APPENDIX C

Air Quality Impact Assessment

BLOCK 27 LANDOWNERS GROUP INC.

Qualitative Air Quality Assessment

Block 27 Development
Vaughan, Ontario

August 2024 – 22-4828

Table of Contents

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Tables

Appendices

Executive Summary

LEA Consulting (LEA) is leading an Environmental Assessment (EA) in collaboration with Delta Urban and the Block 27 Landowners Group Inc. (the Landowners Group) for the development of the collector road network for Block 27. The Landowners Group has retained Dillon Consulting Limited (Dillon) to perform a qualitative air assessment of the Block 27 Study Area (the Study Area).

The Study Area is located north of Teston Road (Regional Road 49), east of Jane Street (Regional Road 5), south of Kirby Road, and west of Keele Street (Regional Road 6). The Study area is currently occupied by agricultural lands, Greenbelt, and natural heritage systems. Dillon understands that the proposed Block 27 development comprises a mix of uses, such as low-rise and mid-rise residential housing, mixed use, retail as well as a community hub including a community centre, schools, a park, and a library.

This report describes a qualitative air quality assessment which was completed to describe potential impacts to air quality that may be associated with increased traffic volumes resulting from the development of the Block 27 project. In response to the Notice of Study Commencement in January 2022, the Ministry of the Environment, Conservation and Parks (MECP) provided comments including four key requests to be included within the qualitative assessment. These requests are listed below:

1. A discussion of local air quality including existing activities/sources that significantly impact local air quality and how the project may impact existing conditions;
2. A discussion of the nearby sensitive receptors and the projects potential air quality impacts on present and future sensitive receptors;
3. A discussion of local air quality impacts that could arise from this project during both construction and operation;
4. A discussion on potential greenhouse gas considerations; and,
5. A discussion of potential mitigation measures.

This report has been prepared in response to the MECP request.

1.0 Study Area

1.1 Proposed Block 27 Development and Surrounding Area

The proposed Block 27 development (Block 27) is situated north of Teston Road (Regional Rd 49), east of Jane Street (Regional Road 5), south of Kirby Road and west of Keele Street (Regional Road 6). Located directly south of the site is predominantly residential developments. The site is approximately 1 km east of Highway 400 and includes a rail line running from the south east corner through the north east corner of the property. Surrounding zoning includes agricultural, industrial, employment, and commercial. A copy of the City of Vaughan Zoning Map is provided in Appendix A.

Block 27 will consist predominately of residential space, however primary and secondary schools, green space and a more developed roadway and transit system will also be included within the development. Block 27 will not include any large industrial uses. The Block 27 Secondary Plan land use plan is included in Appendix A.

A copy of the Block 27 final road network is provided in Appendix B.

1.2 Existing and Future Sensitive Receptors

Sensitive receptors are generally locations where human activities may regularly occur. Land uses that are defined as sensitive receptors for evaluating potential air quality impacts include but are not limited to: residences, schools, daycares, hospitals, and recreational uses such as sports fields. Surrounding the Block 27 development there are a number of sensitive receptors, with the highest concentration located south of the site. Sensitive receptors within a 5 km radius of the site include residential dwellings, multiple schools, churches, community centers, child care facilities, health care facilities, and parks/recreational sites. The Block 27 development will introduce addition sensitive receptors within the project footprint including: schools, residential areas, and park/recreational spaces.

2.0 Existing Air Quality

A review of ambient air quality data from the MECP and Environment and Climate Change Canada (ECCC) National Air Pollution Surveillance (NAPS) program stations was completed to help establish local air quality levels in the Study Area. Based on guidance from the Ministry of Transportation (MTO) *Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects (MTO, 2020)*[1] indictor compounds were selected. Indictor compounds are common pollutants that would be associated with the project.

Indicator compounds were selected for this assessment based on typically emissions from transportation and construction related sources of emissions. These compounds will have the highest potential for impacts in regards to the atmospheric environment:

- Nitrogen oxides (expressed as NO_2);
- Carbon monoxide (CO);
- Sulphur dioxide (SO_2);
- Ozone;
- Particulate matter (TSP, PM_{10}, and $PM_{2.5}$);
- Benzene;
- Benzo(a)pyrene (BaP);
- 1,3-Butadiene;
- Formaldehyde;
- Acetaldehyde; and,
- Acrolein.

2.1 Air Quality Criteria

The criteria for air quality in Ontario are established in Ontario Regulation 419/05[2] (O. Reg. 419/05) and in Ontario's Ambient Air Quality Criteria[3] (AAQC). O. Reg. 419/05 provides air quality standards and guidelines to assess impacts for industrial permitting requirements (i.e., industrial compliance). The AAQCs developed by the MECP are commonly used in environmental assessments, special studies using ambient air monitoring data, assessment of general air quality in a community, and annual reporting on air quality across the province.

[1] Ministry of Transportation (2020). *Environmental Guide for Assessing and Mitigating Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects.* May 2020.

[2] Ministry of the Environment, Conservation and Parks (2019). *Environmental Protection Act. Ontario Regulation 419/05 (O.Reg.419/05): Air Pollution – Local Air Quality*. January 2019.

[3] Ministry of the Environment, Conservation and Parks (2019). Ontario's Ambient Air Quality Criteria. April 2019.

Federally, the Canadian Council of Ministers of the Environment (CCME) has set the aspirational Canadian Ambient Air Quality Standards (CAAQS)[4] to be outdoor air quality targets.

The applicable Ontario and Canada-wide standards and criteria are provided in Table 1.

Table 1: Ontario and Canada-Wide Standards and Criteria

Pollutant	CAS #	Averaging Period	Criterion (µg/m^3)	Regulation/Guideline
NO_2	10102-44-0	1hr	112.8	CAAQS (2020)
			79.0	CAAQS (2025)
			400	Ontario AAQC
		24hr	200	Ontario AAQC
		Annual	32.0	CAAQS (2020)
			22.6	CAAQS (2025)
$PM_{2.5}$	-	24hr	27	CAAQS (2020)
			27	Ontario AAQC
		Annual	8.8	CAAQS (2020)
			8.8	Ontario AAQC
PM_{10}	-	24 hr	50	Ontario AAQC
TSP	-	24 hr	120	Ontario AAQC
		Annual	60	Ontario AAQC
SO_2	7446-09-5	1 hr	106	Ontario AAQC
			183	CAAQS (2020)
			170	CAAQS (2025)
		Annual	11	Ontario AAQC
			13	CAAQS (2020)
			10	CAAQS (2025)
CO	630-08-0	1 hr	36,200	Ontario AAQC
		8 hr	15,700	Ontario AAQC
Benzene	71-43-2	24 hr	2.3	Ontario AAQC
		Annual	0.45	Ontario AAQC
Benzo(a)pyrene	50-32-8	24 hr	0.00005	Ontario AAQC
		Annual	0.00001	Ontario AAQC
1,3-Butadiene	106-99-0	24 hr	10	Ontario AAQC
		Annual	2	Ontario AAQC

[4] Environment and Climate Change Canada (2012). Canadian Ambient Air Quality Standards (CAAQS) for Fine Particulate Matter ($PM_{2.5}$) and Ozone. October 2012.

Pollutant	CAS #	Averaging Period	Criterion ($\mu g/m^3$)	Regulation/Guideline
Formaldehyde	50-00-0	24 hr	65	Ontario AAQC
Acetaldehyde	75-07-0	24 hr	500	Ontario AAQC
Acrolein	107-02-8	1 hr	4.5	Ontario AAQC
		24 hr	0.4	Ontario AAQC

2.2 Background Air Quality

Background air quality was quantified by compiling historic monitoring records proximate to the Study Area. The MECP and ECCC NAPS stations were reviewed for each indicator compound. The closest representative monitoring station to the study area with a three-year data set was selected. A period of three years was selected as it provides a sufficient time period to represent ambient area quality. Data sets with shorter time periods may be more influenced by short term events and potentially not capture seasonal trends or fluctuations in ambient air quality levels. A three year period is typical for air quality assessments within Ontario. The selected station was the Toronto NAPS station (Climate ID 60440).

Local data was not available for the following indicator compounds, as such they are not included within this assessment:

- Benzo(a)pyrene;
- Formaldehyde;
- Acetaldehyde; and,
- Acrolein.

The background concentrations for each indicator compounds were calculated following statistical methods respective of each relevant averaging period.

$PM_{2.5}$ data was used to calculate TSP and PM_{10} background data. As $PM_{2.5}$ is a size fraction subset of PM_{10}, and PM_{10} is a size fraction subset of TSP, the PM10 and TSP background concentrations can be calculated based on the $PM_{2.5}$ background concentration[5]. Background concentrations of PM_{10} and TSP can be calculated by applying a $PM_{2.5}/PM_{10}$ ratio of 0.54 and a $PM_{2.5}/PM_{10}$ ratio of 0.3 as shown below:

- $PM_{2.5}$concentration /0.3 = TSPconcentration; and,
- $PM_{2.5}$concentration /0.54 = PM_{10}concentration.

[5] Lall, R., Kendall, M., Ito, K., Thurston, G., 2004. Estimation of historical annual $PM_{2.5}$ exposures for health effects assessment. Atmospheric Environment 38(2004) 5217-5226.

The calculated background concentrations (µg/m³) for each indicator compound for the study areas are summarized in Tables 2 to 7 below.

2.2.1 Nitrogen Dioxide Summary

Ambient concentrations of NO_2 were found to be greater than both 2020 and 2025 CAAQS criteria. It should be noted that the CAAQS are stringent, aspirational regional air quality targets and not project-specific air quality criteria. While the maximum concentrations exceed the most stringent criteria, the 90th percentile and average concentrations demonstrate that these exceedances are infrequent, and the typical concentrations are well below the criteria. Table 2 provides a summary of NO_2 ambient levels.

Table 2: Nitrogen Dioxide Ambient Summary

Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
	Max	90th Percentile	Average	Max	90th Percentile	Average		
1hr	85.3	67.7	39.5	76%	60%	35%	112.8	CAAQS (2020)
	85.3	67.7	39.5	108%	86%	50%	79.0	CAAQS (2025)
	131.7	67.7	39.5	33%	17%	10%	400	Ontario AAQC
24hr	62.9	34.2	18.8	31%	17%	9%	200	Ontario AAQC
Annual	41.8	--	18.8	131%	--	59%	32.0	CAAQS (2020)
	41.8	--	18.8	185%	--	83%	22.6	CAAQS (2025)

Notes:
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted.
Max CAAQS values have been statistically assessed to match CAAQS reporting criteria as listed below:

- NO_2 1-hr results represent the 3-year average of the annual 98th percentile of the daily maximum 1-hr average concentrations.
- NO_2 24-hr results represent the three year data sets maximum 24-hr concentration.
- NO_2 Annual results represent the three year data sets maximum average over a single calendar year of all 1-hr average concentrations.

2.2.2 Particulate Matter Summary

Ambient concentrations of particulate matter were below all applicable criteria with the exception of the AAQC 24 hr criteria for PM_{10}. While the maximum concentrations may approach or exceed the most stringent criteria, the 90th percentile and average concentrations demonstrate that typical concentrations are well below the criteria. Table 3 provides a summary of PM ambient levels.

Table 3: Particulate Matter Ambient Summary

Pollutant	Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
		Max	90th Percentile	Average	Max	90th Percentile	Average		
$PM_{2.5}$	24hr	25.4	12.4	6.9	94%	46%	26%	27	CAAQS (2020)
		25.4	12.4	6.9	94%	46%	26%	27	Ontario AAQC
	Annual	7.6	--	6.9	86%	--	79%	8.8	CAAQS (2020)
		6.9	--	6.9	79%	--	79%	8.8	Ontario AAQC
PM_{10}	24 hr	63.0	22.9	12.8	126%	46%	26%	50	Ontario AAQC
TSP	24 hr	113.5	41.3	23.1	95%	34%	19%	120	Ontario AAQC
	Annual	23.1	--	23.1	39%	--	39%	60	Ontario AAQC

Notes:
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted.
CAAQS data has been statistically assessed to match CAAQS reporting criteria as listed below:

- $PM_{2.5}$ 24 hr results represent the 3-year average of the annual 98th percentile of the daily 24 hr average concentrations.
- $PM_{2.5}$ Annual results represent the 3-year average of the annual average of the daily 24 hr average concentrations.

AAQC $PM_{2.5}$ 24 hr results has been statistically assessed to match CAAQS reporting criteria for $PM_{2.5}$.

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2.2.3 Carbon Monoxide Summary

Ambient concentrations of carbon monoxide were below all applicable criteria. Table 4 provides a summary of CO ambient levels.

Table 4: Carbon Monoxide Ambient Summary

Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
	Max	90th Percentile	Average	Max	90th Percentile	Average		
1 hr	1.2	0.5	0.2	<1%	<1%	<1%	36,200	Ontario AAQC
8 hr	0.8	0.4	0.2	<1%	<1%	<1%	15,700	Ontario AAQC

Notes:
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted.

2.2.4 Sulphur Dioxide Summary

Ambient concentrations of SO_2 were below all applicable criteria. Table 5 provides a summary of SO_2 ambient levels.

Table 5: Sulphur Dioxide Ambient Summary

Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
	Max	90th Percentile	Average	Max	90th Percentile	Average		
1 hr	57.6	4.8	1.9	54%	5%	2%	106	Ontario AAQC
	15.0	4.8	1.9	8%	3%	1%	183	CAAQS (2020)
	15.0	4.8	1.9	9%	3%	1%	170	CAAQS (2025)
Annual	2.3	--	0.5	18%	--	4%	13	CAAQS (2020)
	2.3	--	0.5	22%	--	5%	10	CAAQS (2025)
	0.5	--	0.5	5%	--	5%	11	Ontario AAQC

Notes:
Data is monitored on a 1 hr frequency, as such 10min and 1 hr measurements are the same
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted
CAAQS data has been statistically assessed to match CAAQS reporting criteria as listed below:

- *SO2 1-hr results represent the 3-year average of the annual 99th percentile of the SO2 daily maximum 1-hour average concentrations*
- SO2 Annual results represent the average over a single calendar year of all 1-hour average SO2 concentrations

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2.2.5 Benzene Summary

Ambient concentrations of benzene were below all applicable criteria. Table 6 provides a summary of benzene ambient levels.

Table 6: Benzene Ambient Summary

Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
	Max	90th Percentile	Average	Max	90th Percentile	Average		
24hr	0.9	0.6	0.4	41%	28%	16%	2.3	Ontario AAQC
Annual	0.4	--	--	80%	--	--	0.5	Ontario AAQC

Notes:
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted.

2.2.6 1,3-Butadiene Summary

Ambient concentrations of 1,3-butadine were below all applicable criteria. Table 7 provides a summary of 1,3-butadine ambient levels.

Table 7: 1,3-Butadiene Ambient Summary

Averaging Period	Ambient Concentration (µg/m³)			Percentage of Criterion (%)			Criterion (µg/m³)	Regulation/ Guideline
	Max	90th Percentile	Average	Max	90th Percentile	Average		
24hr	0.07	0.04	0.02	1%	0.4%	0.2%	10.0	Ontario AAQC
Annual	0.0	--	--	1%	--	--	2.0	Ontario AAQC

Notes:
Max Ontario AAQC values represent absolute maximum values of the data set unless otherwise noted

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3.0 Potential Project Impacts on Air Quality

Whenever new sources, such as an increases in vehicle traffic, are introduced to a study area, there is the potential that impacts to the surrounding area's ambient air quality can occur. Due to increases in vehicular traffic, the Block 27 development will result in increases to overall ambient concentrations of the selected indictor compounds. Both the duration and magnitude of these impacts will be dependent on the sources of emissions from the project and their projected timeline of operation (i.e., length of construction schedule).

The Block 27 development will not introduce new industrial emission sources. The main sources of emissions from this project will come from changes to local traffic levels as well as emissions generated from initial construction and continued maintenance activities (i.e., snow removal, landscaping, road repairs, etc.).

Emissions associated with construction activities will include the combustion of fossil fuels from mobile and stationary equipment, as well as the generation of fugitive dust from construction activities.

When compared to the full lifespan of the project construction emissions will occur in a short duration. During construction there may be localized impacts which exceed the relevant criteria, however these impacts are transient and can be minimized through the implementation of a construction best management practices plan.

Emissions from the roadway post construction will also be related to fossil fuel combustion and fugitive road dust, however regular vehicular traffic (residential, waste collection services, parcel deliveries, etc.) and routine road work, snow removal and maintenance activities will generate these emissions. These emissions are anticipated to last the lifetime of the development project. A traffic analysis was completed to evaluate estimated percent changes in traffic volumes.

3.1 Traffic Analysis

The *Transportation Mobility Plan Update*[6] was reviewed to evaluate traffic levels of the existing road network and future development. The average of the maximum hourly vehicle counts were compared between existing (2023) and projected future traffic volumes (2031). Included within this average were the four major intersections surrounding the development, these being:

- Keele St. and Kirby Rd.;
- Keele St. and Teston Rd.;

[6] LEA (2024). Transportation Mobility Plan Update – Block 27, City of Vaughan

- Jane St. and Teston Rd.; and,
- Jane St. and Kirby Rd.

Traffic volumes for peak morning (AM) and peak evening (PM) hours were considered. Table 8 provides the average peak traffic counts for these four intersections for the existing and future scenario. A percent change from existing traffic conditions is also included within Table 8. A detailed breakdown of traffic volumes at each intersection are provided in Appendix C.

Table 8: Total Traffic Count Summary

Existing 2023 Average		Future 2031 Average	
AM	PM	AM	PM
2081	2433	4246	5586
% Increase From Existing		104%	130%

The development will cause an increase in traffic volume, particularly during peak work commuting hours. As the development will consist primarily of residential dwellings, it is expected that the majority of additional traffic will be composed of light duty passenger vehicles. It should be noted that the percentage of traffic increases between the existing 2023 operating data and future 2031 case is not directly contributed to the project development. Local traffic levels are projected to increase during this time period and will contribute to increases in overall traffic levels.

This increase in traffic will contribute to increases in local concentrations of indicator compounds. The percent increase in traffic will not directly correspond to the same percent increase in ambient pollutant concentrations. The relative increase in ambient pollutant levels will be less than projected increases in traffic as ambient conditions are driven by other local sources including transportation, industry, residential and commercial emissions, natural sources, and transboundary effects. For many contaminants, light duty vehicles have a lower emission rate per vehicle mile compared with commercial heavy duty vehicle traffic. As vehicle emission standards reduce and both passenger and commercial vehicles become more fuel efficient the contribution and influence these vehicles have on local air quality will also reduce. As electrification of passenger vehicles increase further reductions in overall local emissions will occur.

Detailed modelling and emission calculations would be required to better estimate pollutant levels at particular receptor locations. It is anticipated vehicular traffic will have the greatest influence on local air quality at intersections as well and areas near roads which have the highest vehicular traffic.

3.2 Potential Effects to Sensitive Receptors

The surrounding area of the development currently has multiple sensitive receptors. The Block 27 development will introduce additional sensitive receptors. Potential air quality related impacts to both existing and new sensitive receptors may result from the increases in traffic levels and construction related activities of the project.

Given the increase in traffic volumes and the ambient conditions in the area, it is possible that additional exceedances of the relevant criteria may occur as a result of the project. Considering that transportation sources of emissions contribute as only a part of the existing source profile, it is expected that any additional exceedances will be infrequent and short-lived. The average ambient concentrations are unlikely to change significantly due to the project.

It should be noted that within a 2 km radius of the proposed development area is a pre-existing rail line and 400 series highway. Additionally, there is a Walmart distribution centre and multiple commercial and light industrial sources. These sources of emission may influence local air quality at current and future nearby sensitive receptors.

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4.0 Project Greenhouse Gas Considerations

It is anticipated that the operation and construction phases of the development project will result in a net increase in the release of greenhouse gases (GHGs) and subsequent accumulation in the atmosphere. The GHG emissions resulting from the development project may impact reduction targets that have been set or are being developed both provincially and federally.

During the construction phase of the development, GHG emissions are largely expected to occur from the combustion of fossil fuel. Activities consuming fuels expected to result in GHG emissions may include:

- The operation of construction equipment and associated vehicles;
- The transportation of construction material; and,
- Fuel combustion associated with energy demands (e.g., electricity consumption).

During the operating phases of the project, fuel consumption related to increases in vehicular traffic levels and routine road maintenance and associated activities (landscaping, road repairs, snow removal) are expected to contribute to GHG emissions.

It is noted that new light-duty vehicle sales in Canada are transitioning to electric vehicles (EVs) or hybrid vehicles by 2035. This transition to more energy efficient vehicles is expected to reduce GHG emissions over time. In addition, the federal Heavy-Duty Vehicle and Engine Greenhouse Gas Emission Regulations and other regulations under the Canadian Environmental Protection Act (EPA) establish mandatory GHG emission standards for new on-road heavy duty vehicles and engines. Ontario has established reduction initiatives such as the Ethanol and Gasoline regulation and Ontario's Greener Diesel regulation to help meet specific GHG performance targets.

Increases or decreases in the amount and type of vegetation as a result of this development project impact the amount of carbon sequestered through "carbon sinks" in the study area. A carbon sink is considered to be anything that absorbs more carbon than it releases into the atmosphere (e.g., trees and other vegetation).

5.0 Mitigation Measures

Mitigation measures during both the construction and operational phases can be implemented to help reduce potential impacts to local air quality and protect sensitive receptors.

5.1 Construction Mitigation Measures

Emissions associated with construction activities may result in a short-term increase in local ambient levels of indictor compounds. Where possible the following measures should be implemented to help reduce impacts on local air quality:

- Reduce idling of equipment when possible;
- Ensure equipment is in working order (properly maintained, emission control devices installed);
- Utilize fuel-efficient equipment when possible;
- Implement dust management practices such as road watering to reduce fugitive road dust;
- Implement wetting or apply dust suppressants during cutting and crushing activities; and,
- Cover or water material stock piles, when possible, to minimize fugitive dust from wind erosion.

5.2 Traffic and Operational Mitigation Measures

The MTO recommends that during planning stages of transportation related projects, sensitive receptors such as residences, hospitals, childcare facilities, and similar institutional buildings are placed at approximately 100 metres or greater from major transportation sources (MTO, 2020)[7]. It should be noted that, while this project does not meet the MTO's threshold of a major project, the same design principles can be incorporated where applicable to improve air quality at sensitive receptor locations. Mitigation measures that may be implemented through the lifespan of the project include:

- Provide separation between roadways and proposed sensitive receptors where possible;
- Using green spaces as buffer distances and strategically planning setback distances during design phases;
- Provide current and best in technology air conditioning and filtration systems for residential housing, community centers, churches, and schools;
- Designate electrical vehicle charging locations to both promote and allow for electrification of passenger vehicles;
- Ensure road or property maintenance is completed with vehicles and equipment that are in working order (properly maintained, emission control devices installed);
- Reduce idling of road and property maintenance equipment when possible;

[7] Ministry of Transportation. 2020. Ministry of Transportation Environmental Guide for Assessing and Mitigating the Air Quality Impacts and Greenhouse Gas Emissions of Provincial Transportation Projects.

- Utilize fuel efficient equipment when possible; and,
- Implement strategic traffic light controls to reduce periods of idling vehicles.

5.3 Greenhouse Gas Mitigation Measures

Mitigation measures to reduce the potential for GHG emissions are similar to those described for air quality. Largely, mitigation will involve practices that result in decreased usage of fossil fuels. Where possible, the following mitigation measures can be implemented to help reduce GHG emissions:

- Reduce idling of equipment when possible, during construction and maintenance activities;
- Ensure equipment is in working order (properly maintained, emission control devices installed);
- Utilize fuel-efficient equipment when possible;
- Source locally supplied materials where possible to reduce fuel required for transportation;
- Follow construction and design plans that reduce overall efforts and fuel consumption by decreasing operating times of equipment and reducing potential rework; and,
- Where possible, replace or replant vegetation that acts as carbon sinks such as trees.

6.0 Conclusion

This report provides a qualitative analysis of potential air quality impacts that may be caused by the proposed Block 27 development as well as GHG considerations. Based on the preliminary design plans it is not anticipated that any large industrial sources of emissions will be added to the project area. Increases in local traffic will primarily come from light duty vehicles which have a lower emission rate per vehicle mile compared with commercial heavy duty vehicle traffic. As vehicle emission standards are reduce and more fuel efficient vehicles become present on the roadways, the influence these vehicles will have on local air quality will reduce.

Short term emissions associated with the construction phase of the project may have the potential to impact sensitive receptors. Mitigation and best management practices are recommended to decrease potential short term effects.

Sensitive receptors within the project area are located in close proximity to a rail line, 400 series highway and a pre-existing road network. These other sources of emissions will also contribute to potential air quality impacts in addition to the proposed development. To further protect sensitive receptors, mitigation measures such as setback distances, proper air filtration equipment, and the incorporation of greenspaces should be considered during initial project planning.

Appendix A

Zoning Map and Block 27 Land Use Plan

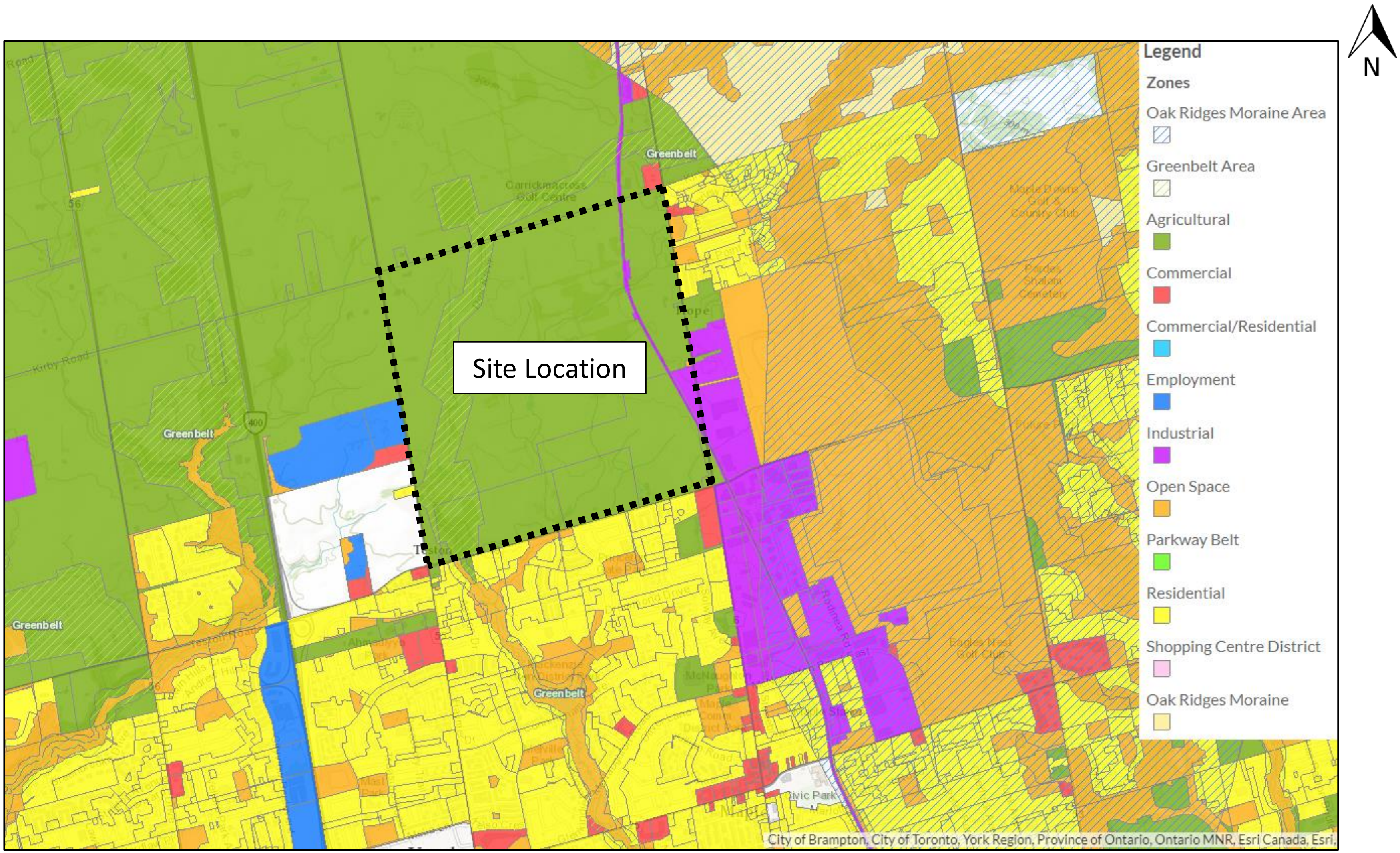

Figure 1

Project # 22-4828

September 2022

Land Use Zoning Designation Plan
Block 27 Development
Vaughan Ontario

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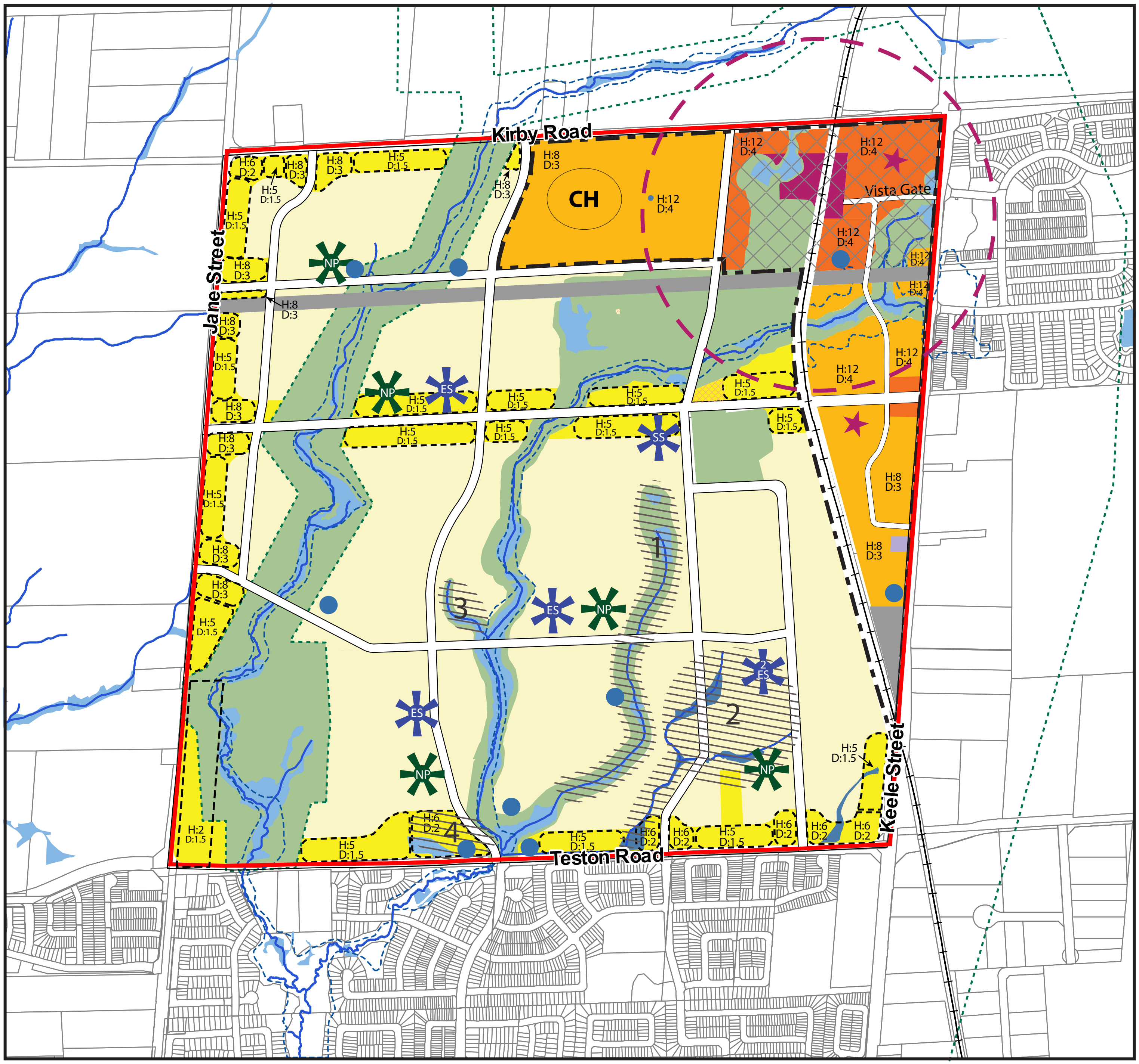


SCHEDULE B

BLOCK 27

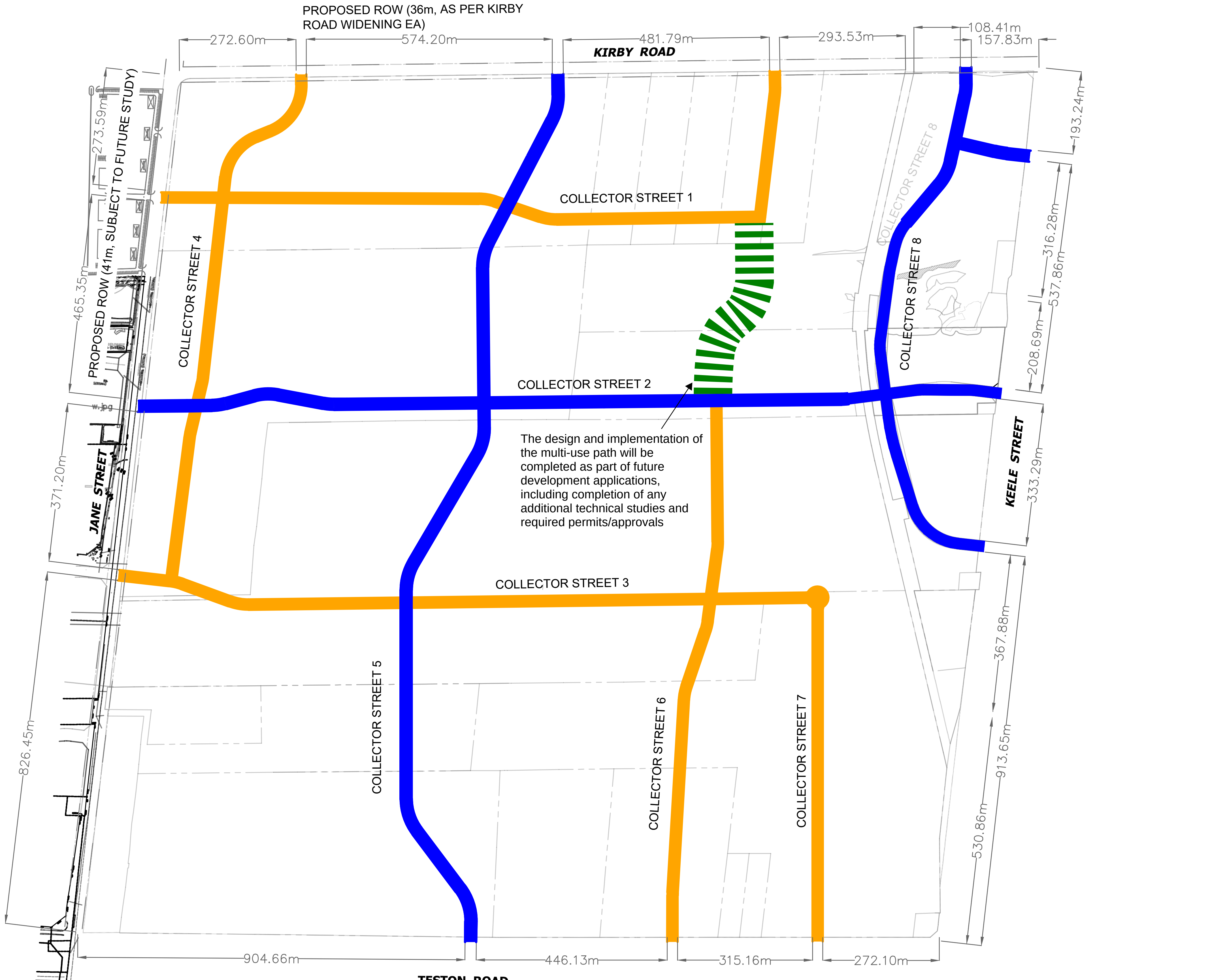
LAND USE PLAN

Legend

- Secondary Plan Area
- Kirby GO - Transit Hub Centre
- 500m Radius
- Transit Hub Special Study Area
- Potential Enhancement Areas
- Hamlet of Teston
- Low-Rise Residential
- Low-Rise Mixed-Use
- Mid-Rise Residential
- Mid-Rise Mixed-Use
- CH Community Hub
- Transit Hub
- Neighbourhood Park
- Public Square
- Elementary School
- Secondary School
- Private Open Space
- Infrastructure and Utilities
- Potential SWM Facility
- Natural Areas
- Natural Areas - Provincially Significant Wetlands
- Natural Areas - Evaluated Wetlands
- Greenbelt Plan Area
- Railway Line
- Stream
- Engineered Floodline
- Natural Areas Special Study Areas
- H Maximum Height
- D Maximum Density

Appendix B

Block 27 Final Road Network



NOTES:

1. AS PER CITY OF VAUGHAN ENGINEERING DESIGN CRITERIA AND STANDARD DRAWINGS (DECEMBER 2020)

HORIZONTAL ALIGNMENT CRITERIA		
	COLLECTOR ST 2, 5 & 8	COLLECTOR ST 1, 3, 4, 6 & 7
ROAD CLASSIFICATION	MAJOR COLLECTOR	MINOR COLLECTOR
MIN. HORZ. CURVE RADIUS (m)	125	115

2. AS PER CITY OF VAUGHAN ENGINEERING STD. DWG. R – 108: HORIZONTAL CURVE RADIUS AT ANGLE BEND = 12m

3. AS PER TAC 3.2.6.1.18: INTERSECTING ROADS ARE ALLOWED TO MEET BETWEEN 70 – 110°

4. AS PER CITY OF VAUGHAN NORTH VAUGHAN NEW COMMUNITIES TRANSPORTATION MASTER PLAN (JAN 2019);
MAJOR COLLECTOR ROADS TO HAVE A RIGHT–OF–WAY OF 26m
MINOR COLLECTOR ROADS TO HAVE A RIGHT–OF–WAY OF 24m

LEGEND:

- MINOR COLLECTOR STREETS
- MAJOR COLLECTOR STREETS
- PROPERTY LIMITS
- PROPOSED ROAD WIDENING (BY OTHERS)
- CONCEPTUAL LOCATION OF THE MULTI–USE PATH CONNECTION THROUGH THE SIGNIFICANT WOODLOT

LEA Consulting Ltd.
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N

Project No. 20009

Date AUG 22, 2024

NOT FOR CONSTRUCTION

BLOCK 27
VAUGHAN ONTARIO

SCALE 1:10000

FINAL ROAD NETWORK

Drawing No. 001

Appendix C

Traffic Volume Assessment

Block 27 Existing and Future Traffic Volumes - 2024-08-12

Intersection	Total Traffic Count				% Increase From Existing	
	Existing (2023)		Future Total (2031)			
	AM	PM	AM	PM	AM	PM
Keele and Kirby	1560	1928	2881	3823	85%	98%
Keele and Vista Gate	1166	1417	2453	3161	110%	123%
Keele and Peak Point	1345	1591	2066	2739	54%	72%
Keele and North Maple	1394	1610	2682	3704	92%	130%
Keele and Teston	2444	2982	5211	7220	113%	142%
St Joan of Arc and Teston	1787	2194	3286	4380	84%	100%
Cranston Park and Teston	1936	2369	3457	5000	79%	111%
Jane and Teston	3045	3537	6627	8550	118%	142%
Jane and Kirby	1274	1286	2266	2749	78%	114%
Street 4 and Kirby Road	-	-	1006	1379	-	-
Street 5 and Kirby Road	-	-	1086	1566	-	-
Street 8 and Kirby Road	-	-	1427	2152	-	-
Street 6 and Kirby Road	-	-	1218	1818	-	-
Street 4 and Street 1	-	-	491	509	-	-
Jane Street and Street 1	-	-	1914	2000	-	-
Street 5 and Street 1	-	-	524	804	-	-
Street 6 and Street 1	-	-	155	287	-	-
Street 8 and Vista Gate	-	-	1628	1983	-	-
Jane Street and Street 2	-	-	1975	2107	-	-
Street 4 and Street 2	-	-	416	709	-	-
Street 5 and Street 2	-	-	911	1445	-	-
Street 6 and Street 2	-	-	908	1220	-	-
Street 8 and Peak Point	-	-	-	-	-	-
Street 8 and Street 2	-	-	746	1140	-	-
Keele Street and Street 2	-	-	2325	3201	-	-
Jane Street and Street 3	-	-	2612	3053	-	-
Street 4 and Street 3	-	-	630	807	-	-
Street 5 and Street 3	-	-	668	1285	-	-
Street 6 and Street 3 / 7	-	-	694	917	-	-
Street 7 and Teston Road	-	-	3211	4398	-	-
Street 8 and North Maple Regional Park	-	-	308	454	-	-
Mosque Gate and Teston Road	-	-	3826	6849	-	-
Highway 400 SB and Teston Road	-	-	4049	6563	-	-
Cityview Blvd and Teston Road	-	-	4429	5336	-	-
Cityview Blvd and Highway 400 SB Ramps	-	-	2800	2300	-	-
Cranston Park and McNaughton Rd	-	-	1248	1768	-	-
McNaughton Rd and Major Mackenzie Drive	-	-	3620	4023	-	-
Spine Rd (Block 34E) and Kirby Road	-	-	1097	1628	-	-