaeological Assessment for the entire study area, which will be initiated through the subdivision approval process by individual applicants prior to development.

A former schoolhouse located at 895 March Road is the only heritage building located in the KNUEA. Currently a private business owns and operates out of this building. The Preferred Land Use Plan allows for this heritage building and its existing access to be maintained. Access to this property and other existing and proposed land uses will be reviewed as part of the planning widening of March Road from two to four lanes.

12.0 PROJECT LISTING

The Transportation Master Plan component of the Kanata North CDP satisfies the requirements of Phases 1 through 4 of the Municipal Class EA Process. The process is outlined in detail in **Section 1.3** Integrated Planning Process. Infrastructure projects that will be undertaken in concert with development of the KNUEA and their schedule classification under the Environmental Assessment Act are outlined as follows:

- Streets A, B, C, D, E, F, and G, including multi-use pathways, and interim roadway modifications at the access connections to March Road and Old Carp Road (Schedule C)
- Extension of BRT from north of Halton Terrace/Maxwell Bridge Road to Streets ‘C’ and ‘E’ (Schedule B)

Recreational pathways to and around the stormwater management ponds will be undertaken as part of the stormwater management pond projects, as identified in the KNCDP EMP. The recreational pathways that follow the 40m creek corridors will cost less than $3.5 million to implement and do not require a separate project listing, in accordance with the Class EA document.

The BRT Extension is considered a Schedule B project due to its location within the March Road right-of-way. The Class EA document suggests that for some linear transit projects, the determination of project schedule is based on the potential for environmental effects, where

- Schedule A/A+ projects can be categorized as having no or minimal adverse environmental effects,

- Schedule B projects have the potential for some adverse environmental effects, where the effects are well understood from a technical perspective and are minor in nature and mitigation is well understood, and
- Schedule C projects have the potential for significant environmental effects.

The above description of a Schedule B linear transit project is considered consistent with the BRT Extension project.

Review agencies and the public will have an opportunity to review the Class EA documentation being prepared for the KNCDP. The assessment and review process is being harmonized with the Planning Act as the development application process is occurring simultaneously. Notification of the conditions of planning approvals and the Class EA documents will be advertised through a **Notice of Completion** and there will be an opportunity to appeal to the Ontario Municipal Board (OMB). If a project has been appealed to the OMB, the requirements of the integrated approach have not been met until the OMB renders a decision allowing the project to proceed. As outlined in Section 2.8.1 of the Municipal Class EA document, a Part II Order request may be made to the Minister of the Environment or delegate.

However, the purpose of the integration provisions is to coordinate requirements under the Planning Act with the Class EA. When reviewing a request for a Part II Order, the Minister of the Environment or delegate will consider the purpose and intent of the integration provisions.

Under the Planning Act, appeals to the OMB may be made to any of the Official Plan and zoning by-law amendments or to the approval of subdivisions. The deadlines for the appeals to each application are found in the Planning Act. For Draft Plans of Subdivision, Zoning By-law amendments, and Official Plan amendments appeals are to be filed within 20 days after written notice of decisions are provided. In addition, the OMB may dismiss an appeal if the person does not submit either written or oral submissions before the approval authority has granted approval. Once approved, however, the Class EA documents and the preferred municipal infrastructure projects will not be subject to additional EA approval requirements with the submission of subsequent site plans or plans of subdivisions. Once the application is approved under the Planning Act, the requirements of the Class EA are met and projects identified in the Class Environmental Assessments for the KNCDP are approved and can proceed to construction and no additional notification under the EA Act is necessary. This allows the integration of both planning processes while ensuring the intent and requirements of both Acts are met.

The implementation, over time, of the KNCDP and the required supporting infrastructure will take place as Conditions of Approval. The approvals will be conducted under the Planning Act, and other acts as listed in **Section 13**.

13.0 NEXT STEPS

13.1 Development Approvals

Section 4 of the City of Ottawa Official Plan outlines the policies for review of development applications, and can be used as a guide to the development approvals process. Specific studies required for each development application vary, and will be identified through a pre-application consultation meeting with City Staff at the beginning of the design and review process. A Planning Rationale will typically be required to describe how the development proposal meets the intent of the Official Pan, Kanata North Community Design Plan and related City approved design

guidelines. Other studies which may be required depending on location, context and the nature of the application include a Geotechnical Study, Community Transportation Study, Servicing and Stormwater Management Study, Environmental Impact Statement, Tree Conservation Report, etc.

13.1.1 Use of Existing Studies

Many of the studies and assessments prepared through the CDP process provide significant detail and direction to support development applications. It is anticipated that for a period of generally 5 years from approval of the CDP, new development applications will be able to rely on the existing studies prepared through the CDP process. For example, heritage and archaeological conditions have been assessed for the entire KNUEA and a Stage 1 Archaeological report has been accepted by the Ministry of Tourism, Culture and Sport. Detailed analysis of transportation and servicing requirements has been provided in the Master Plan documents. In some instances, supplementary materials may be required to support changes to such things as the local road pattern or servicing to properly assess the subdivision.

Environmental studies of existing conditions have been completed through the CDP process, identifying natural heritage features and areas, and including general recommendations for mitigation. These studies are expected to form the basis of the combined Environmental Impact Statements-Tree Conservation Reports (EIS-TCR) that will be required to support the subsequent plans of subdivision and zoning by-law applications for the KNUEA. Additional field studies may be necessary to update and refine the existing conditions information collected as part of the CDP and EMP process. The combined EIS-TCRs will provide detailed site-specific recommendations for the protection of the identified natural heritage system features and trees identified for retention, as well as for the mitigation of anticipated impacts from development.

13.1.2 City of Ottawa Development Approvals Process

Development approvals for the majority of lands within the Kanata North Community Design Plan will initially proceed by Plan of Subdivision in order to establish the necessary road network, servicing infrastructure and parkland dedication.

Zoning Amendments will be required to permit the development established by the Land Use Plan in conjunction with approval of a plan of subdivision and/or site plan. The lands are currently zoned Rural Countryside Zone. It is anticipated that zoning amendments will amend the zoning to appropriate urban residential and mixed use zones to enable development in accordance with the Land Use Plan.

Applications for some development blocks will require Site Plan Control Approval as required by the City's Site Plan Control By-Law (2014-256, as amended).

The City will impose conditions on the development of the land through the subdivision or site plan process. These conditions will address provision of such matters as:

- Parks, open space and protection of natural heritage features;
- Water, sanitary sewers, and stormwater management facilities;
- Transit;
- Construction of roads and infrastructure;
- Widening and daylight triangles; and,
- Utilities.

The execution of development agreements will be required before development is allowed to proceed.

13.1.3 Municipal Approvals

Municipal approvals required for the implementation of the transportation projects identified in this report include the following.

- Roadway Modification Approval

  Roadway Modification Approval (RMA) is required for geometric modifications to an existing road. An RMA will be required for any new auxiliary turning lanes and the installation of new traffic signals at the access connections to March Road, as well as any new auxiliary turning lanes and/or geometric design changes at the access connection to Old Carp Road. The approval is satisfied under delegated authority on City Council's behalf. An RMA Report requires a Key Plan, Functional Design Plan, and cost estimate.

- Detail Design Approval

  The detailed design of the new road network and recreational pathways will require approval as part of the Plan of Subdivision planning process. Subject to funding and authorization, the interim widening of March Road from two to four lanes and the ultimate widening for the BRT lanes will also require detail design approval.

  The transportation and environmental mitigation measures outlined in this report will be further refined through the detailed design process.

- Municipal Consent

  A separate review and circulation process is required to obtain Municipal Consent for any works that impact existing or planned utilities including phone, cable, hydro, gas, and fiber optic networks.

- Road Cut permit

  Following detailed design approval and Municipal Consent, a Road Cut permit is required to undertake any cut within a City road allowance. To obtain a permit a contractor must be bonded and insured, and submit a Traffic Management Plan. The Road Cut permit outlines peak hour work restrictions, establishes reinstatement standards, and imposes a duty to protect City owned trees.

13.1.4 External Agency Approvals

Through the development approval process there are also points of contact where the developer will be required to reach out to external agencies for additional approvals, including but not limited to:

- Ministry of Environment (MOE)

All sanitary sewers, storm drainage, and stormwater facilities are regulated under the Ontario Water Resources Act and will require an Environmental Certificate of Approval from the Ministry of the Environment.

- Department of Fisheries and Oceans (DFO)

  Proposed works that may constitute a harmful alteration, disruption or destruction (HADD) of fish habitat and require authorization from DFO under the Fisheries Act may include but are not limited to:

  - The realignment of Tributary 2 of Shirley's Brook;
  - The removal of the existing weir structures along Tributary 3 of Shirley's Brook;
  - The installation of culvert crossings on Tributaries 2 and 3, and at March Road;
  - The realignment of Shirley's Brook Main Branch at March Valley Road.

- Conservation Authority (CA)

  Proposed enhancements to watercourses are regulated under Section 28 of the Conservation Authorities Act. Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses will require approval from the Mississippi Valley Conservation Authority (MVCA)

- Ministry of Tourism, Culture and Sport (MCTS)

  Archaeological Clearance for Stage 1 Archaeological Assessment and Stage 2 must be provided by the MCTS.

- Ministry of Natural Resources and Forestry (MNRF)

  The Endangered Species Act (S.O. 2007, c.6) is administered by the MNRF. Registration of activity and/or a permit is required for disruption of Species at Risk. An Overall Benefit Permit may also be required to ensure mitigation in some instances.

- National Capital Commission (NCC)

  The NCC's Federal Land Use and Review Approval Process (FLUDA) is required when there is a defined project taking place on federal lands.

13.2 Development Charge Projects

The Development Charges Act, 1997 (DCA) gives the authority to the City of Ottawa to pass a new Development Charges (DC) By-law every five years. Development charges are one-time fees levied by municipalities on new residential and non-residential properties to help pay for a portion of the growth-related capital infrastructure requirements. The adoption of this study will signify Council's intention to ensure that any increase in the need for service attributable to growth, based on the requirements outlined in the legislation, will be included in a future Development Charge Background Study.

The following is a list of the DC eligible growth related projects in Kanata North that should be covered in accordance with Schedule B of the Development Charges Background Study:

- March Road widening to four lanes;
- March Road intersections;
- Oversizing of sanitary sewers above 375 mm;
- Upgrade to the Briar Ridge Pump Station;
- Upgrade to off-site 400mm watermains;
- Land acquisition for park and ride and fire station.

13.3 Detail Design

The TMP recommends a high-level transportation solution that demonstrates feasibility and guides future development. The report is not intended to provide a street-by-street detail design; rather this enhanced level of detail will be completed in conjunction with Plan of Subdivision and/or Site Plan applications. The more rigorous field investigation and design undertaken on a site-by-site basis will inevitably lead to adjustments from the design herein. These alterations are both normal and expected as any design evolves into a final constructed format (a discussion of minor versus major design change is outlined in **Section 13.7** of this report).

The detail design solution will depend upon several constraint factors such as final geotechnical information, including grade raise for units and roadways, dwelling configuration and layout, etc. These constraints can be dealt with and/or mitigated by a variety of design techniques, such as pre-loading, light-weight fill, slab-on-grade dwellings (no basement), or pile foundations. The precise engineering technique(s) to resolve localized constraints are best finessed during detail design. The key point is that the TMP demonstrates a feasible design solution for the KNUEA that will guide future designers in developing detailed design solutions.

The detailed design will evaluate and assess construction methods and staging to undertake the project. The end result will be a tender document that includes:

<u>Drawings</u>

- Alignment
- Removals
- Grading and Drainage
- Geometry and General Layout
- Pavement Elevations
- Ditches, Culverts, Sewers and SWM facilities
- Services/Utility Relocations
- Pavement Markings
- Typical Sections
- Non-Standard Details
- Landscaping Plan
- Electrical (Illumination / Street Lighting)

<u>Specifications</u>

- Tender
- Form of Agreement
- Modified OPS General Conditions
- PPQ Sheets
- Special Provisions

- Special Provisions General
- Standard Drawings and Standard Specifications

In support of the preparation of the detailed design further review of traffic operations is recommended.

13.4 Property Acquisition

Property acquisition will be required for the extension of the BRT from north of Halton Terrace/Maxwell Bridge Road to the North Collector (Streets 'C' and 'E'). The existing right-of-way width varies and is in the order of 30 metres for most of the extension. The additional land requirement affects properties owned by the KNLOG and other private land owners along the corridor.

As shown in the proposed interim cross section, the initial widening of March Road should be to the east, where the required right-of-way can be acquired entirely from the KNLOG. The ultimate right-of-way requirement on the west side involves land acquisition from the KNLOG and other private land owners. This will be acquired either through land development approvals or prior to construction of the BRT.

The land requirement represents the minimum footprint needed to construct the Transitway facility. Private land is required where existing right-of-way is insufficient to accommodate transitway elements and the associated widening at intersections. There may be opportunities during detail design to further minimize land acquisition and impact on residential properties.

The City of Ottawa will confirm property requirements and limits early during the design phase and negotiate with affected property owners where property acquisition is required. Necessary property will be acquired prior to the construction stages. The City will proceed with the acquisition of property needs as the design work proceeds and definitive property plans are developed.

The processes through which the City of Ottawa, under the authority of The Planning Act, will acquire land for the road widening are described below, in **Section 13.6**.

Land for the KNUEA Park and Ride site will be acquired following registration of the plan of subdivision.

13.5 Construction Monitoring

The transportation and environmental protection elements of the detailed design will be implemented during the construction stage. Implementation methods will be considered for key construction activities and identified in the construction documents.

Typical construction methods for implementing environmental protection elements include the following:

- Traffic Protection Plan
- Traffic Management
- Limitation of Operations
- Construction Access
- Restriction on Open Burning
- Storage Areas

- Dust Control
- Spills and Release of Debris
- Erosion and Sediment Control

During the construction phase, contract administration and full time inspection will ensure that the work is undertaken in conformance with the environmental requirements of the construction documentation.

13.6 Infrastructure Staging

As demonstrated in the Master Servicing Study, Transportation Master Plan and the Environmental Master Plan, development can generally proceed from any location within the Study Area. Development is expected to begin close to March Road and spread out to the east and west. It is anticipated that development will occur incrementally through Plans of Subdivision with associated infrastructure and services being installed.

Where properties of non-participating landowners are located within a development phase, such properties shall not be required to develop with the balance of the lands in that phase. Through the review of draft plans of subdivision, consideration may be given to accommodate the potential integration of these individual properties.

Topography does play a role in the staging of sanitary servicing, as the KNUEA is geographically defined by the north-south ridge east of March Road. Generally, lands above the ridge will be serviced by the March Road Trunk Sewer while lands below (east of) the ridge will be serviced by the Briar Ridge Pump Station. Alternative options that result in a more efficient sanitary servicing scenario may be considered through the development review process. This may include some exchange of drainage areas above and below the ridge.

13.6.1 March Road and Bus Rapid Transit Staging

As noted in previous sections of this report, March Road currently has a protected road widening allowance of 34 metres between the urban area limit and Dunrobin Road. The road allowance should be widened to 44.5 metres to the northern limit of the KNUEA to accommodate the ultimate BRT cross-section, consistent with the currently protected right-of way through the urban area. This is consistent with the City of Ottawa's 2013 Transportation Master Plan (2013 TMP), which identifies a need to widen March Road from two to four lanes between Halton Terrace/Maxwell Bridge Road and Dunrobin Road. The City of Ottawa, under the authority of the Planning Act, will acquire land for the road widening as a condition of various approvals including plans of subdivision, plans of condominium, site-plans, and consent applications. Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time the widening in accordance with policies in the Official Plan.

Again, as noted previously, subject to the urban portion of the March Road widening project being brought into the affordable plan, and subject to reasonable terms being established including payback period, the Kanata North Landowners Group (KNLOG) is prepared to enter into a front-ending agreement with the City to construct the four lane widening of March Road to the limit of the urban area.

The Kanata North Transitway is identified in the City of Ottawa's 2013 TMP, with the transitway portion between Corkstown Road and Solandt Road in the 2031 affordable rapid transit network, and the extension to Maxwell Bridge Road/Halton Terrace slated for post 2031. A conceptual

future transit corridor ultimately extends to the north towards Dunrobin Road. The Park and Ride lot will be constructed at the discretion of OC Transpo and may be built prior to the completion of the transitway to encourage transit ridership in the area.

13.6.2 Core Services Staging

Details of the staging of the core servicing are set out in the following table.

Table 23: Core Services Staging

INFRASTRUCTURE REQUIREMENT	DEVELOPMENT STAGE
Sanitary Servicing	
Extension of March Road Trunk Sewer and upgrade to Shirley's Brook Drive sanitary sewer to 600mm	Required prior to any development serviced from March Road
Briar Ridge Pump Station Upgrade	Servicing capacity is available up to 10 L/s of flow calculated from new development. Upgrade will be required for additional flow
Extension of sanitary sewer along the rail corridor, and upgrade to sanitary sewer in Brookside Subdivision to 450mm	Servicing capacity is available up to 46 L/s of flow calculated from new development. Upgrade will be required for additional flow
Water Servicing	
Water services extended from off-site	Required prior to any development serviced from March Road
Stormwater Management	
Stormwater management facilities	Required concurrent with lands tributary to the facility
Shirley's Brook realignment and outlet for Pond 3	Required concurrent with the lands tributary to the facility
Transportation	
Interim signalized access connections to March Road	Required concurrent with initiation of adjacent development
March Road upgrade to four lanes through the KNUEA limits	TBD through future City Transportation Master Plan updates and subject to Front Ending Agreement between City and landowners.

INFRASTRUCTURE REQUIREMENT	DEVELOPMENT STAGE
Kanata North Park and Ride	TBD based upon development timing and funding availability
Kanata North Transitway BRT extension	TBD through future City Transportation Master Plan updates

13.7 Environmental Assessment Amendment Process

As noted previously, development should proceed in a manner that is consistent with the Master Plans. As with the Community Design Plan, it is not possible to anticipate every circumstance or issue that may arise over the course of the development of the lands and it may not be feasible to implement the projects as described in the environmental assessment reports. A major change to the project would require an addendum outlining the implications of the change and made available for public review. Not all changes however would be considered as major. Below is summary of a well-defined process that permits landowners to make modification as necessary as the detailed planning and designs proceed following approval of the environmental assessments.

13.7.1 Minor Changes

Minor changes are those that do not appreciably change the expected environmental impacts or proposed mitigation associated with the project. These are modifications that typically arise as projects are refined through the planning and design process, such as , a design change within the cross section of a roadway, landscaping around storm ponds, and natural habitat compensation as part of another approval process, would be considered minor.

Changes in alignment or facility footprints that do not affect more than three participating landowners should have the consensus of those land owners and would also be considered as minor. All affected landowners and appropriate stakeholders will be provided details of proposed minor changes. Minor changes will be dealt with at the time of detailed design through the City's development review process.

13.7.2 Major Changes

Major changes are those that substantially change the environmental net impacts with the project or occur as a result of a change in the environmental setting for the project. An example of a major change would be a proposed change in the number stormwater management facilities, or a change to a project that affects (increases) the identified project EA schedule.

If the proposed modification is major, the recommendations and conclusions in the EA would require updating. An addendum to the EA would be required to document the change, identify the associated impacts and mitigation measures and allow related concerns to be addressed and reviewed by the appropriate stakeholders. Notice of the addendum will be posted and the addendum made available for public review. Only those changes identified in the addendum are open for review.

14.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the foregoing transportation analysis and the recommended transportation plan for the Kanata North community can be described as follows.

1. An urban cross section is recommended for March Road between Halton Terrace/Maxwell Bridge Road and a point north of Maxwell Road, to be implemented as part of the planned four-lane widening.

2. The City of Ottawa's 2013 TMP Affordable Rapid Transit Network includes the section of the Kanata North Transitway between Corkstown Road and Solandt Road, to be implemented between 2014 and 2031 as an at-grade median Bus Rapid Transit (BRT) facility. It also includes Transit Priority measures between Solandt Road and a future Park and Ride Lot north of Maxwell Bridge Road, to be implemented within the 2031 horizon year.

3. The Ultimate Network includes an extension of the BRT facility to north of Maxwell Bridge Road, with a conceptual future transit corridor extending further north towards Dunrobin Road.

4. The Kanata North Transitway Environmental Project Report (October 2013) identified Park and Ride facilities at Innovation Drive and along March Road north of Maxwell Bridge Road. The Park and Ride north of Maxwell Bridge Road will address future demand resulting from development in the KNUEA. The size and location of the northerly Park and Ride has been established as part of the CDP process for the KNUEA.

5. Background growth along March Road will trigger the need for additional lane capacity by the 2026 build-out year. This is consistent with the City of Ottawa's 2008 TMP, which identified a need to widen March Road from two to four lanes between Old Carp Road and Dunrobin Road. The March Road widening project fell short of the City's affordable road network funding envelope, and was not included in the City's 2013 TMP affordable road projects list. However, the urban portion of the project was at the top of the list for future consideration. As development in the KNUEA progresses, it is anticipated that the urban portion of the project will receive a higher score, and will be included in the affordable road projects list in the next TMP update.

6. The timing of the March Road widening from two to four lanes will be determined by the City of Ottawa through future TMP updates when the urban portion of the project is brought into the affordable plan.

7. Subject to the urban portion of the March Road widening project being brought into the affordable plan, and subject to a reasonable payback period, the Kanata North Landowners Group (KNLOG) is prepared to enter into a front-ending agreement with the City to construct the widening of March Road to four lanes to the limit of the urban area.

8. In light of the projected travel demand, and consistent with the City's direction to reduce auto dependency, consideration should also be given to advancing the implementation of the ultimate median BRT system prior to the 2031 planning horizon.

9. The optimal location for the future KNUEA Park and Ride facility is at the northwest corner of the March Road/North Collector (Streets 'C' and 'E') intersection.

10. Traffic signals are considered the preferred type of intersection control at the March Road access locations.

11. The preferred solution for an access connection to Old Carp Road includes a realignment of Old Carp Road and Halton Terrace such that both roads tee into the proposed North-South Collector (Street 'A').

12. The preferred solution for access connections to March Road includes:

    - four full movement signalized intersections, and
    - a local right-in right-out road connection on the west side of March Road south of the creek corridor.

13. Two right-in right-out driveways are assumed for the commercial uses along the east side of March Road.

14. The collector/collector intersections in the northwest and southwest quadrants of the KNUEA could be considered as possible candidates for roundabout control at the time the applications for Draft Plan of Subdivision are processed by the City.

15. The City's 2013 Transportation Master Plan Update includes policies and actions for providing safe and efficient roads by designing and building complete streets. Complete streets design elements have been considered for all roadways in the KNUEA. The Complete Streets design elements identified in this report should be considered and further refined at the Plan of Subdivision and Site Plan stage.

16. A 44.5m right-of-way width is recommended along March Road between the current urban area boundary and the northern limit of the KNUEA. This right-of-way width will provide for the ultimate extension of the median BRT system.

17. The Kanata North CDP TMP satisfies the requirements of the Municipal Class EA process for the portion of the conceptual future transit corridor, as shown in the City's 2013 TMP, that extends between Maxwell Bridge Road/Halton Terrace and the North Collector (Streets 'C' and 'E'). Additional studies will need to be completed to fulfill the Municipal Class EA requirements for any further extension of the median BRT north of the March Road/North Collector intersection.

18. A median BRT station(s) will be identified along the corridor within the KNUEA, as development occurs and detailed BRT plans are developed. The identification of station location(s) will need to take into consideration the location of the most northerly planned station along the corridor (March/Klondike, as per the approved Kanata North Transitway EA) and the planned park and ride at March Road/North Collector (Streets 'C' and 'E', as per the Kanata North CDP process).

19. It is recommended that interim transit priority measures be examined and implemented as required through the study area as part of the initial widening of March Road from two to four lanes in preparation for the next City of Ottawa TMP update.

20. The proposed March Road cross sections are consistent with the recommendations of the 1994 March Road Reconstruction Environmental Study Report and are addressed by the Kanata North Transitway Environmental Project Report.

21. The interim and ultimate March Road cross sections have geometric features (such as landscaping in the medians and narrow lane widths) that reflect a design speed of 60 kilometres per hour.

22. The right-of-way to be protected along all collector roadways within the KNUEA will be 24m. Future collectors will be provided with a 24m right-of-way but will be built as local roads in the short term. Local roads will have 18m, 16.5m and 14m rights-of-way.

23. The 18m and 16.5m right-of-way widths allow for the provision of sidewalk along local roads leading directly to transit, school, park, institution or retail/commercial/employment land uses, as shown in the Parks and Pathways Plan. The 14m right-of-way width will be used for single loaded roads adjacent to open space.

24. The KNCDP TMP Existing Conditions Report indicated that active transportation modal shares within the Transportation Area of Interest (TAI) are significantly lower than the target modal shares identified in the City's 2013 TMP. The walking and cycling facilities included in the Parks and Pathways Plan are anticipated to achieve the City's 2013 TMP targets for active transportation modal shares in the KNUEA.

25. The proposed pedestrian and cycling network provides connections to all land-uses within the subject lands, as well as the existing communities to the north and south. The pedestrian and cycling network will be fully integrated with the City of Ottawa's existing pedestrian and cycling network.

26. Provision for transit service in early phases of development will be encouraged through the creation of Early Service Agreements between developers and City of Ottawa, Transit Services. Early transit service will help achieve the projected ridership targets and minimize vehicular site traffic.

27. Based on the Demonstration Plan, the development of the KNUEA has the potential to include 960 singles, 950 street townhouses, 1,040 multi-unit residential units, 300,000 square feet (GFA) of community commercial, 100,000 square feet (GFA) of neighbourhood commercial, three elementary schools, one high school and a park and ride lot consisting of approximately 500 spaces.

28. Construction is expected to begin in 2018. The rate of development will be subject to market demands. For analysis purposes, development is assumed to occur over an 8 year period for a build-out year of 2026.

29. Based on the results of screenline analysis, other corridors in the greater Kanata North area apart from the KNUEA may need to be investigated by the City or through other long-term planning studies to provide additional capacity in the future.

30. Auxiliary lanes at the KNUEA access intersections are recommended as follows:

    - March Road / South Collector (Streets 'A' and 'G')
        - Northbound, southbound and eastbound left turn lanes

    - Dual westbound left turn lanes
    - Northbound right turn lane
- March Road / Midblock Collector (Street 'D')
    - Northbound and eastbound left turn lane
- March Road / North Collector (Streets 'C' and 'E')
    - Northbound, southbound, eastbound and westbound left turn lanes
- March Road / North Local / Maxwell Road
    - Northbound, southbound, eastbound and westbound left turn lanes
- Old Carp Road / North-South Collector (Street 'A')
    - Westbound left turn lane
- Halton Terrace / North-South Collector (Street 'A')
    - Westbound left turn lane

31. Additional right-of-way will be required at the March Road/South Collector (Streets 'A' and 'G') intersection beyond the recommended 44.5m corridor to accommodate the recommended northbound right turn lane. The additional right-of-way requirement will be confirmed at the Plan of Subdivision stage.

32. Intersection capacity analysis has been completed to determine how much development can proceed in the KNUEA before any adverse impacts are realized to the existing two-lane March Road.

33. For the purpose of the interim analysis, it is assumed that the initial phases of development will include the collector road network, collector access connections to March Road and predominantly residential land uses. Any initial commercial development would reduce the assumed amount of residential development.

34. Intersection capacity analysis suggests that approximately 1,650 units can be developed in the KNUEA prior to any adverse impact on the existing two-lane March Road.

35. Consistent with the current policies of the City of Ottawa's 2014 Development Charges (DC) Background Study regarding the widening of existing arterial roads, the required roadway modifications at the interim access connections to March Road should be eligible for DC funding.