Report No. 92804

Report:

1140 Main Street, Cambridge, Ontario
Air Quality and Odour Study

Date: October 31, 2024



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Air Quality and Odour Study

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Report No.:	92804 22 pages, 4 Appendices

Revision History

Version	Date	Summary Changes/Purpose of Revision
1	October 31, 2024	None

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EXECUTIVE SUMMARY

Alliance Technical Group (ATG), formerly ORTECH Consulting Inc. was retained to complete an air quality and odour study for the proposed subdivision at 1140 Main Street in Cambridge, Ontario (the "Site"). The proposed development includes one-storey, two-storey, and stacked townhouses, as well as one park. The purpose of this study is to address the potential air quality and odour impacts from existing industrial facilities within a Study Area of 1 km. The latest development plans are shown in Appendix A.

This study was conducted in consideration of the following resources:

- The Ministry of Environment, Conservation and Parks' (MECP's) D-6 Guidelines.
- The Ontario Environmental Protection Act (EPA) and Ontario Regulations 419/05.
- Ontario's Ambient Air Quality Criteria (AAQC).
- Canadian Ambient Air Quality Standards (CAAQS).
- MECP's Air Contaminant Benchmark (ACB) List, 2023 (MECP limits).
- Methodology for Modeling Assessments of Contaminants with 10 Minute Average Standards and Guidelines under O. Reg. 419/05.

The location of the Site and the boundary of the Study Area are shown in Appendix B. Based on a review of existing land uses within the Study Area, the following significant sources of air emissions were identified:

- Cambridge Waste Management Center (CWMC)
- Gerdau Metal Recycling (GMR)
- Gerdau Steel Mill (GSM)

The impact of air emissions from these sources on the Site was further studied by using AERMOD (version 22112), a regulatory dispersion model approved by the MECP. Air emissions from the identified industrial facilities were assessed based on emissions data acquired through various sources such as Environment and Climate Change Canada's (ECCC's) National Pollutant Release Inventory (NPRI), published literature and ATG's experience with similar facilities. Background air quality levels were accounted for by adopting National Air Pollution Surveillance (NAPS) data from representative stations. The contaminants reported to the NPRI program by GSM and CWMC are particulate matter (TSP, PM_{10} and $PM_{2.5}$).

AERMOD modelling predicted that the particulate matter levels at the Site are expected to be below the AAQC, CAAQS and MECP limits. Further, the impacts of odour emissions from composting of yard waste at the CWMC were assessed in this report. Odours are not considered a regulated contaminant in Ontario. However, the MECP provides odour assessment guidance. In ATG's experience, MECP typically looks at two odour threshold values, 1 OU and 10 OU. The likelihood of odour complaints increases, when odour levels exceed 10 OU. Where 1 OU (odour unit) is defined generally as an odour concentration that is detected by half the members of an odour panel using a dynamic dilution olfactometer.

The community odour surveys reveal that the odours from various industrial facilities within the Study Area were detectable in the Slight to Moderate range near the respective industrial facilities, which decreased to non-detectable levels beyond 100 meters as the surveyor moved away from the survey locations. Moderate to Strong odours from CWMC were detected at the east property line of the Site, which decreased to Slight odours as the Surveyor moved towards the center, and then the west end of the Site. The odour impacts from the CWMC were further studied using the AERMOD model.

The odour dispersion modelling predicted 2% higher impacts in the range of 1 OU and 10 OU, at the nearest proposed residential units at the Site when compared to the odour impacts at the existing residential unit immediately south of the CWMC. The modelling results indicate odours >10 OU are not expected at the existing receptors. However, the proposed receptors may experience odours >10 OU for approximately 0.5% of time in a year. A potential area of influence was established where odours over 10 OU can be detected, which extends approximately 175 meters from the west property line of the CWMC into the Site. The at-receiver mitigation method of using carbon filtration systems and the inclusion of a warning clause in the sale agreement is recommended by ATG. Also, ATG suggests exploring at-source mitigation for controlling odours at the CWMC in consultation with the Region.

1. INTRODUCTION

Alliance Technical Group (ATG), formerly ORTECH Consulting Inc. was retained to complete an air quality and odour study for the proposed subdivision at 1140 Main Street in Cambridge, Ontario (the "Site"). The purpose of this study is to address the potential air quality and odour impacts from existing industrial facilities within a Study Area of 1 km. Based on a review of existing land uses within the Study Area, the following significant sources of air emissions were identified:

- Cambridge Waste Management Center (CWMC)
- Gerdau Metal Recycling (GMR)
- Gerdau Steel Mill (GSM)

1.1 Description of the Site and the Study Area

The proposed development is divided into six blocks. Blocks 1 to 3 consist of 681 residential units, comprising one-storey, two-storey and stacked townhouses with parking spaces. Block 4 is park space, immediately adjacent to CWMC. Block 5 is an open space, and Block 6 is a stormwater management area. The latest development plans are shown in Appendix A.

The closest existing residential land uses are on the south side of the main street, and there are two residential units on the industrial lands adjacent to the Site. Immediately to the east of the Site is CWMC with outdoor compost pads. Immediately to the west of the Site is GMR, which has outdoor storage for scrap metal. There is tree cover north of the Site which provides a buffer between the existing industrial land uses and the Site. GSM is located more than 600 meters from the Site.

2. RELEVANT GUIDELINES AND REGULATIONS

2.1 MECP's D-6 Guidelines

MECP's D-6 guidelines (the "Guidelines") recommend a 1000-meter study area for land use proposals, define three classes of industrial facilities: Class I, Class II and Class III (see definitions below), and define Sensitive Land Uses. Guideline D-6 also defines Minimum Recommended Separation Distances (MSDs) and Potential Area of Influence (AOI) between industrial facilities, and sensitive land uses for each Class, as shown in Table 1. The class designations are based on the potential for noise, dust and odours.

A Class I Industrial Facility is "A place of business for a small scale, self-contained plant or building which produces/stores a product which is contained in a package and has low probability of fugitive emissions. Outputs are infrequent and could be point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration. There are daytime operations only, with infrequent movement of products and/or heavy trucks and no outside storage".

A Class II Industrial Facility is "A place of business for medium scale processing and manufacturing with outdoor storage of wastes or materials and/or there are periodic outputs of minor annoyance. There are occasional outputs of either point source or fugitive emissions for any of the following: noise, odour, dust and/or vibration, and low probability of fugitive emissions. Shift operations are permitted and there is frequent movement of products and/or heavy trucks during daytime hours".

A Class III Industrial Facility is "A place of business for large scale manufacturing or processing, business characterized by: large physical size, outside storage of raw and finished products, large production volumes and continuous movement of products and employees during daily shift operations. It has frequent outputs of major annoyance and there is a high probability of fugitive emissions".

Table 1: Minimum Separation Distances and the Potential Influence Areas from Sensitive Land Uses

Class	Recommended Minimum Separation Distance (m)	Potential Influence Area (m)
I	20	70
II	70	300
III	300	1000

Although Guideline D-6 suggests that distances are normally measured from property line to property line, there is an allowance for measuring from a specific source to sensitive receptors. Guideline D-6 also discusses reducing the minimum separation distance required based on mitigation at industrial sites and provides for exceptions to the Recommended Minimum Separation Distances for some development sites including infilling.

Facilities that do not meet the definition of any one of the three classes are expected to have virtually no potential for creating noise, odour, dust or vibration that would give rise to complaints. The definitions and examples in the MECP Guidelines relevant to air quality concerns were used to characterize each of the nearby facilities. The D-6 Guideline includes "residences, senior citizens homes, schools, daycare facilities, hospitals, churches and other institutional uses" as sensitive land uses.

2.2 Ontario Environmental Protection Act (EPA) and Ontario Regulation 419/05

Environmental Compliance Approvals (ECA) and Environmental Activity and Sector Registry (EASR) are two permitting instruments for industrial facilities, under Section 9 of the EPA, which follow the requirements of Ontario Regulation 419/05 (O. Reg. 419/05) and Ontario Regulation 1/17 (O. Reg. 1/17). In general, low risk industries follow the EASR process while more complex industrial operations require an ECA.

Per O. Reg. 419/05, facilities emitting air contaminants are required to comply with MECP's air quality standards at all off-site receptor points. Odours, which are categorized as a nuisance, are regulated at sensitive receptors such as schools, residences, long-term care homes, etc., either through the air quality criteria in O. Reg. 419/05 or through specific terms and conditions in the ECA or EASR documentation. Industrial facilities with existing permits (ECAs or EASRs), as identified in Table 2, are expected to meet the MECP's air quality standards at the nearest off-site receptors.

3. AIR EMISSIONS SCREENING ASSESSMENT

The air emissions screening assessment was based on readily available information, such as conceptual site plans, satellite imagery, Access Environment website (MECP's map-based tool), etc., and direct observations conducted during the site visit on May 21, 2024.

3.1 Existing Industrial and Commercial Land Uses

According to Table 2, multiple Class I to III industrial facilities were identified within the study area. The classification of these facilities is based only on their air emissions potential. Except for three facilities, all other industrial facilities were found to be at adequate separation distance such that adverse air quality impacts are not anticipated at the Site.

3.1.1 Cambridge Waste Management Center (CWMC)

Per the Region of Waterloo (the Region) website, the CWMC is located at 201 Savage Drive in Cambridge, which includes a public drop-off area, a large waste transfer building, and compost pads. The blue bin waste and household hazardous waste are transferred off-site for further processing and disposal. The CWMC receives approximately 20,000 metric tonnes (MT) of yard waste per year, which is composted at the facility. The historical satellite imagery reveals that there are two compost pads, which may or may not be fully occupied by the composting windrows. A portion of these pads may be used for yard waste storage, as satellite imagery shows waste stockpiles.

From the satellite imagery, approximate dimensions of 120 meters x 10 meters for each windrow were observed, with the number of windrows varying seasonally to a maximum of 20 windrows. It was observed during the field visits that the windrows are approximately 2 meters high. The facility's total paved road length is estimated to be approximately 1.5 km, based on satellite imagery. Also, historical satellite imagery reveals that a shredder is probably used to reduce the size of raw material before composting. According to the Region's website, the composting process lasts for an entire 12-month period, and the windrows are occasionally turned as needed.

Since, the location of dust and odour-causing operations is outdoors, and the frequency of fugitive emissions and truck movement is expected to be continuous, CMWC is designated as a Class III facility. The dust emissions generated from the material handling of yard waste and vehicle movement on paved roads, as well as the odour emissions from the windrows, were modelled using the AERMOD dispersion model. CWMC reports annual emissions data to the NPRI program.

3.1.2 Gerdau Metal Recycling (GMR)

GMR is an end-of-life vehicle disposal site which operates under a waste EASR. Per the EASR document, no shredding, shearing or crushing operations are done at the facility. Torch cutting of metals less than 250 mm in thickness is done at the facility, with the permit condition that a plan is in place at the facility to prevent visible emissions from being carried beyond the property. From the satellite imagery, there is no evidence of soiling (due to metal emissions) on the facility building roof surfaces.

The frequency of fugitive emissions and truck movement is not expected to be continuous, and the facility operates only during the daytime, GMR can be classified as a Class I-II facility. Dust emissions from this facility are mainly expected to be from material handling i.e., delivery of scrap metal to the facility and material drop from scrap handler. The materials handled at the facility are large metal pieces or end-of-life vehicles, unlike yard waste at composting facilities or aggregates at concrete plants. Dust emissions from material handling operations at GMR are not expected to be significant. However, the dust emissions from GMR were included in the dispersion modelling assessment due to the proximity of the facility to the Site. No annual emissions data is reported by GMR to the NPRI program.

3.1.3 Gerdau Steel Mill (GSM)

Per ECA issued to GSM, the facility manufactures hot-rolled carbon steel bars and shapes from recycled scrap metal. There is a tall stack at the facility, the height of which is estimated to be approximately 20 meters based on field observations. GSM reports annual emissions data to the NPRI program. GSM reported no fugitive dust emissions to NPRI. From satellite imagery, the majority of operations appear to be enclosed. However, due to the continuous nature of operations, GSM can be classified as a Class II-III facility. Due to the separation distance of GSM from the Site, the lower-level emission sources are not expected to have an adverse impact at the Site. Only, the dust (particulate matter) emissions from the tall stack were included in the dispersion modelling assessment. The stack parameters were estimated based on field observations and ATG's experience.

3.2 Transportation Facilities

There are no 400-series highways within the Study Area and the regional highways and the rail lines are located more than 500 meters from the Site. The separation distance of transportation networks from the Site is adequate to prevent adverse air quality impacts. Hence, the air emissions from the transportation network within the Study Area were not included in the dispersion modelling assessment.

Table 2: Active Industrial Facilities with Air Emission Sources within the Study Area

Active Facilities Within Study Area	Address	Operations	Permit Type	Distance to the Site	D-6 Classification	Within AOI?	Within MSD?	Modelled?	Comments
Gerdau Metal Recycling	1050 Main Street	End-of-life vehicle scrap yard (no crushing)	EASR	14	I-II	Yes	Yes	**Yes**	Particulate emissions were modelled
Cambridge Waste Management Center (CWMC)	201 Savage Drive	Yard waste composting	ECA	21	III	Yes	Yes	**Yes**	Particulate and odour emissions were modelled
Fuchs Lubricants Canada Ltd.	405 Dobbie Drive	Lubricant manufacturing	ECA	340	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Galt Display Rack Company Limited	141 Savage Drive	Display racks manufacturer	ECA	380	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Eagle Truck and Trailer Repair	131 Savage Drive	Truck repair shop	None	420	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Grober Nutrition	162 Savage Drive	Milk replacement product manufacturing	None	490	II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Tri Pac Inc.	415 Dobbie Drive	Package manufacturing	None	500	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Tigercat International Inc.	100 Savage Drive	Construction machinery manufacturing	EASR	520	II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Stampede Culinary Partners (Delft Blue Foods)	435 Dobbie Drive	Meat processing and packaging	None	550	I-II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Babcock & Wilcox Power Generation Group Canada Corp.	75 Savage Drive	Industrial equipment supplier	ECA	605	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Novatek Welding & Fabricating	75 Moorefield Street	Metal fabricator	None	620	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Combined Metal Industries Inc.	454 Dobbie Drive	End-of-life vehicle scrap yard (no crushing)	EASR	660	I-II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Gerdau Ameristeel	160 Orion Place	Steel mill	ECA	660	II-III	Yes	No	**Yes**	Particulate emissions were modelled
South Cambridge Shopping Centre	200 Franklin Blvd.	Shopping center	ECA	750	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Wire-Wire Manufacturing Ltd.	447 Dobbie Drive	Custom wire, sheet and tube manufacturing	None	770	II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Dana Canada Corporation	401 Franklin Boulevard	Automotive parts manufacturing	ECA	770	I-II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Custom Aluminum Foundry Limited (The Innovative Shapecasting Group)	458 Dobbie Drive	Aluminum and zinc-aluminum casting facility	ECA	800	I-II	No	No	No	Adequate separation distance; adverse impacts not anticipated
Colorline Display & Screening	395 Franklin Blvd.	Display stand manufacturer	None	810	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Cambridge Brass Inc.	140 Orion Place	Brass components manufacturing	ECA	840	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Franklin Auto Body	364 Franklin Boulevard	Autobody shop	ECA	900	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
557733 Ontario Ltd. (Dundas Autobody)	450 Dundas Street South	Autobody shop	ECA	925	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
ABS Collision Inc.	378 Franklin Boulevard North	Autobody shop	ECA	940	I	No	No	No	Adequate separation distance; adverse impacts not anticipated
Cambridge Landfill Site (closed)	201 Savage Drive	Enclosed flare for landfill gases from a closed landfill	ECA	1000	I	No	No	No	Adequate separation distance; adverse impacts not anticipated

4. EMISSIONS ESTIMATION

4.1 Air Emissions from CWMC

Dust Emissions

The dust emissions from CWMC were estimated based on the maximum annual production capacity of 20,000 metric tonnes of yard waste, as per the Region's website. The handling of yard waste and construction of windrows generates dust. The material is expected to be moist, so there is an inherent dust control present in the process. Per the Region's website, the composting is done 12 months a year.

Total waste received on a particular day (i.e., weekly collection day)
= 20,000 MT/year x 1 year/52 weeks x 1.1 (safety factor)
= 423 MT/day

A reasonably conservative daily operations scenario includes all the following operations happening on the same day:

- Raw material unloading (delivery) onto the stockpile
- Shredding on raw material
- Dropping of shredded material onto the stockpile
- Construction of one windrow on the compost pad closest to the Site. Each windrow is estimated to be 120 m x 10 m from satellite images. The height of each windrow is approximately 2 m, as noted during the site visit to the area.

In ATG's opinion, the following activities (Table 3) on a particular day represent a reasonably conservative scenario identified above.

Table 3: Conservative Dust Emissions Scenario (daily basis)

Activity	Value	Units
Annual waste processed	20000	MT
Weekly deliveries to CWMC which occur on a given day	52	weeks/year
Waste quantity delivery to stockpile; 10% safety factor applied	423	MT/day
Delivery trucks weight	20	MT
Assuming 20 MT delivery trucks, total trips per day	21	trips/day
Paved road length for delivery trucks (estimated)	1537	meters
Delivery trucks VKT	32.5	VKT
For construction of one windrow (dimensions 120 m x 10 m x 2 m); material density 200 kg/m^3	480	MT/day
Wheel loader capacity	10	MT
Loader trips from the stockpile to compost pad 1 (paved road)	96	2-way trips/day
Paved road length from the stockpile to compost pad 1	150	meters
Loader VKT on paved road from stockpile to compost pad 1	14.4	VKT

The predictive emission factor equation from AP-42 Chapter 13.2.4 was used for the calculation of particulate matter emission factors and, subsequently, the emission rates (Table 4).

Table 4: Dust Emissions from Material Handling at CWMC

Contaminant	u m/s	K	M	EF kg/Mg	Delivery Stockpile ER g/s	Windrows Drop Point g/s	Shredder Stockpile g/s
TSP	6.72	0.74	12	4.12E-04	2.02E-03	2.29E-03	2.29E-03
PM_{10}	6.72	0.35	12	1.95E-04	9.53E-04	1.08E-03	1.08E-03
$PM_{2.5}$	6.72	0.053	12	2.95E-05	1.44E-04	1.64E-04	1.64E-04

1. The values of k and M are taken from AP-42 Chapter 13.2.4. The moisture content of the cover material of municipal solid waste landfills was used as a representative value.
2. The 5-year average value of maximum daily wind speeds is 6.72 m/s, which was adopted from MECP's meteorological data for the West Central Region.

The dust from paved roads was calculated (Table 5) based on the predictive emission factor equation from AP-42 Chapter 13.2.1. The total length of paved roads at CWMC is estimated to be approximately 1.5 km with one-way traffic movement.

Table 5: Dust Emissions from Paved Roads at CWMC

Parameter	PM30 (TSP)	PM_{10}	$PM_{2.5}$
k g/VKT	24	4.6	1.1
sL	7.4	7.4	7.4
W	20	20	20
E g/VKT	967	185.3	44.3
VKT (daily)	46.9	46.9	46.9
ER g/s	5.25E-01	1.01E-01	2.41E-02

1. The values of k and sL are taken from AP-42 Chapter 13.2.1.

Odour Emissions

In ATG's experience with other similar composting facilities, the average odour emission rate from the waste storage area and compost piles is 0.52 $OU/s/m^2$. The most conservative odour emissions scenario from the CWMC would be if both compost pads are covered with compost piles i.e., 4 compost piles on pad 1 and 16 compost piles on pad 2. During the composting cycle, the odour intensity is highest at the beginning i.e., at the time of windrow construction and drops gradually over a period of time to almost barely noticeable levels when the compost is ready for shipment. It is unrealistic to assume that all 20 windrows are constructed in one day, which would cause the highest odour emissions. So, in ATG's opinion, a reasonably conservative odour emissions scenario is:

- Compost pad 1 is covered with fresh windrows i.e., odour emissions occurring at a rate of 0.52 $OU/s/m^2$.
- Half of compost pad 2 emits odour at a rate of 2/3rd of 0.52 $OU/s/m^2$.
- The remaining half of compost pad 2 emits odour at a rate of 1/3rd of 0.52 $OU/s/m^2$.

4.2 Air Emissions from GMR

Dust emissions from GMR were estimated based on AP-42 Chapter 11.19. The uncontrolled emission factors for conveyor transfer points were adopted for delivery of scarp to the facility and scrap handling emissions. The information on the maximum annual scrap handling capacity of GMR was not found in the public domain. Gerdau's metal shredding facility in Whitby, Ontario, has an annual waste shredding capacity of 140,000 tonnes/year (Preliminary Resource Recovery Report Card and Gaps Assessment for Canada, 2021). This facility has a footprint of four times the GMR facility in Cambridge. For conservatism, the scrap handling capacity of GMR was assumed to be 70,000 tonnes/year.

Daily waste handling capacity of GMR
= Annual capacity/365 days x 1.1 (safety factor)
= 70,000/365 x 1.1
= 211 tonnes/day

Sample Calculation:

TSP emissions from scrap handling
= Daily waste handling capacity tonnes/day x AP-42 emission factor kg/ton x 1000 g/kg x 1 day/24 hours x 1 hour/3600 seconds
= 211 tonnes/day x 0.0015 kg/ton x 1000 g/kg x 1 day/24 hours x 1 hour/3600 seconds
= 3.66E-03 g/s

Similarly, PM_{10} and $PM_{2.5}$ emissions were calculated as shown in Table 6.

Table 6: Dust Emissions from GMR

Contaminant	AP-42 Emission Factor (kg/Mg)	Material Delivery (g/s)	Scrap handler (g/s)
TSP	0.0015	3.66E-03	3.66E-03
PM_{10}	0.00055	1.34E-03	1.34E-03
$PM_{2.5}$*	0.000225	5.49E-04	5.49E-04

* $PM_{2.5}$ emission factor was estimated based on the table for Category 3, Table B.2.2, Appendix B.2 of AP-42.

4.3 Air Emissions from GSM

GSM reported only point source emissions to the NPRI program for the year 2023. These emissions are likely to be a sum of all point source emissions at the GSM facility. For conservatism, all point source emissions reported to the NPRI program were attributed to the tall stack at the GSM facility.

Table 7 summarizes the dust emissions from the GSM facility. the daily averaged emission rates were calculated based on 24x7 operations of the Facility and 10% safety factor.

Table 7: Dust Emissions from GSM

Contaminant	CAS #	Point Source Emissions (tpy)	Daily ER (g/s)
TSP	TSP	0.98	3.43E-02
PM_{10}	PM_{10}	0.98	3.43E-02
$PM_{2.5}$	$PM_{2.5}$	0.98	3.43E-02

5. DISPERSION MODELLING

US EPA AERMOD model (version 22112) is the current regulatory dispersion model in Ontario, as adopted by MECP. AERMOD requires data inputs such as emission intensity (grams/unit time) for an emission source (example roads, rail lines, stacks, etc.) and meteorological data (wind speed, temperature, etc.) to calculate the dispersion of contaminants towards receptor points (residence, schools, etc.).

5.1 Physical Characterization of Emission Sources

A summary of modelled emission sources, source IDs, source types and source parameters is provided in Table 8.

Table 8: AERMOD Emission Sources and Parameters

Source ID	Source Description	Source Type	Release Height (m)	Exhaust Flow Rate (m^3/s)	Exhaust Diameter (m)	Exhaust Temperature (°C)
GF	Gerdeau Furnace Stack	POINT	20	5	4	500
GR	Gerdau Metal Recycling	VOLUME	1.5	-	-	-
SP	Raw Material Stockpile	VOLUME	1.5	-	-	-
SH	CWMC Shredder	VOLUME	1.5	-	-	-
SHS	CWMC Shredder Stockpile	VOLUME	1.5	-	-	-
W1	Windrow 1	AREA	1	-	-	-
PR1	Paved Road Segment 1	LINE_VOLUME	2.55	-	-	-
PR2	Paved Road Segment 2	LINE_VOLUME	2.55	-	-	-
PR3	Paved Road Segment 3	LINE_VOLUME	2.55	-	-	-
PR4	Paved Road Segment 4	LINE_VOLUME	2.55	-	-	-
PR5	Paved Road Segment 5	LINE_VOLUME	2.55	-	-	-
CP1	Compost Pad 1	AREA	1	-	-	-
CP2_1	Compost Pad 2 - Area 1	AREA	1	-	-	-
CP2_2	Compost Pad 2 - Area 2	AREA	1	-	-	-

5.2 Contaminant Emission Rates

Contaminant emission rates from the sources identified in Table 8 are provided in Section 4.

5.3 Buildings

The building layout for the proposed development is provided in Appendix A.

5.4 Receptors

ATG used the following approach to set up elevated receptor points around the buildings, consistent for each building identified in Appendix A.

- Receptors at Ground Level (GL) along the property line and the building periphery.
- Receptors at 1.5 meters above ground level (breathing zone).
- Receptors at the window level of each building block.

5.5 Meteorological Data

MECP's regional meteorological data (version April 2023) processed with AERMET 22112 for the West Central Region (London) was used, as made available on the Ministry's website. The CROPS dataset was selected for conservatism.

5.6 Terrain Data

MECP's NED GeoTIFF file "cdem_dem_040P.tif" was used as digital terrain input to the AERMAP. The US EPA recommended elevation data import technique was used to import the elevations for receptors, sources and buildings.

6. COMMUNITY ODOUR SURVEY

ATG completed community odour surveys on three separate days in 2024 – May 21, May 29 and May 31, twice per day, by individuals trained in odour panel study i.e., with calibrated noses. The surveys were done at various locations, which included multiple points on the Site, near CWMC, near industrial facilities north of the Site and at the existing residential area south of Highway 27. The purpose of these surveys was to identify the extent of odour impacts at the Site and beyond the Site, as well as other potential odour sources near the Site. A summary of odour survey locations is provided in Table 9 and the location mapping is shown in Appendix C.

The odour intensities were classified as follows:

0 – No odour
1 – Slight
2 – Moderate
3 – Strong
4 – Extreme

Table 9: Details of Odour Survey Locations

Location ID	Description	No. of Surveys
L1	South of the Site	2
L2	Northeast corner of CWMC	4
L3	West of Gerdau	2
L4	North of Stampede	4
L5	East of Innovative Shape Casting along Dobbie Dr.	4
L6	East of Tigercat along Dobbie Dr.	4
L7	East Property Line of the Site; Adjacent to CWMC compost pad	2
L8	Center of the Site	4
L9	South of Stampede	2
L10	Southwest of Fuchs along Dobbie Dr.	2
L11	Southwest of Tigercat along Savage Dr.	2
L12	Blue Rock Crescent (Existing Residential Area)	3
L13	West Property Line of the Site; Adjacent to GMR	1

7. RESULTS AND DISCUSSIONS

7.1 Dust Modelling Results

AERMOD modelling results of significant sources of air emissions near the Site are presented in Table 10. The maximum modelled concentrations of all contaminants were found to be below the air quality limits (AAQC, CAAQS and MECP).

Table 10: Dust Modelling Results

Contaminant	Averaging Period	Air Quality Threshold (µg/m³)	Standard/ Reference	Maximum Modelled Concentration (µg/m³)	% of Air Quality Threshold
PM_{10}	24-hour	50	AAQC	20.38	41%
$PM_{2.5}$	24-hour	27	CAAQ	1.87	7%
	Annual	8.8	CAAQ	0.45	5%
TSP	24-hour	120	MECP	101.27	84%

Background Air Quality

Background air concentration represents cumulative levels of air contaminants released from various emission sources, such as industrial sources, roadways, railways, etc., in the vicinity of an air monitoring station where the background air quality levels are recorded. This report addresses the air quality impacts from emission sources within 1 km of the Site.

Background air quality conditions were established by reviewing publicly available historical ambient air monitoring data from NAPS air monitoring stations. The selection of a representative NAPS station is critical to establish background air quality. NAPS #61502 (Kitchener) is located approximately 20 km from the Site and is the closest NAPS station to the Site. Background ambient levels of $PM_{2.5}$ were adopted from NAPS #61502. NAPS stations do not report PM_{10} background levels for Ontario cities. In 2022, Sarnia was the only city which reported PM_{10} background levels. The background air quality of Sarnia data is not considered representative of the Site due to the presence of large-scale industries in Sarnia, unlike the Study Area. For conservatism and due to the unavailability of background PM_{10} data, the Sarnia data was utilized in this report for PM_{10}.

Table 11 shows the three-year (2020-2022) averaged background $PM_{2.5}$ data. This is the latest NAPS data available through ECCC during the preparation of this report.

Table 11: Background Air Quality Levels

Contaminant	Averaging Period	Background Air Quality (µg/m³)	NAPS Station ID	Air Quality Threshold (µg/m³)	Reference	% of Air Quality Threshold
PM_{10}	24-hour	25.31	-	50	AAQC	51%
$PM_{2.5}$	24-hour	13.67	61502	27	CAAQ	51%
	Annual	7.67	61502	8.8	CAAQ	87%

Note: $PM_{2.5}$ data is averaged over three years (2020-2022). PM_{10} data is available only for the year 2022.

Since the proposed development is not industrial or commercial in nature, the proposed development is not expected to add new emissions to the background air quality levels. The receptors, i.e., a residential unit of the proposed development, would be exposed to the background air quality levels, which includes the contribution of industrial emission sources. Hence, for cumulative air quality assessment, the addition of 100% background levels to the maximum modelled concentrations would be considered double accounting. So, 50% of background air quality levels were used for the cumulative air quality impact assessment (Table 12). The air quality limit used for the assessment of TSP is a regulatory limit applicable to individual industrial facilities, and the MECP uses it to ensure compliance. No background air quality was added to the cumulative impact assessment of TSP emissions. As shown in Table 12, the particulate matter (dust) concentrations at the Site are below the applicable air quality limits.

Table 12: Cumulative Air Quality Impact at Site

Contaminant	Averaging Period	50% of Background Air Quality (µg/m³)	Maximum Modelled Conc. (µg/m³)	Cumulative Conc. (µg/m³)	Air Quality Threshold (µg/m³)	Reference	% of Air Quality Threshold
PM_{10}	24-hour	13.00	20.38	33.38	50	AAQC	67%
$PM_{2.5}$	24-hour	6.83	1.87	8.70	27	CAAQ	32%
	Annual	3.83	0.45	4.28	8.8	CAAQ	49%
TSP	24-hour	-	101.27	101.27	120	MECP	84%

7.2 Odour Survey Results

For a majority of instances, the odour intensities were identified as Slight to Moderate. The results of odour surveys are tabulated in Table 13. Except for locations L1, L7, and L8, the odours from the CWMC were not detectable. The odours at all other locations were typical of the adjacent industry type. For example, at location L5, which is close to The Innovative Shape Casting, “Hot Metal” type odours were detected, which are typical of metal casting facilities. The odours of the Slight – Moderate range identified in Table 13 were declined as the surveyor moved away from the respective location and were undetectable beyond 100 meters from the survey location. It is clear from the survey results that the east property line of the Site (L7) could experience moderate to strong odours. These odours dissipated away from the east property line of the Site and only Slight odours were detectable near the west and south property line of the Site. The odours from CWMC were further studied using the AERMOD dispersion model, and the results are discussed in Section 7.3.

Table 13: Odour Survey Results

Date	Location	Odour Intensity
May 21, 2024 (AM)	L1	Slight
	L2	Slight - Moderate
	L3	Slight
	L4	None - Slight
	L5	Slight - Moderate
	L6	Slight
May 21, 2024 (PM)	L2	Slight - Moderate
	L3	Slight - Moderate
	L5	Slight - Moderate
	L4	None - Slight
	L6	None - Slight
	L1	Slight
May 29, 2024 (AM)	L7	Moderate - Strong
	L8	Slight - Moderate
	L2	None - Slight
	L9	Slight - Moderate
	L10	Slight
	L11	Slight - Moderate
May 29, 2024 (PM)	L2	Slight
	L9	Slight - Moderate
	L10	Slight
	L11	Slight - Moderate
	L8	Slight
	L7	Moderate - Strong
May 31, 2024 (AM)	L5	None - Slight
	L12	Slight
	L6	None - Slight
	L4	Slight
	L13	Slight - Moderate
	L8	None - Slight
May 31, 2024 (PM)	L12	Slight
	L5	Slight
	L6	Slight
	L4	Slight
	L12	Slight
	L8	Slight

7.3 Odour Modelling Results

Odours are not considered a regulated contaminant in Ontario. However, the MECP provides odour assessment guidance. In ATG's experience, MECP typically looks at two odour threshold values, 1 OU and 10 OU. The likelihood of odour complaints increases when odour levels exceed 10 OU.

As shown in Table 14, the frequency of exceedances of odours between 1 OU and 10 OU at the proposed residential receptor is predicted to be 2% higher than the frequency of exceedances of the same odour intensities at the existing receptors, i.e., the proposed receptors could experience 2% higher instances of odour levels between 1 OU and 10 OU in a year. The existing receptor is not expected to experience odour levels of more than 10 OU. However, the proposed receptors could experience odour levels of more than 10 OU for 0.5% of the time in a year.

To establish the potential area of influence, based on the dispersion modelling results, a circle was drawn from the centroid of odour sources to the farthest location on the Site where odours of 10 OU or more were predicted even for a single instance. The radius of this circle, i.e., the distance of potential odour > 10 OU, was found to be 306 meters from the centroid of odour sources, which is 175 meters from the CWMC property (see Appendix D).

Table 14: Odour Modelling Results

Receptor	Maximum Predicted OU	Maximum 1 OU - 10 OU Exceedances	Maximum >10 OU Exceedances
Existing Residential Unit	9.97	11.60%	None
Proposed Residential Development	13.65	13.70%	0.51%
Proposed Park	14.00	15.20%	0.72%

8. GENERAL MITIGATION STRATEGIES

To mitigate the odour impacts from the CWMC, ATG recommends incorporating carbon filters into the HVAC systems of the residential units covered by the potential area of influence, as shown in Appendix D. Also, a warning clause should be included in the sale agreement of residential units in consultation with the legal counsel, which clearly states that the frequent odours are detectable at the residential units, especially in open areas such as front and back yards, balconies and the park. Further, the option of mitigating odours at the source, i.e., at CWMC, can be explored in consultation with the Region.

9. CONCLUSIONS AND RECOMMENDATIONS

ATG completed this air quality and odour study for the proposed subdivision at 1140 Main Street in Cambridge, Ontario. The purpose of this study was to address the potential air quality and odour impacts from existing industrial facilities within a Study Area of 1 km. Using the relevant guidance documents, publicly available records of MECP's environmental (Air) permits and reported emissions data, the CWMC, the GMR and the GSM were identified as facilities with potential air quality impacts at the Site. A detailed air quality assessment was completed for these facilities using the AERMOD model. The CWMC and GSM reported only dust emissions TSP, PM_{10} and $PM_{2.5}$ emissions to NPRI. The GMR facility is expected to be a source of dust emissions as well. The predicted dust levels at the Site due to direct emissions impacts from three identified facilities were found to be below applicable air quality levels. 50% of background air quality levels (from NAPS 61502; Kitchener) were added to the modelled concentrations, and the cumulative air quality levels were found to be below applicable air quality limits.

The community odour surveys reveal that the odours from various industrial facilities within the Study Area were detectable in the Slight to Moderate range near the respective industrial facilities, which decreased to non-detectable levels beyond 100 meters as the surveyor moved away from the survey locations. Moderate to Strong odours from CWMC were detected at the east property line of the Site, which decreased to Slight odours as the Surveyor moved towards the center, and then the west end of the Site. The odour impacts from the CWMC were further studied using the AERMOD model.

The odour dispersion modelling predicted 2% higher impacts in the range of 1 OU and 10 OU at the nearest proposed residential units at the Site when compared to the odour impacts at the existing residential unit immediately south of the CWMC. The modelling results indicate odours >10 OU are not expected at the existing receptors. However, the proposed receptors may experience odours >10 OU for approximately 0.5% of the time in a year. A potential area of influence was established where odours over 10 OU can be detected, which extends approximately 175 meters from the west property line of the CWMC into the Site. The at-receiver mitigation method of using carbon filtration systems and the inclusion of a warning clause in the sale agreement is recommended by ATG. Also, ATG suggests exploring at-source mitigation for controlling odours at the CWMC in consultation with the Region.

10. LIMITATIONS

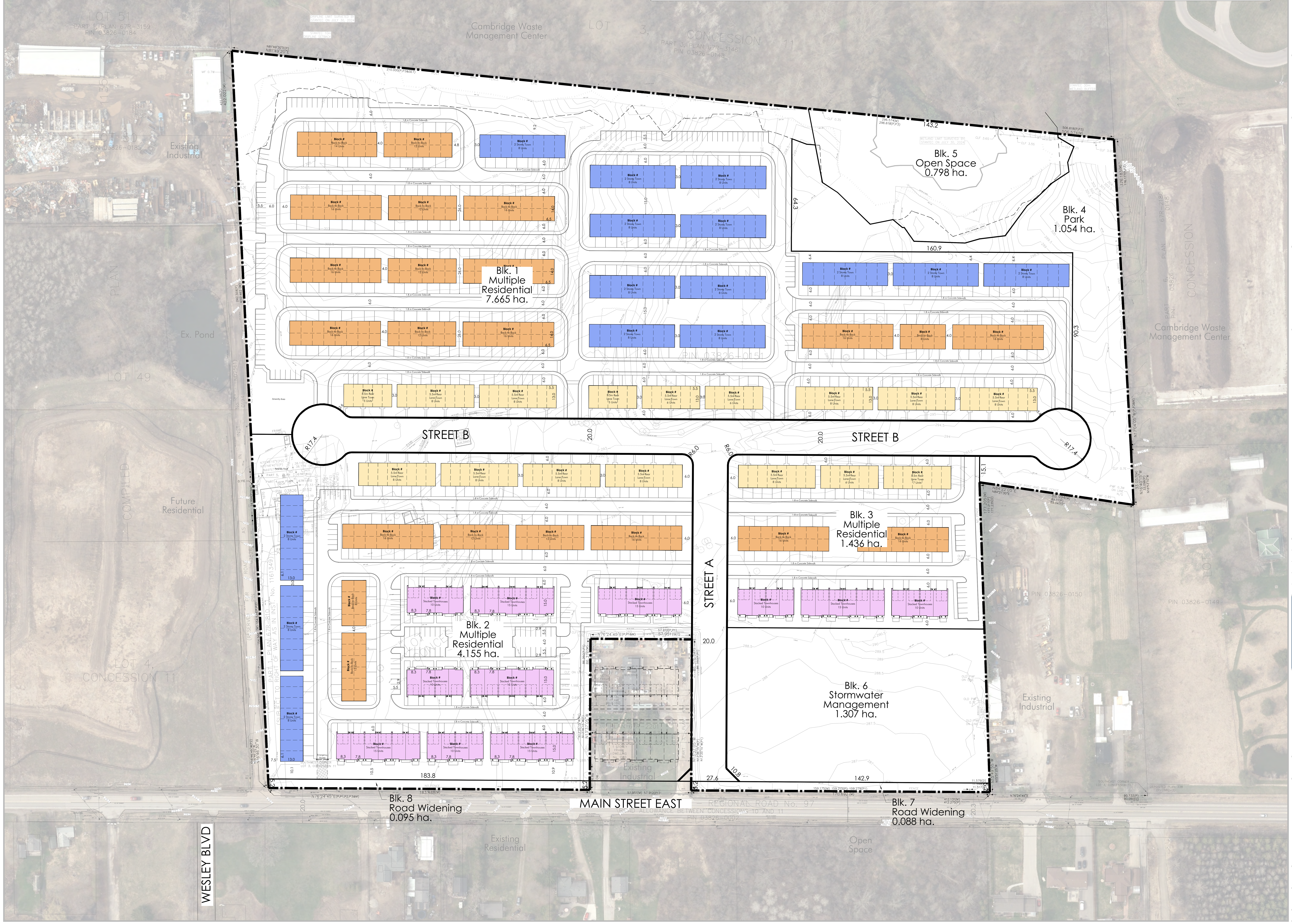
The assessment, conclusion and recommendations in this report are based on the information provided by Madison Group, documented technical guidance from regulatory bodies such as MECP, US EPA, published reports by ECCC available in the public domain and ATG's professional opinion. This report is prepared exclusively for 1140 Main Street, Cambridge, their representatives and stakeholders of the development plan (Appendix A). The assessment presented in this report does not apply to other sites. Any changes to the site plan may require revision of this assessment. The report should not be misconstrued as a comprehensive air quality report for the Site. In addition to industrial emission sources, other emission sources identified in this report may or may not impact the proposed development.

APPENDIX A

Proposed Development Plan
(1 page)

Multiple Block Preliminary Unit & Parking Estimates (Sept. 4, 2024)

	5.5m Rear-Lane Town	6.1m 2 Storey Town	Stacked Town	Back-to-Back	Total Units	Parking Rate (1.25/ unit)	Parking Provided
Block 1	62	96	0	198	356	445	454
Block 2	32	24	105	76	237	296.25	297
Block 3	21	0	35	32	88	110	93
Total	**115**	**120**	**140**	**306**	**681**	**851.25**	**844**



CONCEPT PLAN #1

Legal Description
Pt Lt 3 Con 11 North Dumfries Pt 1, 67r810 & Pt 1, 67r3579, S/t 1161349; Cambridge

Owner's Certificate
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

DATE:__________

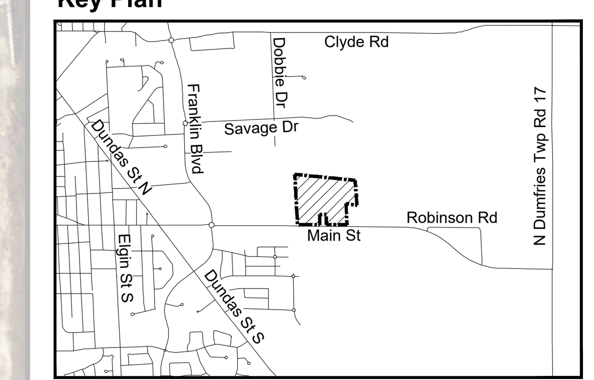
DATE:__________

DRAFT

Surveyor's Certificate
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE:__________

Key Plan



Subject Lands

SCALE: NTS

Source: Region of Waterloo

Additional Information Required Under Section 51(17) of the Planning Act R.S.O. 1990, c.P.13 as Amended

A. AS SHOWN
B. AS SHOWN
C. AS SHOWN
D. RESIDENTIAL, STORMWATER MANAGEMENT, PARK, OPEN SPACE
E. AS SHOWN
F. AS SHOWN
G. AS SHOWN
H. MUNICIPAL WATER SUPPLY
I. LOAM, SANDY LOAM
J. AS SHOWN
K. ALL SERVICES AS REQUIRED
L. AS SHOWN

Area Schedule

Description	Lots/Blocks	Units (min-max)	Area (ha)
Multiple Residential	1-3	±681	13.256
Park	4		1.054
Open Space	5		0.798
Stormwater Management	6		1.307
Road Widening	7,8		0.183
Roads			1.346
Total	**8**	**±681**	**17.944**

Notes
1. All dimensions are in metres unless otherwise shown.
2. Property Boundary & Topographic Survey Base prepared by Schaeffer Dzaldov Purcell Ltd. (February 16, 2024).
3. Contains information licensed under the open government licence- City of Cambridge.
4. Contains information licensed under the open government licence- Ontario.

Revision No.	Date	Issued / Revision	By
2.	Sept. 4, 2024	For Client Review;	SP
1.	July 5, 2024	For Client Review;	GC

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	Date: September 4, 2024
	File No.: 23291A
	Plan Scale: 1:1,000 (Arch D)
	Drawn By: G.C.
Project: 1140 Main Street	Checked By: D.A.
Applicant	Other
File Name: CONCEPT PLAN	Dwg No.: 1 of 1

Scale Bar: 10 0 25 50 75 100m

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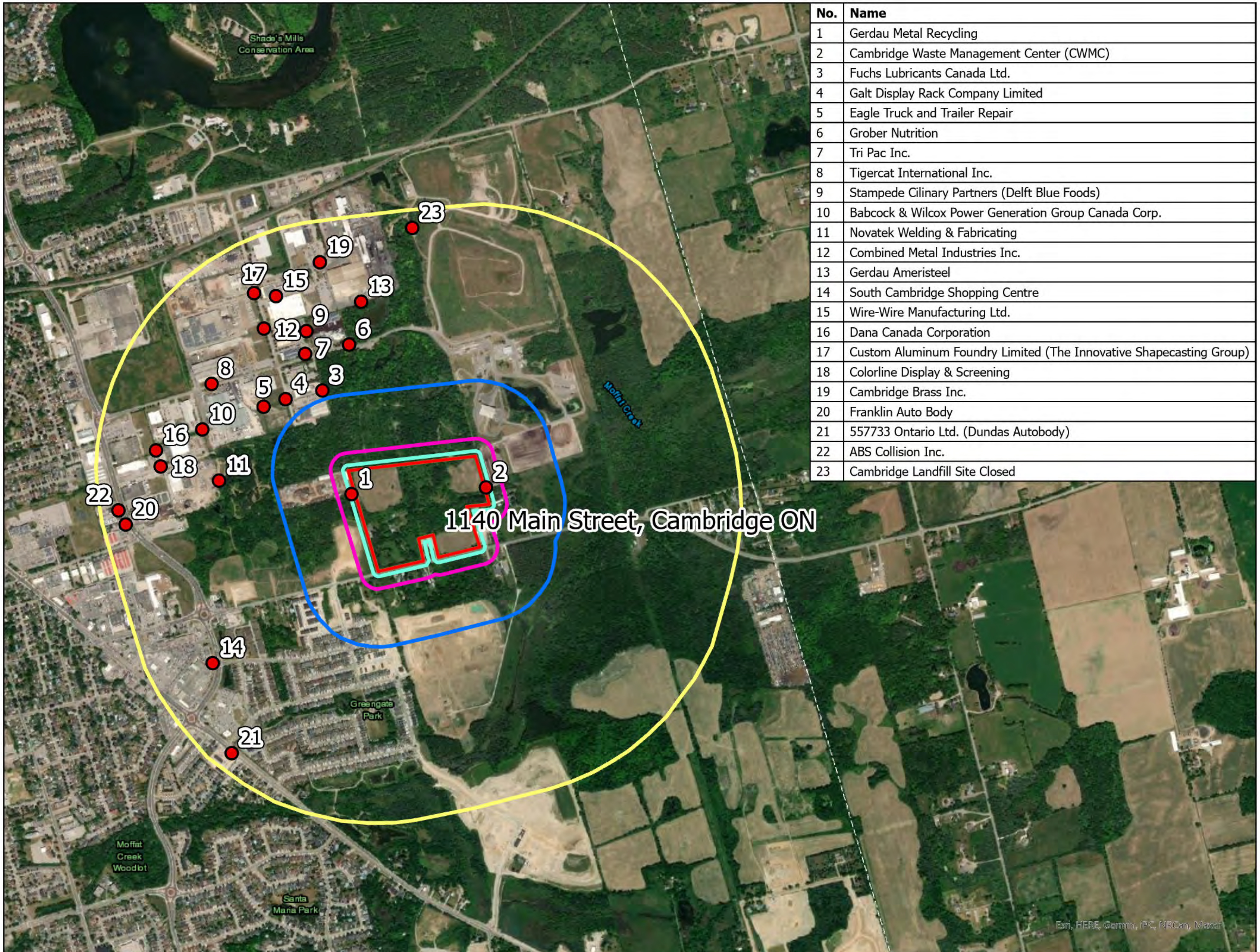
APPENDIX B

Current Land Use within the Study Area
(1 page)



No.	Name
1	Gerdau Metal Recycling
2	Cambridge Waste Management Center (CWMC)
3	Fuchs Lubricants Canada Ltd.
4	Galt Display Rack Company Limited
5	Eagle Truck and Trailer Repair
6	Grober Nutrition
7	Tri Pac Inc.
8	Tigercat International Inc.
9	Stampede Cilinary Partners (Delft Blue Foods)
10	Babcock & Wilcox Power Generation Group Canada Corp.
11	Novatek Welding & Fabricating
12	Combined Metal Industries Inc.
13	Gerdau Ameristeel
14	South Cambridge Shopping Centre
15	Wire-Wire Manufacturing Ltd.
16	Dana Canada Corporation
17	Custom Aluminum Foundry Limited (The Innovative Shapecasting Group)
18	Colorline Display & Screening
19	Cambridge Brass Inc.
20	Franklin Auto Body
21	557733 Ontario Ltd. (Dundas Autobody)
22	ABS Collision Inc.
23	Cambridge Landfill Site Closed

PROJECT TITLE:

Land Use Within Study Area
- 1140 Main Street, Cambridge ON

LEGEND:

- Site Locations
- 1km Buffer
- 300m Buffer
- 70m Buffer
- 20m Buffer
- Property Line

NORTH ARROW:

SCALE BAR:

0 0.25 0.5 Kilometers

COMPANY NAME:
Alliance Technical Group

PREPARED BY:
Jenoshan Sivakumar

PREPARED DATE:
31/10/2024

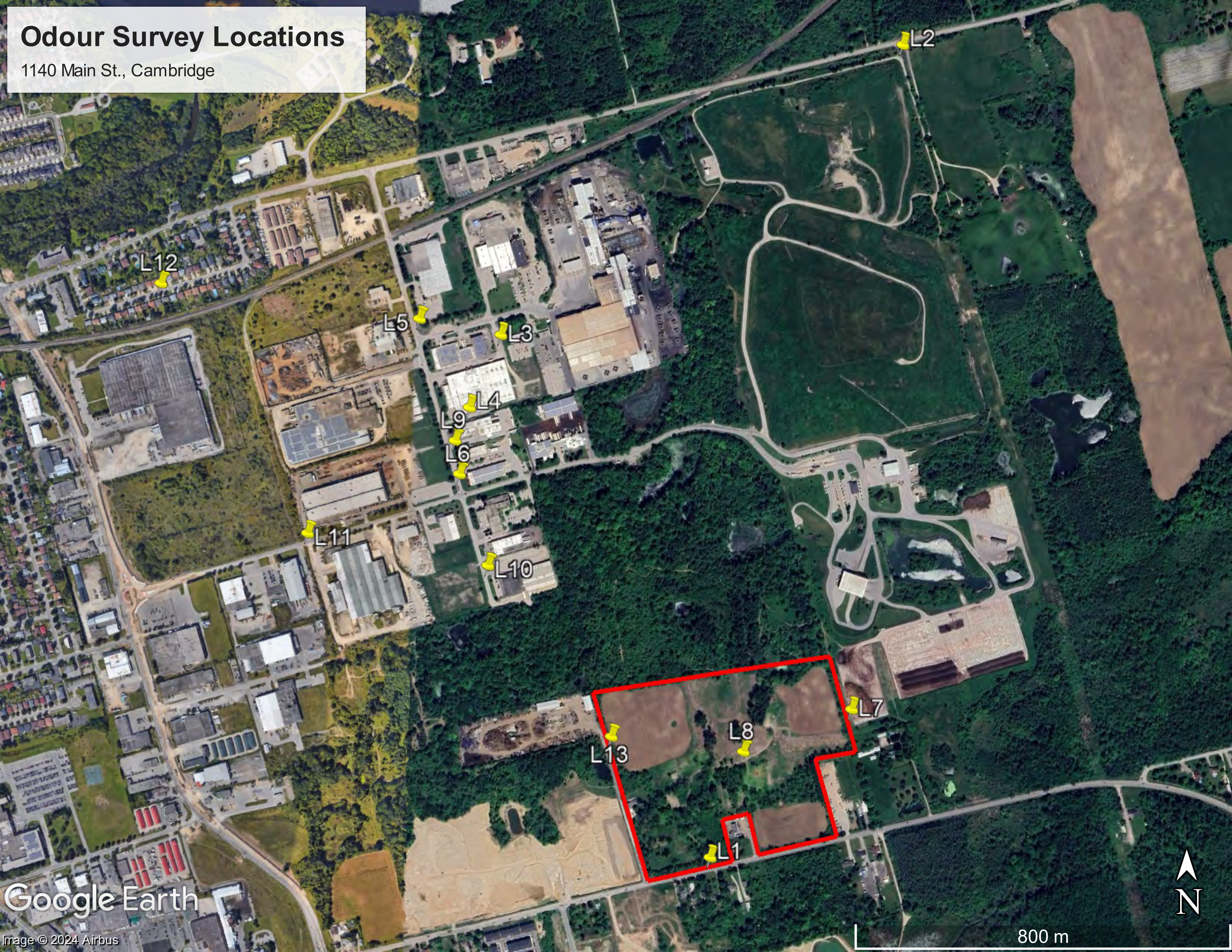
SOURCE:
City of Cambridge
Datum: WGS 1984 UTM Zone 17N

PROJECT NUMBER: 97804

CLIENT: Madison Group

APPENDIX C

Odour Survey Locations Mapping
(1 page)



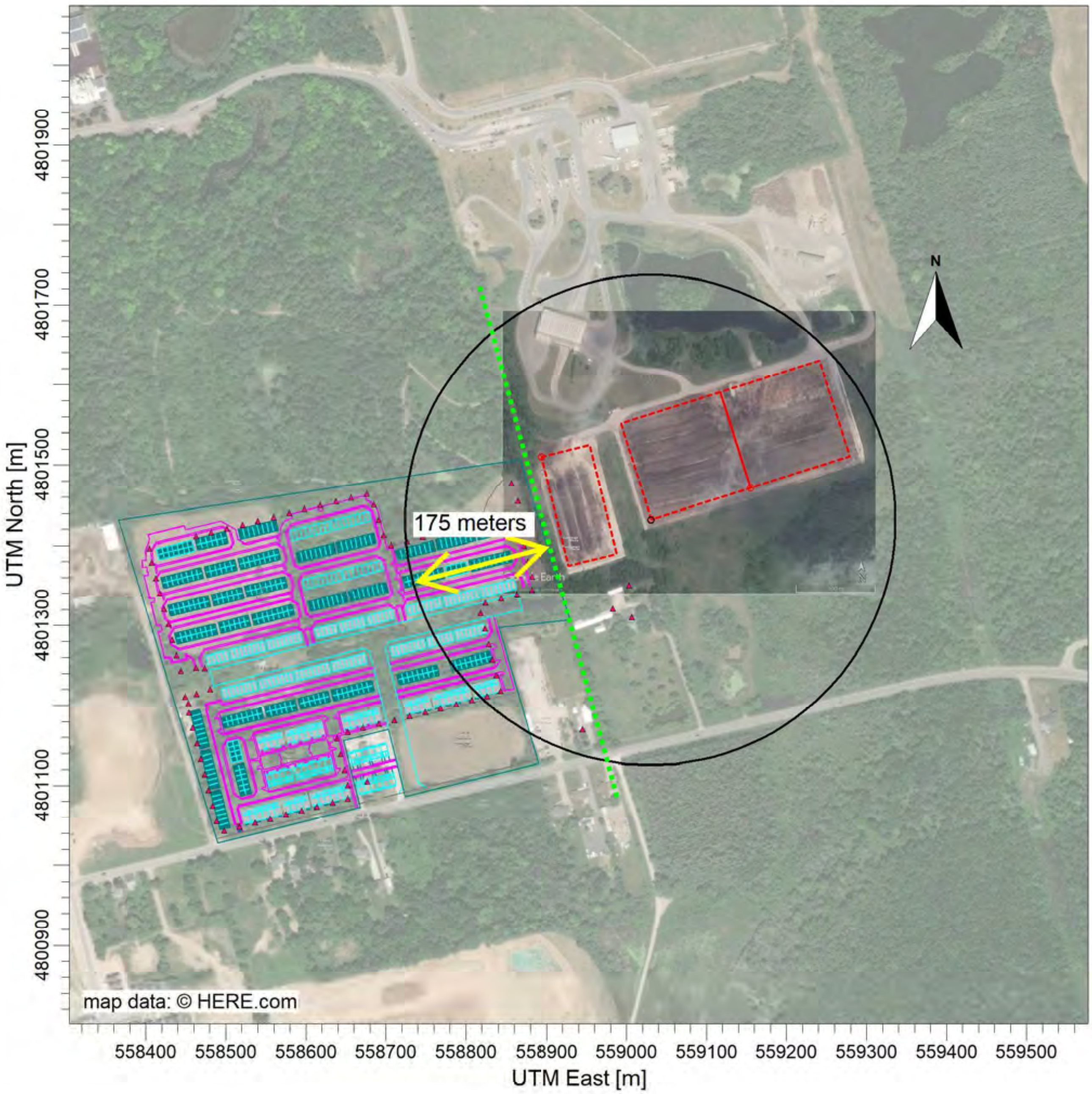
Odour Survey Locations
1140 Main St., Cambridge
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
L11
L12
L13
800 m
N
Google Earth
Image © 2024 Airbus

APPENDIX D

Potential Area of Influence
Odour Impacts from the CWMC
(1 page)

PROJECT TITLE:

1140 Main Street, Cambridge, ON
Area of Influence - Odours >10 OU



COMMENTS:	SOURCES:	COMPANY NAME:	
Circle represents the area of influence of odours from the centroid of all compost pads. The circle intersects the Site at 175 meters from the CWMC property.	3	**ORTECH Consulting Alliance Inc.**	
	RECEPTORS: 447		ORTECH AN ALLIANCE TECHNICAL GROUP COMPANY
		SCALE: 1:8,000 0 — 0.3 km	
		DATE: **2024-10-27**	PROJECT NO.: **92804**