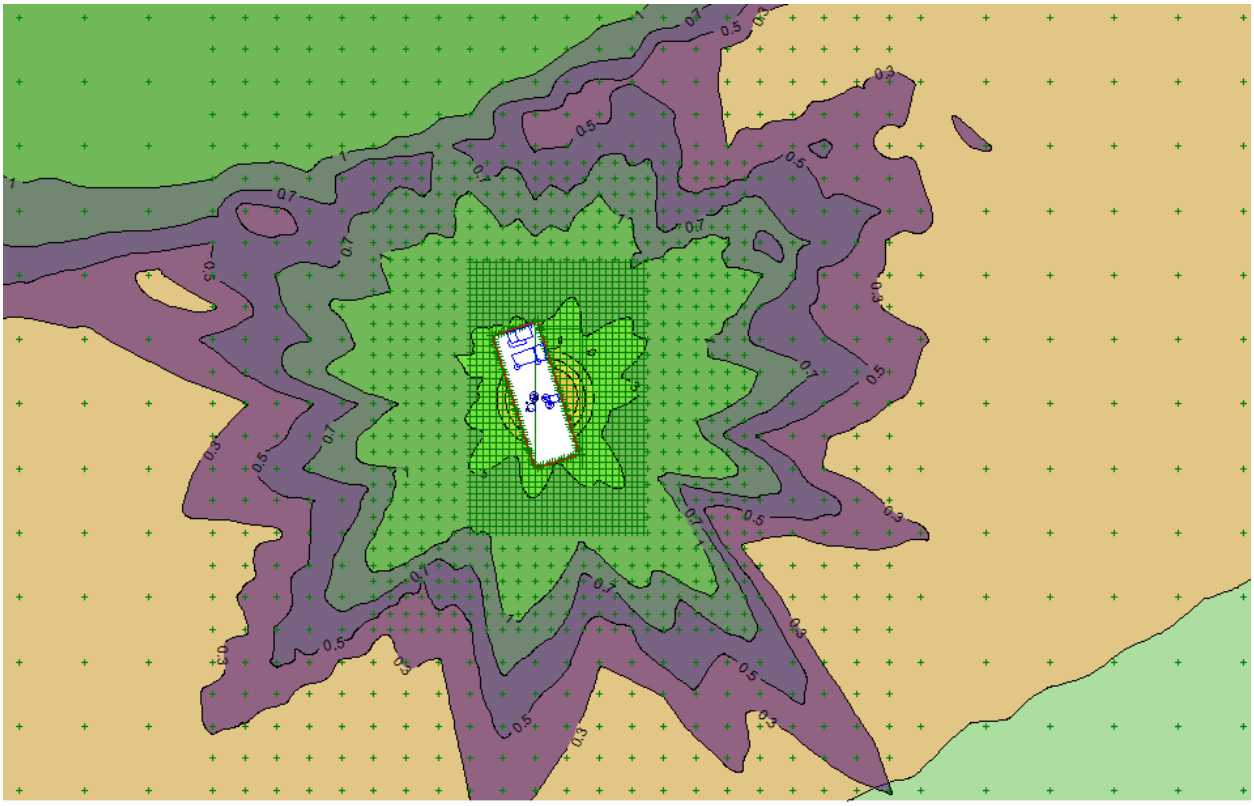
IRONCLAD DEVELOPMENTS INC.

NOISE IMPACT ASSESSMENT (DRAFT)

800 EAGLESON ROAD, OTTAWA

JUNE 12, 2018



NOISE IMPACT ASSESSMENT (DRAFT)

800 EAGLESON ROAD, OTTAWA

IRONCLAD DEVELOPMENTS INC.

FINAL REPORT

PROJECT NO.: 181-02513-00
DATE: JUNE 12, 2018

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June 12, 2018

IRONCLAD DEVELOPMENTS INC.
Ironclad Developments Inc.
101-57158 Symington Rd 20E
Springlied, MB
R2J 4L6

Attention: Pascal Toupin-Selinger

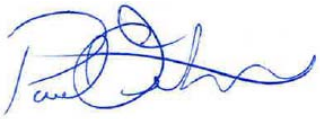
Dear Sir:

Subject: Noise Impact Assessment for Proposed Development at 800 Eagleson Road, Ottawa (DRAFT)

WSP is pleased to provide you with the following report detailing the noise impact assessment of the proposed residential development to be located at 800 Eagleson Regional Road in Ottawa, Ontario. This report details the results of the noise impact assessment as it relates to the impacts from nearby transportation noise sources; specifically, Fernbank and Eagleson Road.

We trust that our submission meets your approval and we look forward to the continued opportunity to work with you. If you have any questions regarding our report, please contact the undersigned at (905) 882-4211 or via email at paul.orchard@wsp.com.

Yours truly,



Paul Orchard
Team Lead - Environment

PO/cr/kg
Encl.

WSP ref.: 181-02513-00

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June 12, 2018
Date

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June 12, 2018
Date

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Abbreviations

dB	decibel
dBA	decibel, A-weighted
Hz	Hertz
ISO	International Organization for Standardization
km	kilometre(s)
Leq(16)	Daytime 16-hour (0700-2300) Energy Equivalent Sound Level (Leq)
Leq(8)	Nighttime 8-hour (2300-0700) Energy Equivalent Sound Level (Leq)
Leq	Energy Equivalent Sound Level over a period of time
m	metre(s)
m^2	square metre(s)
MOECC	Ontario Ministry of the Environment and Climate Change
ORNAMENT	Ontario Road Noise Analysis Method for Environment and Transportation
POR	point of reception
RMS	root mean square

Glossary

A-weighting	The weighting is applied to sound level data to account for changes in level sensitivity as a function of frequency. The A-weighting adjustment reflects average human ear.
decibel (dB)	A logarithmic quantity of generally used in the measurement of sound. The decibel (dB) provides the possibility of representing a large span of sound levels in a simplified manner. It is used for both sound pressure level as well as sound power level. When it is used to refer sound pressure level, a location or distance from a sources is usually provided with the sound pressure level.
decibel, A-weighted (dBA)	A-weighted decibels (dBA). Most common units for expressing sound levels approximating the response of the human ear.
energy equivalent sound level	An energy-average sound level (Leq) over a specified period that would have the same sound energy as the actual (i.e., time varying) sound over the same period.
frequency	The number of times per second that the sine wave of sound repeats itself. It can be expressed in cycles per second, or Hertz (Hz).
frequency weighting (A, B, and C Weighting)	A method used to account for changes in sensitivity as a function of frequency. Three standard weighting networks, A, B, and C, are used to account for different responses to sound pressure levels. Most commonly used weighting is A-weighting (see also A-weighting).
Hertz (Hz)	The unit of frequency also expressed as cycles per second.
noise	Unwanted sound.
octave band	The interval between two frequencies having a ratio of two to one. For acoustical measurements, the octaves start a 1,000 Hz centre frequency and go up or down from that point, at the 2:1 ratio. From 1,000 Hz, the next filter's centre frequency is 2,000 Hz, the next is 4,000 Hz, or 500 Hz, 250 Hz, etc.

point of reception (POR)	A noise-sensitive receptor such as a residence, campground, daycare, school, church, or hospital as defined in Ontario Ministry of the Environment and Climate Change Publication NPC-300.
root mean square (vibration)	The root mean square of a vibration velocity signal is the square root of the average of the squared velocity of the vibratory signal.
sound power level	The total sound energy radiated by a source per unit time. The unit of measurement is the Watt. The acoustical power radiated from a given sound source as related to a reference power level (i.e., typically 1E 12 watts, or 1 picowatt) and expressed as decibels. A sound power level of 1 watt = 120 decibels relative to a reference level of 1 picowatt.
sound pressure level	Logarithmic ratio of the root-mean-square sound pressure to the sound pressure at the threshold of human hearing (i.e., 20 micropascals).
vibration	Vibration is defined as an oscillatory motion of an element/particle. Rail related vibration is described in terms of the velocity. The velocity represents the instantaneous speed of the element/particle.

1 INTRODUCTION

Ironclad Developments Inc., (Ironclad) has retained the services of WSP Canada Inc., (WSP) to prepare a Noise Impact Assessment for the proposed residential development to be located at 800 Eagleson Road in Ottawa, Ontario. This study addresses the noise impacts of transportation sources associated with the nearby roads on the proposed development. In addition, it discusses the noise impact of the development on itself as well as on its surroundings. The report was prepared in support of a Site Plan Control Application required at this state of the development.

The noise impact assessment was conducted in accordance with the Ministry of the Environment and Climate Change (MOECC) Noise Pollution Control (NPC) publication NPC-300 "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning".

In accordance with the NPC-300 requirements, this report discusses environmental noise from stationary sources and transportation sources on the development. The results are presented in Section 3 "impact of the surrounding environment on the development". Similarly, the impact of the development on to the surrounding environment is discussed in Section 4 "impact of the development on the surrounding environment". The impact of the development on itself is discussed in Section 5 "Impact of Development on itself". Finally, summary of recommendations are presented in Section 6.

Traffic data was obtained from the City of Ottawa and was used to estimate future sound levels at the façades of the proposed development. Sound level from transportation sources were compared to the guideline limits provided in the MOECC publication NPC-300 and recommendations are developed.

2 SITE DESCRIPTION

The proposed development is a multi-family residential building consisting of 143 units and will be located on the southwest corner of Fernbank Road and Eagleson Road. The development will be situated in a single-family residential areas to the north, northeast and west and Maurice Lapointe Public School to the east.

The location of the proposed development is presented in **Figure 1** in **Appendix A.** The proposed development will include a 6-storey residential building consisting of 14,722 m² gross floor area and a 1-level of parking (underground). The site plan indicates several exterior parking lots and design drawing indicates a gymnasium and 143 suites (1 to 3-bedroom suites) located on Level 1 through 6. The site plan and concept plans of the proposed development are included in **Appendix B**.

WSP identified the noise sources in the vicinity of the development through a review of aerial imagery. As per MOECC's classification, the acoustical environment surrounding the site is considered as urban in nature (MOECC Class 1); in sound in such environment is dominated by anthropogenic sound during both the daytime and night time hours (MOECC Class 1).

The subject property is currently zoned for arterial mainstreet (AM). Arterial mainstreet zone means a land to accommodate a broad range of uses including retail, service commercial, offices, residential and institutional uses in a mixed-use style building(s) or side by side style (i.e. separate) buildings. A zoning map from the City of Ottawa is provided in **Appendix A** (**Figure 2**).

The dominant noise sources impacting the site are road traffic on arterial roads: Eagleson Road and Fernbank Road.

3 IMPACT OF THE SURROUNDING ENVIRONMENT ON THE DEVELOPMENT

3.1 NOISE SOURCES AND IMPACTS

The environmental noise sources that are external to the project with potential to have effect on the development are discussed and assessed in this section.

The City of Ottawa official plan stipulates that a noise study shall be prepared when a new development is proposed within distances as follows:

- 100 metres from the right-of-way of an existing or proposed road; arterial, major collector, light rail transit, bus rapid transit or transit priority corridor;
- 250 metres from the right-of-way of an existing or proposed highway or secondary main railway line;
- 500 metres from the right-of-way of a freeway or 400-series provincial highway or principal main railway line.

The primary noise sources in the area surrounding the development is the road traffic on Eagleson and Fernbank Road which are both arterial roads within 100 metres of the site. Other roads are over 100 metres away from the proposed development and are not expected to have a major impact.

The area includes light rail transit corridor, bus rapid transit and transit priority corridor; these are all greater than 100 metres away from the proposed development and are not expected to have a noise impact on the site. There are no principal or secondary main railway lines within 250 metres of the site.

WSP's review indicated that the proposed development is not within City of Ottawa's International Airport (Macdonald–Cartier International Airport) Operating Influence Zone or Airport Vicinity Development Zone; therefore, assessment of aircraft noise is not considered in this report.

There are no significant industries/industrial activities present in the area of the proposed development. Therefore, the potential for "stationary" noise impacts from the surrounding industries on the proposed development is negligible.

As discussed previously, the dominant source that could have in impact on the proposed development are the arterial road traffic on Fernbank Road to the north and Eagleson Road to the east. These transportation sources have the potential to contribute to the sound levels at the proposed development.

3.2 NOISE GUIDELINES AND ASSESSMENT CRITERIA

Noise is recognized as a pollutant in the Environmental Protection Act, as uncontrolled noise can affect human activities. Ontario provincial noise control guidelines require that noise concerns are addressed in the planning of any new development.

In land use planning, although elimination or control of the source of pollution is usually a primary objective, there are general limits as to what is practical and technically possible. Therefore, MOECC Publication NPC-300, "Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning" provides sound level criteria for acceptable levels of transportation noise impacting on residential developments. These limits are discussed in Section "Part C – Land Use Planning" of NPC-300. **Table 3-1** below summarizes these limits.

NPC-300 provides sound level limits in terms of energy equivalent (average) sound levels [L_{EQ}] in units of A-weighted decibels [dBA] at a specific noise-sensitive location. Both outdoor and indoor locations are identified, with the focus of outdoor areas being amenity spaces. Indoor criteria vary with sensitivity of the space. As a result, sleep areas have more stringent criteria than living/dining room space.

Table 3-1 NPC-300 Sound Level Criteria for Road Noise

AREA	TIME PERIOD	L_{EQ} (dBA) -ROAD
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	55
Indoor Living/Dining Room	Daytime (0700 – 2300h)	45
Indoor Bedroom	Daytime (0700 – 2300h)	45

NPC-300 further defines that in order to qualify as an OLA a certain minimum area as well as depth (measured from the façade) requirement should be met. Accordingly, a balcony or terrace that are less than 4 meters in depth are not considered an OLA as per MOECC's guidelines.

3.2.1 OLA, VENTILATION, BUILDING REQUIREMENTS AND WARNING CLAUSES

In order to decide appropriate control to achieve the above noted sound level limits, NPC-300 has provided further guidance.

Sound Level in Outdoor Living Area (OLA) - If the future daytime (0700 – 2300h) sound level in an OLA is below 55 dBA no control is required; an excess of daytime sound level up to 5 dBA over the 55 dBA limit is often acceptable without noise control, however such excess should be notified to the future occupants (in case of residential receptors) with a warning clause. If sound level exceeds 60 dBA, feasibility of controlling noise in terms of economic, technical and administrative feasibility should be investigated and where possible control included in the design.

Table 3-2 NPC-300 Warning Clause Requirements for Outdoor Living Areas

AREA	TIME PERIOD	L_{EQ} (dBA)	VENTILATION AND WARNING CLAUSE REQUIREMENTS
Outdoor Living Area (OLA)	Daytime (0700 – 2300h)	<55	None
		55 - 60	Warning Clause (Type A)
		>60	Noise control + Warning Clause

Sound Level in Indoor Spaces - To achieve indoor sound levels listed in **Table 3-1**, the MOECC publication NPC-300 provides guidelines based on predicted sound level at the façade/plane of window. If the predicted sound level at the plane of window exceeds, additional considerations such as the type of ventilation; type of windows, exterior walls, and doors that will be required must be selected. In addition, warning clauses to inform the future occupants are also required.

Table 3-3 summarizes requirements for ventilation, type of building façade construction and the requirement for warning clauses to inform the future occupants of the exceedances.

Table 3-3 Warning Clause, Ventilation and Building Requirements

AREA	TIME PERIOD	LEQ (DBA)	VENTILATION REQUIREMENTS	BUILDING COMPONENT REQUIREMENTS	WARNING CLAUSE
Plane of Window [1]	Daytime (0700 – 2300h)	< 55	None	Building components compliant with Ontario Building Code (OBC)	None
		55 - 65	Forced Air Heating with provision for central air condition	Building components compliant with OBC	Type C required
		> 65	Central air conditioning is required	Building components designed/selected to meet Indoor Requirements	Type D required
	Night time (2300 – 0700h)	≤ 50	None	Building components compliant with OBC	None
		51 - 60	Forced Air Heating with the provision to add central air conditioning	Building components compliant with OBC	Type C required
		> 60	Central air conditioning is required	Building components designed/selected to meet Indoor Requirements	Type D required

Notes: [1] Plane of Window of a Bedroom, Living Room or Dining Room

The warning clauses referred to in **Table 3-3** are defined in **Table 3-4** below. In a residential development, where required, these clauses are to be included in offers/agreements of purchase and sale or leases or rental agreements, to notify potential purchasers and tenants of the environmental concerns to make an informed decision. However, in a school development, it is important to communicate future owners, and operators.

Table 3-4 NPC-300 Warning Clauses

TYPE	WARNING CLAUSES
Type A	"Purchasers/tenants are advised that sound levels due to increasing (road) traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and Ministry of the Environment and Climate Change."
Type B	"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits if the Municipality and the Ministry of the Environment and Climate Change."
Type C	"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within sound level limits of the Municipality and the Ministry of the Environment and Climate Change. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

TYPE	WARNING CLAUSES
Type D	"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and Ministry of the Environment and Climate Change."

3.3 TRAFFIC DATA AND FUTURE PREDICTIONS

Road traffic volumes were obtained from the City of Ottawa for Eagleson Road and Fernbank Road dated April 11, 2017. Future road traffic volumes were projected to a 10-year horizon (2028) using a 2.5% annual growth rate based on existing traffic data provided by the City of Ottawa. This information is provided in **Appendix C** and is summarized in **Table 3-5**. Commercial vehicle percentage was determined from the traffic data and summarized in the table below. A typical regional road day/night split of 90%/10% was used for roadways.

Table 3-5 Summary of Road Traffic Data Used in the Transportation Analysis

ROAD	TRAFFIC VOLUMES (AADT)	NO. OF LANES	DAY/NIGHT SPLIT (%)	MEDIUM TRUCKS (%)	HEAVY TRUCKS (%)	POSTED SPEED LIMIT (KPH)
Eagleson Road	15,444	2	92/8	7%	2.5%	60
Fernbank Road	3,251	2	92/8	7%	2.8%	60

Road traffic data and calculations used for the study are included in **Appendix C**.

3.4 NOISE IMPACT ASSESSMENT METHODS

Per MOECC Guidelines, the impact at receptors was estimated using the future road traffic data presented in Table 3.5. The sound level predictions were made using STAMSON version 5.04, a computer algorithm developed by the MOECC. A copy of the sample STAMSON output file is included in **Appendix D**.

The following factors were taken into account in the analysis:

- Vehicle speeds;
- Road traffic volumes;
- Percentage of trucks;
- Horizontal and vertical road-receiver geometry;
- Ground absorption; and
- Screening provided by terrain, houses or existing barriers.

Most impacted receptor locations (in terms of façade and height) were chosen as representative receptor locations for each facade. The modelled receptor locations are shown on the site plan included in **Figure 3** in **Appendix A**.

3.5 RESULTS

Plane of window

Sound levels were predicted at the most impacted façades during the daytime and nighttime hours. The predicted sound levels were used to investigate ventilation and building construction requirements. The results of these predictions are summarized in **Table 3-6**.

Table 3-6 Summary of Predicted Facade Sound Levels – Transportation (Road)

PREDICTION LOCATION	DESCRIPTION	DAYTIME SOUND LEVEL (dBA)	NIGHTIME SOUND LEVEL (dBA)
A	North Façade (6th Floor) – exposure to Fernbank and Eagleson Roads	62	54
B	North Façade (6th Floor) – exposure to Fernbank and Eagleson Roads	65	57
C	East Façade (6th Floor) – exposure to Eagleson Road	67	60
D	East Façade (6th Floor) – exposure to Eagleson Road	64	56
E	South Façade (6th Floor) – exposure to Eagleson Road	61	54
F	West Façade (6th Floor) – exposure to Fernbank and Eagleson Roads	54	47
G	West Façade (6th Floor) – exposure to Fernbank Roads	63	56

The façade level indicates that due to the magnitude of exterior sound level, there is potential to exceed indoor sound level; therefore, as per NPC-300 noise control façade construction and warning clauses are required.

Outdoor Living Area (OLA)

A review of floor plans indicates that there is a sitting area near the east front entrance which is shown in the drawings (**Appendix B).** This area is greater than 4 metre depth and for completeness, this sitting area was considered an OLA. The results of the predicted sound levels at the OLA are summarized in **Table 3-7**.

Table 3-7 Summary of Predicted Outdoor Amenity Space Sound Levels – Transportation (Road)

PREDICTION LOCATION	DESCRIPTION	MODELLED SOUND LEVEL (dBA)
OLA	Sitting Area Front Entrance – exposure to Eagleson Road	58

Since the predicted sound levels, are greater than 55 dBA , but less than or equal to 60 dBA, as per NPC-300 guideline, prospective purchasers or tenants should be informed of potential noise exceedances by a warning clause.

3.6 RECOMMENDATIONS

The following discussion outlines the recommendations for building facade constructions, ventilation requirements, and warning clauses to achieve the noise criteria stated in **Table 3-3**.

3.6.1 OUTDOOR LIVING AREA

The predicted sound levels at the area considered as outdoor living area will be greater than 55 dBA but less than or equal to 60 dBA, therefore no physical mitigation is required. As required by the MOECC, warning clauses (Type A) should be included in all offers of purchase and sales, and lease or rental agreements.

3.6.2 VENTILATION REQUIREMENTS

The projected sound levels at the exterior façade with exposure to Fernbank Road and/or Eagleson Road is within the range of 54 – 67 dBA during the daytime and 47 – 60 dBA during the nighttime depending on the location. Therefore, it is recommended that central air conditioning be provided to the building. This will allow occupants to keep windows closed and maintain a comfortable living environment. Since it is a mid-high-rise development, central air conditioning is typical.

As required by the MOECC, warning clauses (Type D) should be included in all offers of purchase and sales, and lease or rental agreements.

3.6.3 BUILDING REQUIREMENTS

Based on the predicted sound level at the plane of window the sound exceeds 65 dBA during the daytime at Location C. Therefore, the upgraded window glazing and faced

Exterior wall: Exterior wall can be constructed with a variety or material providing an STC-50 or more. The exterior façade can be brick veneer, masonry, spandrel glass or metal panels; the selected exterior façade with an insulated drywall partition on the inside should provide a composite STC-50 or better. A spandrel panel wall consisting of two layers of drywall on a separate framing with insulation in the cavities can achieve STC-50.

Balcony doors - The preliminary layout of the development include balconies; these balconies are less than 4 meters in depth but with operable doors. Assuming a total window to floor area of 25% (including windows and doors), a double-glazed door assembly rated at an STC 32 or better should be selected. A double glaze door assembly consisting of 3 mm glass panes with a 16-mm air gap or greater can achieve STC-32. The door system should include good weather seals to minimize noise flanking; I swing type door is preferred.

Window assembly - It was confirmed that the building will include double glazed window assembly. It is recommended that window glazing assembly providing a STC 32 or better should be included for all side of buildings a double glazed fully sealed window assembly consisting of two 3 mm panes separated by 16 mm air gap or greater is expected to provide this STC rating. Typically, window assemblies include small operable portion within the window assembly. A good weather seal should be included for this operable portion to minimize the noise flanking.

The roadway impacts on the remained of the are not predicted to exceed the noise criteria stated in **Table 3-1**. Therefore, glazing and façade construction meeting or exceeding Ontario Building Code (OBC) requirements are expected to provide sufficient transmission loss to meet indoor sound level requirements.

3.6.4 WARNING CLAUSES

As per MOECC's guidelines, the inclusion of warning clauses in all offers of purchase and sale, and lease or rental agreements are required. Appropriate wording is provided below and can be altered as required by the City of Ottawa as needed.

Type A

"Purchasers/tenants are advised that sound levels due to increasing (road) traffic may occasionally interfere with some activities of the school occupants as the sound levels exceed the sound level limits of the City of Ottawa and Ministry of the Environment and Climate Change."

Type D

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and Ministry of the Environment and Climate Change.

(Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning

Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

4 IMPACT OF THE DEVELOPMENT ON THE SURROUNDING ENVIRONMENT

In terms of the noise environment of the area, it is expected that the project will have a negligible effect on the neighboring properties. The traffic related to the proposed development will be small in relation to the traffic volumes within the area, and it is not of concern with respect to noise impact.

The noise sources associated with the proposed development are expected to be rooftop HVAC units and other similar mechanical units (i.e. boilers, chillers, elevators, pumps, emergency generators, chillers, exhaust fans, air conditioners, parking garage exhausts) which could have the potential to have adverse impacts on the surrounding neighborhood. Typically, this equipment is located inside a mechanical room and if there are rooftop sources they are not expected to have an impact on adjacent residential receptors given that the high ambient sound levels in the area and the fact that the systems will be designed to ensure that the applicable noise guidelines are met at on-site receptors, off-site impacts are not anticipated.

Considering typical HVAC units, the impact of building mechanical on surrounding environment is estimated to be less than 45 dBA. This complies with the MOECC Publication NPC-300 requirements. Potential impacts should be verified by an acoustic consultant as part of the final building design based on equipment selection.

5 IMPACT OF THE DEVELOPMENT ON ITSELF

The impact on the development on itself can be from mechanical systems outlined in Section 4. Considering typical HVAC units, the impact of building mechanical on surrounding environment is estimated to be less than 45 dBA. This complies with the MOECC Publication NPC-300 requirements. Potential impacts should be verified by an acoustic consultant as part of the final building design based on equipment selection.

6 CONCLUSIONS AND RECOMMENDATIONS

The predicted sound levels from surface transportation were assessed per MOECC publication NPC-300 requirements. Noise control measures are discussed in Section 3.1 are summarized in this section. The development's impact on to the environment and on itself were discussed in Section 4 and 5 and concluded that the development does not have dominant effect on itself or its surrounding environment.

6.1 SUMMARY OF RECOMMENDATIONS

The following recommendations are offered:

1. Once the site plan is finalized including building floor plan and suites layout plans (at the Site Plan Approval Stage) this noise impact feasibility study be updated with a detailed impact study;
2. The development will require central air conditioning as an alternate means of open window;
3. The preliminary acoustical performance requirements for exterior façade elements (i.e. exterior walls, windows and balcony doors) for the development are discussed in Section 3. This should be confirmed based on final layout plans at the site plan approval stage;
4. Warning clauses as discussed in the previous section should be included in pertinent Offers of Purchase or Sales and Lease or Rental Agreements.

5. Detailed plans should be reviewed by a professional engineer or acoustic consultant or City's building inspector to confirm that no outdoor living area greater than 4 metres in depth is provided within the development other than that was assessed. If provided, such area should be assessed and noise control requirements be determined at the site plan approval stage;
6. At site plan approval stage, it is recommended that an acoustical engineer registered to practice in the province of Ontario or approved professional from City's building department must certify that the building plan includes the noise control discussed within this report.

6.2 CONCLUSIONS AND CLOSURE

Based on the content of this impact study it is concluded that developing the proposed development in compliance with the MOECC's noise criteria is feasible.

This report has been prepared to support the Site Plan Control Application being prepared by Ironclad Developments Inc. This study demonstrate that it is feasible to develop the site in compliance with MOECC's noise guideline objectives presented in its guideline NPC-300. Once the design is finalized and details becomes available it is expected that a noise study report confirming the findings of this report will be submitted to support the building permit approval application.

This report entitled "Noise Impact Assessment 800 Eagleson Road Development" was prepared by WSP for the account of "Ironclad Developments Inc." (the "Client"), in accordance with the professional services agreement. Any reliance of this document by any third party is strictly prohibited without express or written consent from the Client and WSP. The material in it reflects WSP's professional judgement in light of the scope, schedule, information available to it at the time of preparation and limitations stated within the report and in the professional services agreement between WSP and the Client. In preparation of this document WSP did not verify information provided by others. Any unauthorized use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the sole responsibility of such third parties. Such third party agrees that WSP shall not be responsible for cost or damages of any kind suffered by any third party as a result of decisions made or actions based on unauthorized use of this report.

7 BIBLIOGRAPHY

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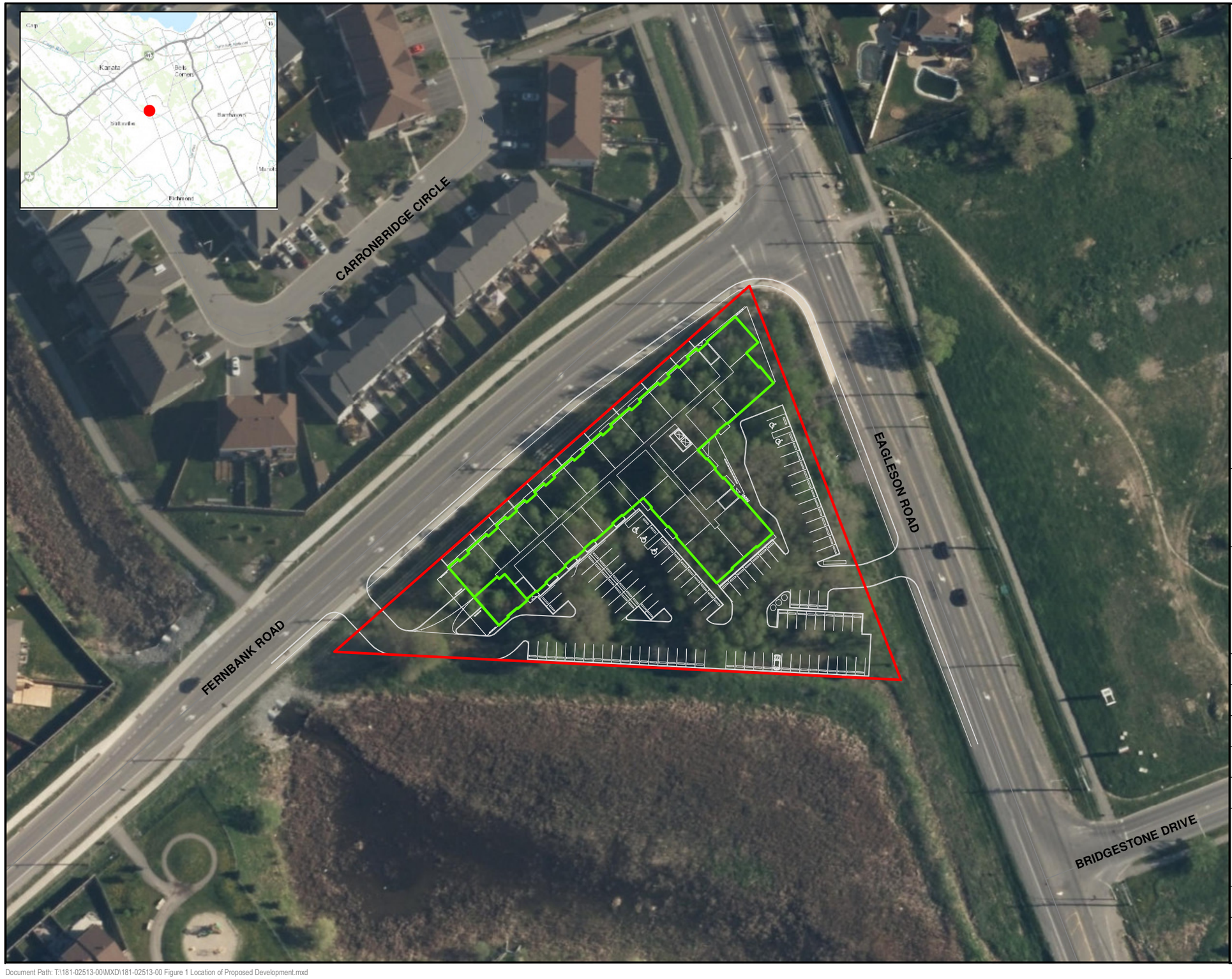
APPENDIX

A FIGURES



wsp

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LEGEND

APPROXIMATE SITE BOUNDARY
PROPOSED BUILDING

N
W E
S

10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

IRONCLAD DEVELOPMENT INC.

PROJECT:

NOISE IMPACT ASSESSMENT
800 EAGLESON ROAD
OTTAWA, ONTARIO

PROJECT NO:	DATE:
181-02513-00	JUNE 2018

DESIGNED BY: -

DRAWN BY: T.P.

CHECKED BY: -

FIGURE NO:	SCALE:
1	1:1,000

TITLE:

LOCATION OF PROPOSED DEVELOPMENT

DISCIPLINE:

ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: T:\181-02513-00\MXD\181-02513-00 Figure 1 Location of Proposed Development.mxd

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LEGEND

ZONING BOUNDARY

PROPOSED BUILDING

Residential Zones - R1 - R5
Institutional Zones (Minor Institutional) - I1
Open Space Zones - O1
Industrial Zones (business park) - IP
Commerical/Mixed Used Zones:
- Local Commercial Zone - LC
- General Mixed Used Zone - GM
- Arterial Mainstreet Zone - AM

*for other codes see the zoning by-law

N W E S

30 15 0 30 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

IRONCLAD DEVELOPMENT INC.

PROJECT:

NOISE IMPACT ASSESSMENT
800 EAGLESON ROAD
OTTAWA, ONTARIO

PROJECT NO:	DATE:
181-02513-00	JUNE 2018

DESIGNED BY: -

DRAWN BY: T.P.

CHECKED BY: -

FIGURE NO:	SCALE:
2	1:3,000

TITLE:

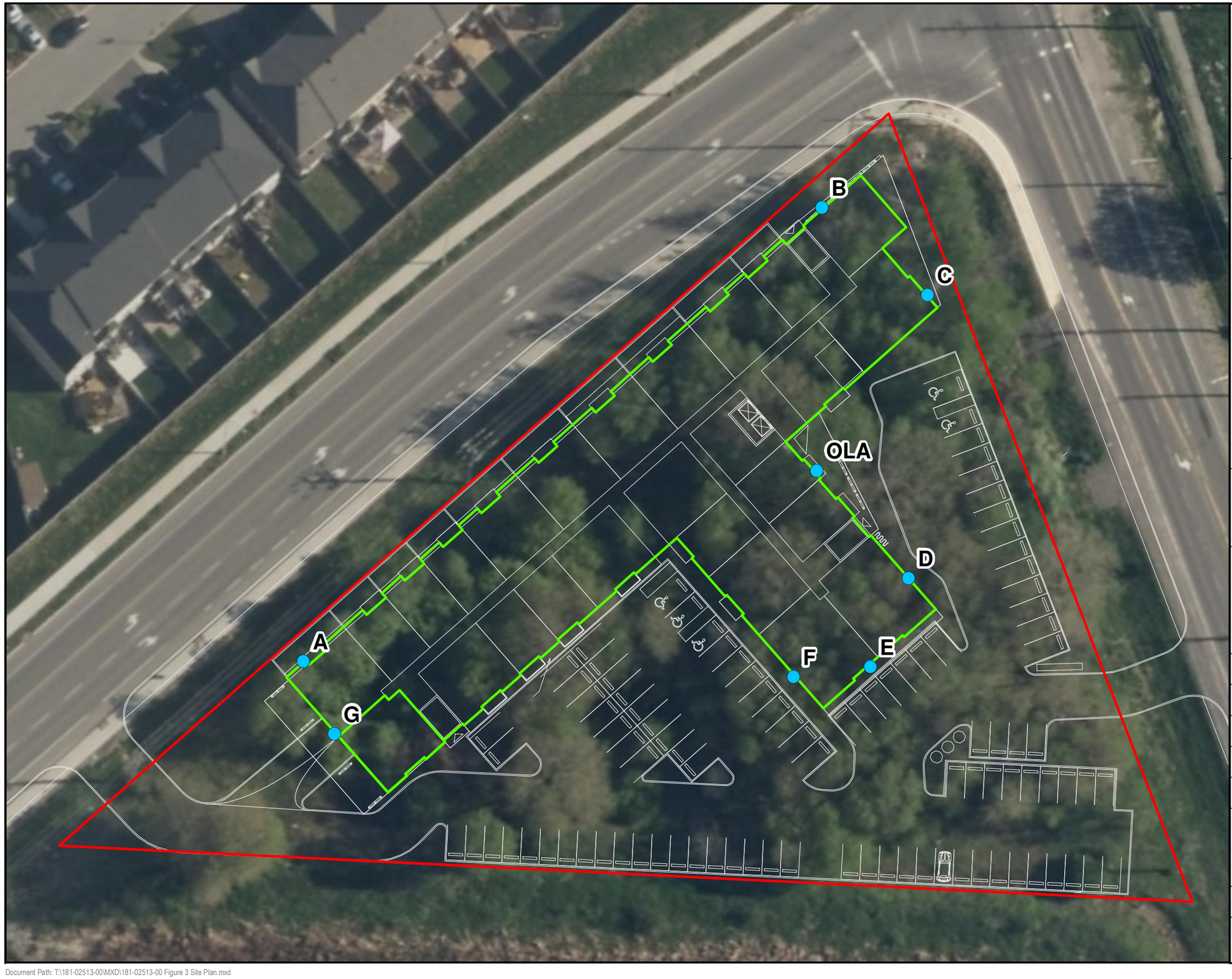
ZONING MAP

DISCIPLINE:

ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: T:\181-02513-00\MXD\181-02513-00 Figure 2 Zoning.mxd



126 DON HILLOCK DRIVE, UNIT 2
AURORA, ONTARIO CANADA L4G 0G9
TEL.: 905-750-3080 | FAX: 905-727-0463 | WWW.WSP.COM

LEGEND

- APPROXIMATE SITE BOUNDARY
- PROPOSED BUILDING
- POR LOCATION

N
W E
S

10 5 0 10 Metres

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

CLIENT:

IRONCLAD DEVELOPMENT INC.

PROJECT:

NOISE IMPACT ASSESSMENT
800 EAGLESON ROAD
OTTAWA, ONTARIO

PROJECT NO:	DATE:
181-02513-00	JUNE 2018

DESIGNED BY: -

DRAWN BY: T.P.

CHECKED BY: -

FIGURE NO:	SCALE:
3	1:500

TITLE:

SITE PLAN SHOWING PREDICTION LOCATIONS
(TRANSPORTATION)

DISCIPLINE:

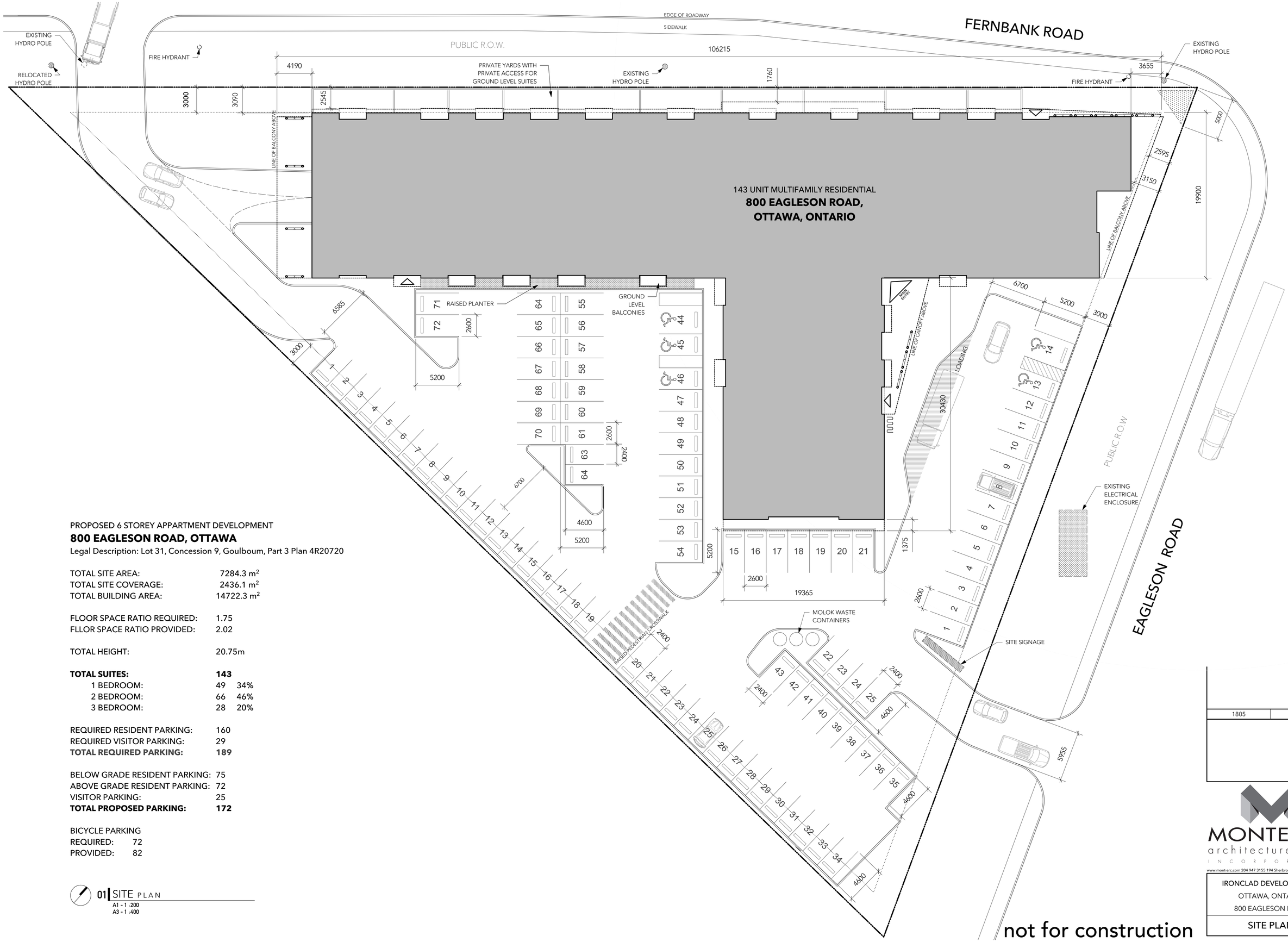
ENVIRONMENT

ISSUE:	REV.:
	-

Document Path: T:\181-02513-00\MXD\181-02513-00 Figure 3 Site Plan.mxd

APPENDIX

B DRAWINGS



PROPOSED 6 STOREY APPARTMENT DEVELOPMENT

800 EAGLESON ROAD, OTTAWA

Legal Description: Lot 31, Concession 9, Goulboum, Part 3 Plan 4R20720

TOTAL SITE AREA:	7284.3 m²
TOTAL SITE COVERAGE:	2436.1 m²
TOTAL BUILDING AREA:	14722.3 m²
FLOOR SPACE RATIO REQUIRED:	1.75
FLLOR SPACE RATIO PROVIDED:	2.02
TOTAL HEIGHT:	20.75m
TOTAL SUITES:	**143**
1 BEDROOM:	49 34%
2 BEDROOM:	66 46%
3 BEDROOM:	28 20%
REQUIRED RESIDENT PARKING:	160
REQUIRED VISITOR PARKING:	29
TOTAL REQUIRED PARKING:	**189**
BELOW GRADE RESIDENT PARKING:	75
ABOVE GRADE RESIDENT PARKING:	72
VISITOR PARKING:	25
TOTAL PROPOSED PARKING:	**172**

BICYCLE PARKING
REQUIRED: 72
PROVIDED: 82

01 SITE PLAN
A1 - 1 :200
A3 - 1 :400

not for construction

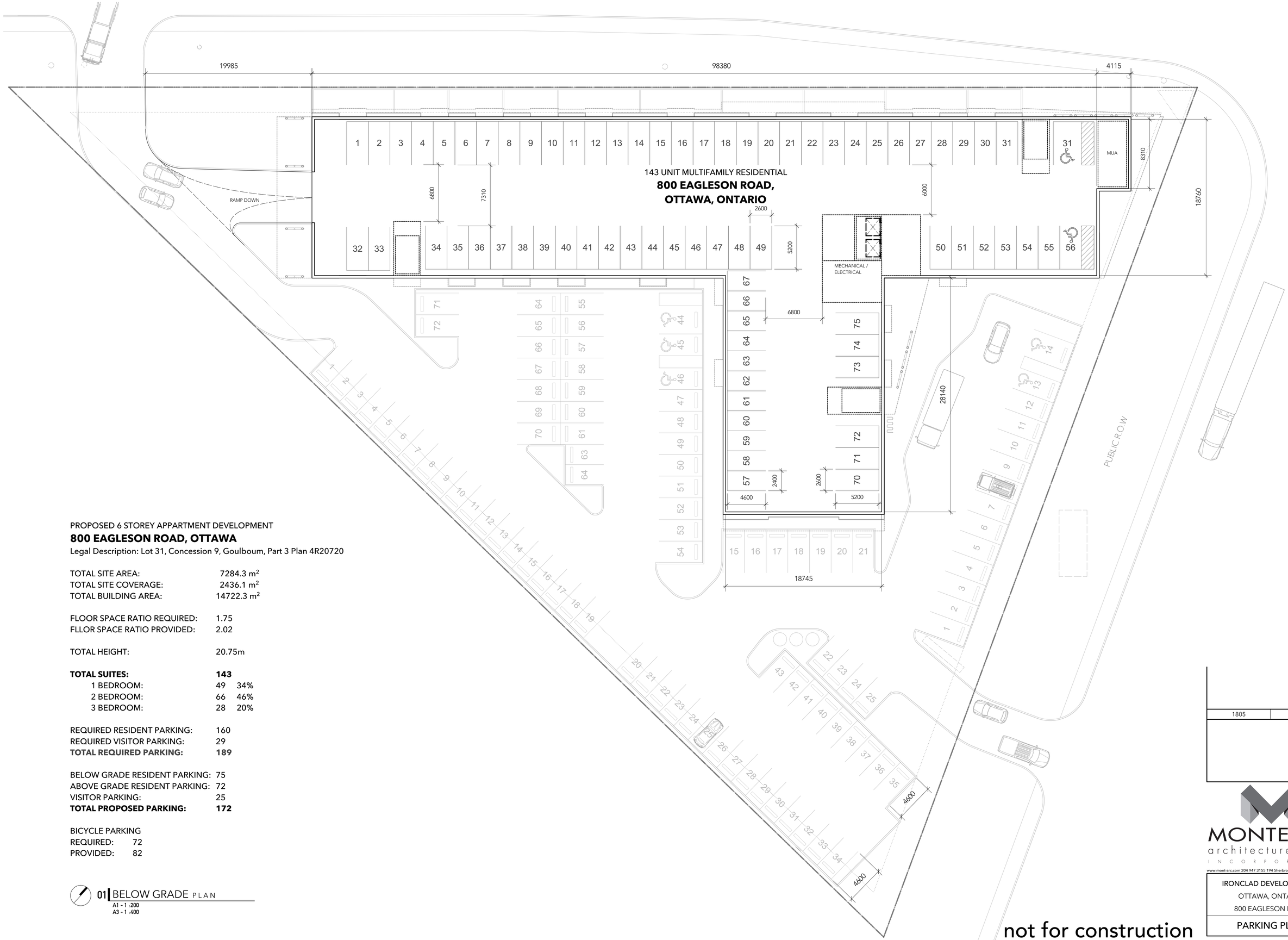
1805

MONTEYNE
architecture works
INCORPORATED
www.mont-arc.com 204 947 3155 194 Sherbrook St., Winnipeg, R3C 2B6

IRONCLAD DEVELOPMENTS
OTTAWA, ONTARIO
800 EAGLESON ROAD

SITE PLAN

A1.0



PROPOSED 6 STOREY APPARTMENT DEVELOPMENT

800 EAGLESON ROAD, OTTAWA

Legal Description: Lot 31, Concession 9, Goulboum, Part 3 Plan 4R20720

TOTAL SITE AREA:	7284.3 m^2
TOTAL SITE COVERAGE:	2436.1 m^2
TOTAL BUILDING AREA:	14722.3 m^2
FLOOR SPACE RATIO REQUIRED:	1.75
FLLOR SPACE RATIO PROVIDED:	2.02
TOTAL HEIGHT:	20.75m
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VISITOR PARKING:	25
TOTAL PROPOSED PARKING:	**172**
BICYCLE PARKING	
REQUIRED:	72
PROVIDED:	82

01 BELOW GRADE PLAN

A1 - 1 :200

A3 - 1 :400

not for construction

1805

MONTEYNE
architecture works
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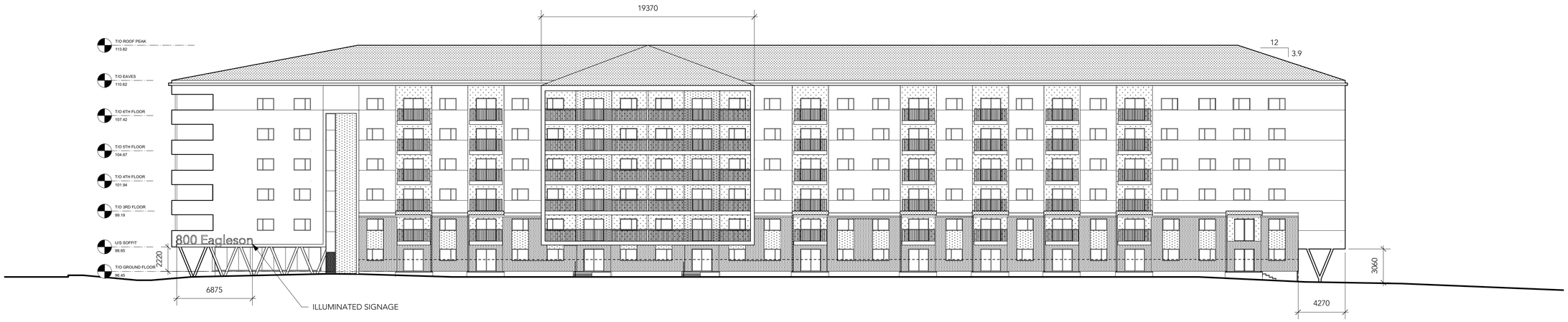
IRONCLAD DEVELOPMENTS
OTTAWA, ONTARIO
800 EAGLESON ROAD

PARKING PLAN

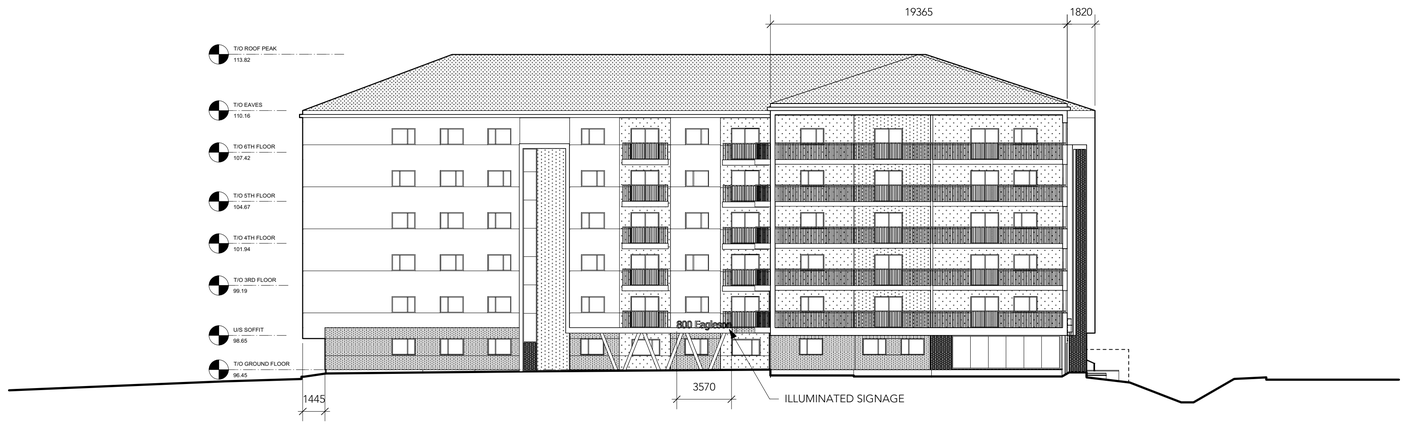
A1.1



01 NORTH ELEVATION

A1 - 1 :200
A3 - 1 :400

FIBRE REINFORCED CEMENTITIOUS PANEL - 1
FIBRE REINFORCED CEMENTITIOUS PANEL - 2
FIBRE REINFORCED CEMENTITIOUS PANEL - 3
FIBRE REINFORCED CEMENTITIOUS PANEL - 4
CLAY MASONRY



02 EAST ELEVATION

A1 - 1 :200
A3 - 1 :400

1805

MONTEYNE
architecture works
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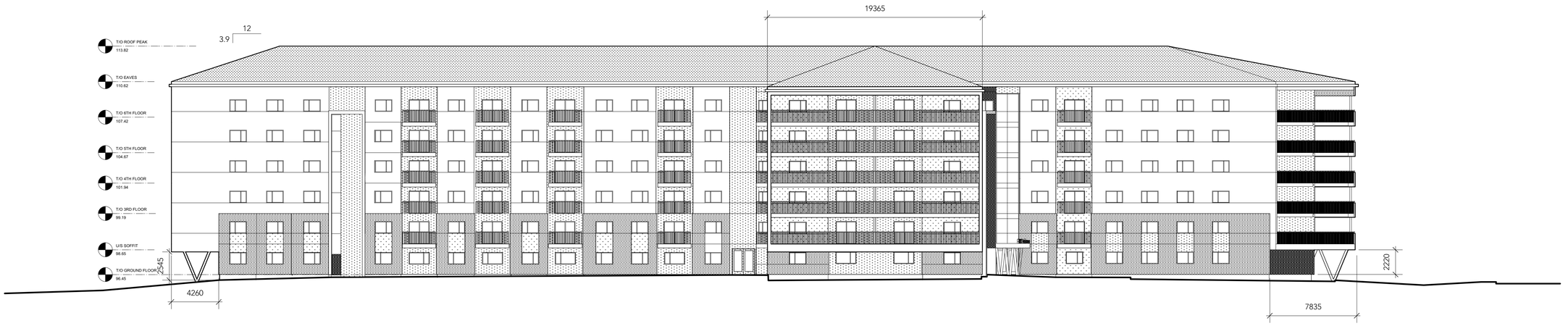
IRONCLAD DEVELOPMENTS
OTTAWA, ONTARIO
800 EAGLESON ROAD

ELEVATIONS 2

not for construction

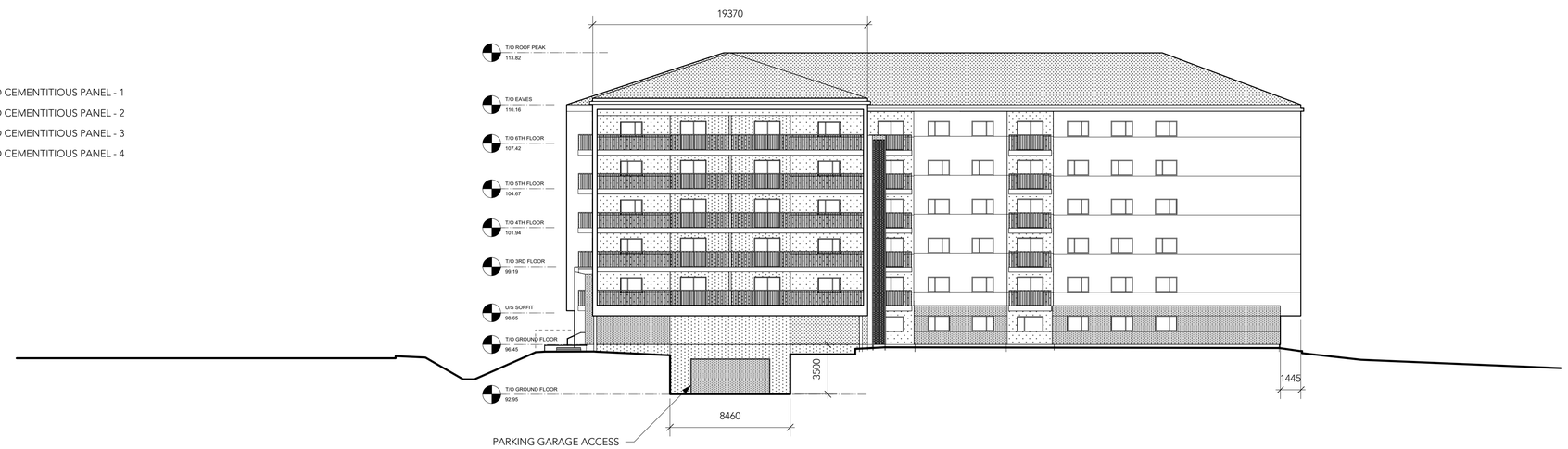
A3.0



01 SOUTH ELEVATION

A1 - 1 :200
A3 - 1 :400

- FIBRE REINFORCED CEMENTITIOUS PANEL - 1
- FIBRE REINFORCED CEMENTITIOUS PANEL - 2
- FIBRE REINFORCED CEMENTITIOUS PANEL - 3
- FIBRE REINFORCED CEMENTITIOUS PANEL - 4
- CLAY MASONRY



02 WEST ELEVATION

A1 - 1 :200
A3 - 1 :400

1805

MONTEYNE
architecture works
INCORPORATED
www.mont-arc.com 204 947 3155 194 Sherbrook St., Winnipeg, R3C 2B6

IRONCLAD DEVELOPMENTS
OTTAWA, ONTARIO
800 EAGLESON ROAD

ELEVATIONS 2

not for construction

A3.1


300 Eagleson


300 Eagleson


300 Eagleson


300 Eagleson

PLANT LIST

AMENTIY AREA

PROMINENT FOCAL POINT LANDSCAPE PLANTING DISPLAY AT MAIN CORNER
- TIERED PLANTING BEDS

CLAIRIFY IF YOU WANT TO EXPAND INTO EXISTING INTERSECTION
- NEW CURB AND SIDEWALKS / CURB CUTS?
SUGGEST WE RETAIN EXISTING CONDITION FOR COST SAVINGS & JUST EXTEND SIDEWALK WHERE IT CURRENTLY ENDS

COMMENT FROM INITIAL MEETING:
'TREES WITHIN CITY ROW TO BE REMOVED
- FOR REVIEW/APPROVAL BY FORESTRY SERVICE'

Q - DO WE WANT TO PROPOSE ANY TREES IN THE CITY ROW ALONG EITHER EAGLESON OR FERNBANK ROADS?

4 SEASON SCREENING FOR PRIVACY

ACTIVATE THE EAGLESON FRONTAGE OF THE SITE THROUGH PROVISION OF AMENITY SPACES; COORDINATE WITH LOCATION OF BUS STOP

Small Seating Space with direct concrete walkway connection to Perimeter Sidewalk Along Eagleson Rd and Existing Bus Stop (confirm Location Of Bus Stop) - Open View Lines To Be Maintained From Both Eagleson Rd, Front Entry To Building and Parking Lot For CPTED Principals

GROUND-FLOOR UNITS ONTO FERNBANK RD.
FUNCTIONAL DOORS AND PATIOS CW TREE AND SMALL AT GRADE PLANTER

PROPOSE 6' (1.8M) WOOD PRIVACY FENCE FOR EACH UNIT TO CREATE PRIVATE SPACES
RETAINING WALLS / STAIRS TO BE DETERMINED

ENTRY COURTYARD AMENITY AREA:
AT GRADE PLANTER CW FEATURE TREE IN CIRCULAR PLANTER WITH 450MM HEIGHT SEAT WALL

COVERED ENTRY

BIKE RACK UNDER COVER (11 BIKES)

BENCH SEATING OPPORTUNITIES UNDER COVER

AT GRADE PLANTER

TREES IN TREE GRATES ALONG ENTRY DROP OFF

THE LANDSCAPED BUFFER AROUND THE PARKING AREA MUST MEET THE PROVISIONS OF THE ZONING BY-LAW.

4. Landscape and Environment

Guideline 22
Provide a minimum 3.0 metre wide landscape area along the edge of a site where parking areas, driveways or stacking lanes are adjacent to a public street. Use trees, shrubs and low walls to screen cars from view while allowing eye level visibility into the site.

Guideline 25
Provide a minimum 2.5 metre wide landscape area along the site's side and rear yards in order to provide screening and enhance site environmental benefits.

Guideline 28
Provide significant architectural or landscape features at the corner on corner sites in order to emphasize the public streets and enhance the streetscape.

POTENTIAL LOCATION FOR CROSSWALK MAY REQUIRE LIGHTS & TRAFFIC WARNING

Possible Trellis Archway Feature (3of3)

PROPOSED BOLLARD - TO SLOW DOWN PEDESTRIAN TRAFFIC PRIOR TO CROSSING THE ROAD
- CONSIDER REMOVABLE BOLLARD OPTION FOR SNOW CLEARING MAINTENANCE

EXPOSED AGGREGATE CONCRETE ON NARROW EDGES AREAS PRONE TO WEAR BY PEDESTRIAN TRAFFIC

POTENTIAL 1.8 METER ASPHALT WALKWAY PEDESTRIAN CONNECTION - ALONG TOP OF BANK

LARGE NATIVE DECIDUOUS SHADE TREES ON SOUTH EDGE OF WALKWAY
- OFF SITE WORK

SELECTION OF NATIVE TREES CONIFER SCREENING ALONG TOP OF BERM

CONSIDER OPENING UP PART OF THE REAR PROPERTY LINE ONTO THE STORMWATER MANAGEMENT POND IN ORDER TO CONNECT THE BUILDING TO AN OUTDOOR AMENITY AREA;

Possible Trellis Archway Feature (2of3)

Possible Trellis Archway Feature (1of3)

OPTION TO CONSIDER - FROM MEETING COMMENTS
CONSIDER PLANTING TREES ON THE BERM ON THE SOUTHERN EDGE OF THE SITE
- BERM IS ON CITY PROPERTY, COORDINATE WITH MARK RICHARDSON REGARDING THE PLANTING PROCESS.

DISCUSSION POINT
Guideline 28 - Features at Corners
Potential for Trailhead Gateways
Trellis Archway Structure

Date	Revisions	By
05.07.2018	Draft For Review	LS
05.30.2018	Draft For Review	LS

LAZZARIN SVISDAHL LANDSCAPE ARCHITECTS
202-1300 1st Avenue, Prince George B.C. V2L 2Y3
250-563-6158 www.lsla-landarch.com

Project

PROJECT TITLE

Eagleson Rd.
Ottawa, Ontario

Sheet Title

Landscape Plan

Date

May. 1, 2018

Scale

1:250

Drawn By

VH

Project No.

Drawing No.

L 1

APPENDIX

C TRAFFIC DATA

Transportation Services - Traffic Services

W.O. 36906

Turning Movement Count - Heavy Vehicle Report

EAGLESON RD @ FERNBANK RD

Survey Date: Tuesday, April 11, 2017

		EAGLESON RD									FERNBANK RD									
		Northbound				Southbound					Eastbound				Westbound					
Time Period		LT	ST	RT	N TOT	LT	ST	RT	S TOT	STR TOT	LT	ST	RT	E TOT	LT	ST	RT	W TOT	STR TOT	Grand Total
07:00	08:00	4	14	0	**18**	0	9	2	**11**	**29**	1	0	3	**4**	0	0	0	**0**	**4**	**33**
08:00	09:00	2	19	0	**21**	0	21	2	**23**	**44**	0	0	7	**7**	0	0	0	**0**	**7**	**51**
09:00	10:00	8	10	0	**18**	0	13	2	**15**	**33**	2	0	9	**11**	0	0	0	**0**	**11**	**44**
11:30	12:30	4	12	0	**16**	0	11	4	**15**	**31**	2	0	4	**6**	0	0	0	**0**	**6**	**37**
12:30	13:30	3	6	0	**9**	0	10	2	**12**	**21**	2	0	3	**5**	0	0	0	**0**	**5**	**26**
15:00	16:00	8	11	0	**19**	0	17	0	**17**	**36**	0	0	13	**13**	0	0	0	**0**	**13**	**49**
16:00	17:00	6	5	0	**11**	0	13	2	**15**	**26**	1	0	3	**4**	0	0	0	**0**	**4**	**30**
17:00	18:00	3	4	0	**7**	0	4	0	**4**	**11**	3	0	2	**5**	0	0	0	**0**	**5**	**16**
Sub Total		38	81	0	**119**	0	98	14	**112**	**231**	11	0	44	**55**	0	0	0	**0**	**55**	**286**
U-Turns (Heavy Vehicles)					**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total		38	81	0	**0**	0	98	14	**112**	**231**	11	0	44	**55**	0	0	0	**0**	**55**	**286**

Heavy Vehicles include Buses, Single-Unit Trucks and Articulated Trucks. Further, they ARE included in the Turning Movement Count Summary.

Eagleson Road HDV = 231
[Eq 12 hr] x 1.39 = 321.09
[Avg 12 hr] x 0.9 = 288.98
[Avg 24 hr] x 1.31 = 378.565
Therefore, 378.565/15444 (Total Vehicles 24 Hr AADT) = 2.45% HDV

Fernbank Rd HDV = 55
[Eq 12 hr] x 1.39 = 76.45
[Avg 12 hr] x 0.9 = 68.81
[Avg 24 hr] x 1.31 = 90.13
Therefore, 90.13/3251 (Total Vehicles 24 Hr AADT) = 2.77% HDV

Transportation Services - Traffic Services

Work Order 36906

Turning Movement Count - Full Study Summary Report

EAGLESON RD @ FERNBANK RD

Survey Date: Tuesday, April 11, 2017

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor .90

Full Study

	EAGLESON RD									FERNBANK RD									
	Northbound				Southbound					Eastbound				Westbound					
Period	LT	ST	RT	NB TOT	LT	ST	RT	SB TOT	STR TOT	LT	ST	RT	EB TOT	LT	ST	RT	WB TOT	STR TOT	Grand Total
07:00 08:00	139	606	0	**745**	0	276	60	**336**	**1081**	210	0	43	**253**	0	0	0	**0**	**253**	**1334**
08:00 09:00	166	716	0	**882**	0	355	82	**437**	**1319**	160	0	98	**258**	0	0	0	**0**	**258**	**1577**
09:00 10:00	109	505	0	**614**	0	269	67	**336**	**950**	119	0	84	**203**	0	0	0	**0**	**203**	**1153**
11:30 12:30	89	309	0	**398**	0	310	86	**396**	**794**	99	0	85	**184**	0	0	0	**0**	**184**	**978**
12:30 13:30	90	299	0	**389**	0	342	113	**455**	**844**	98	0	88	**186**	0	0	0	**0**	**186**	**1030**
15:00 16:00	123	432	0	**555**	0	550	148	**698**	**1253**	121	0	159	**280**	0	0	0	**0**	**280**	**1533**
16:00 17:00	173	470	0	**643**	0	784	202	**986**	**1629**	122	0	178	**300**	0	0	0	**0**	**300**	**1929**
17:00 18:00	151	463	0	**614**	0	754	186	**940**	**1554**	136	0	184	**320**	0	0	0	**0**	**320**	**1874**
Sub Total	1040	3800	0	**4840**	0	3640	944	**4584**	**9424**	1065	0	919	**1984**	0	0	0	**0**	**1984**	**11408**
U Turns				**0**				**0**	**0**				**0**				**0**	**0**	**0**
Total	1040	3800	0	**4840**	0	3640	944	**4584**	**9424**	1065	0	919	**1984**	0	0	0	**0**	**1984**	**11408**
EQ 12Hr	1446	5282	0	**6728**	0	5060	1312	**6372**	**13100**	1480	0	1277	**2758**	0	0	0	**0**	**2758**	**15858**
Note: These values are calculated by multiplying the totals by the appropriate expansion factor.													**1.39**						
AVG 12Hr	1301	4754	0	**6055**	0	4554	1181	**5735**	**11790**	1332	0	1150	**2482**	0	0	0	**0**	**2482**	**14272**
Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.													**.90**						
AVG 24Hr	1704	6227	0	**7932**	0	5965	1547	**7512**	**15444**	1745	0	1506	**3251**	0	0	0	**0**	**3251**	**18695**
Note: These volumes are calculated by multiplying the Average Daily 12 hr. totals by 12 to 24 expansion factor.													**1.31**						

Comments:

Note: U-Turns provided for approach totals. Refer to 'U-Turn' Report for specific breakdown.

2017 Traffic Data

Area	Time Period	Autos	Medium Trucks	Heavy Trucks	Total
Eagleson Road	0700-2300h	12,866	995	348	14,208
	2300-0700h	1,119	86	30	1,236
	Total	13,984	1,081	379	15,444
Fernbank Road	0700-2300h	2,699	209	83	2,991
	2300-0700h	235	18	7	260
	Total	2,933	228	90	3,251

Information	Eagleson	Fernbank
AADT	15,444	3,251
Road Gradient %	0%	0%
Medium Truck %	7%	
Heavy Truck %	2.45%	2.77%
Posted Speed Limit (kph)	60	60
Day/Night Split	92%	
	8%	

Notes:

	Information obtained from the City of Ottawa
	Information obtained from the City of Ottawa ENCG

Road Gradient based on topography maps of the area.

2027 Traffic Data

Area	Time Period	Autos	dium Truc	eavy Trucl	Total
Eagelson Road	0700-2300h	16,469	1,273	446	18,188
	2300-0700h	1,432	111	39	1,582
	Total	17,901	1,384	485	19,770
Fernbank Road	0700-2300h	3,454	268	106	3,829
	2300-0700h	300	23	9	333
	Total	3,755	291	115	4,162

Based on a 2.5% annual growth

APPENDIX

D SAMPLE STAMSON OUTPUT

```
STAMSON 5.0        NORMAL REPORT        Date: 06-06-2018 09:46:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: EAGLOCC.te           Time Period: Day/Night 16/8 hours
Description: Sound Levels at Location C


Road data, segment # 1: Eagleson (day/night)
----------------------------------------
Car traffic volume  : 16469/1432  veh/TimePeriod  *
Medium truck volume :  1273/111   veh/TimePeriod  *
Heavy truck volume  :   446/39    veh/TimePeriod  *
Posted speed limit  :    60 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  15444
    Percentage of Annual Growth        :   2.50
    Number of Years of Growth          :  10.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   2.45
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: Eagleson (day/night)
----------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  23.00 / 23.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      3       (Elevated; no barrier)
Elevation                 :  17.29 m
Reference angle           :   0.00

FF
Results segment # 1: Eagleson (day)
-----------------------------------

Source height = 1.25 m

ROAD (0.00 + 67.19 + 0.00) = 67.19 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.15  69.74   0.00  -2.13  -0.41   0.00   0.00   0.00  67.19
-------------------------------------------------------------------------------

Segment Leq : 67.19 dBA

Total Leq All Segments: 67.19 dBA

FF
Results segment # 1: Eagleson (night)
-------------------------------------

Source height = 1.25 m

ROAD (0.00 + 59.61 + 0.00) = 59.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.15  62.15   0.00  -2.13  -0.41   0.00   0.00   0.00  59.61
-------------------------------------------------------------------------------

Segment Leq : 59.61 dBA

Total Leq All Segments: 59.61 dBA

FF
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 67.19
                           (NIGHT): 59.61
FF
FF
```