NOISE & VIBRATION STUDY

"2481 BARTON STREET EAST"
MIXED-USE BUILDING
HAMILTON, ON

Prepared for:

Barton Street Developments Inc.
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Markham, ON
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Prepared By:

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Our File No: 22-2224
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1.0 INTRODUCTION

dBA Acoustical Consulting Inc. has been retained to provide a noise & vibration study on behalf of Barton Street Developments Inc., for the proposed “2481 Barton Street East” Mixed-Use Building” consisting of a 5-story and 17-storey attached apartment building with 207 residential units and 2 commercial units.

The purpose of the study is to determine the noise impact from Barton Street East and Centennial Parkway North vehicular traffic and area stationary noise sources that may impact the proposed residential development as required OPA/ZBA application approval for the City of Hamilton.

Proposed for the site are 207 residential units with standard balconies, 2 commercial units, an outdoor rooftop amenity area on the top of the 5th floor as well as an enclosed rooftop mechanical penthouse on the 17th floor.

This study will detail noise impact relative to the site plan and recommend noise control measures necessary (if applicable) to meet Ministry of Environment, Conservation and Parks (MECP) Publication NPC-300 entitled “Stationary & Transportation Sources-Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton.

Vibration is not considered as there are no heavy industries in the site area. CN/CP Rail is more than 490m from the site and therefore not a concern with noise, due to distance separation and shielding. Aircraft is not a concern as the development is located outside the NEF 25 contour of any area Airports. Key Plan is attached as Figure 1.

2.0 SITE DESCRIPTION

The proposed mixed-use building is located approximately 30m north from the center line of Barton Street East which is a 4-lane roadway with a centre turning lane and runs east to west and has a posted speed limit of 50 km/hr. Centennial Parkway North is approximately 65m west of the proposed mixed-use building and is a five-lane roadway with west side and center turning lanes and runs north to south and a posted speed limit of 50 km/hr.

The subject site is surrounded by commercial properties with parking lots on all sides. These commercial properties will provide shielding for traffic noise. There is a scrap metal yard to the northeast of the proposed development. Local streets will not have a noise impact due to low traffic volumes and speed limits. See Figure 2 for Site Plan.

3.0 NOISE IMPACT ASSESSMENT

3.1 NOISE CRITERIA

The MECP specifies limits for road noise relative to new residential developments. The MECP Publication NPC-300 entitled “Stationary & Transportation Sources-Approval & Planning, specifies the criteria, summarized as follows:

TABLE1- Road Traffic Sound Levels Limits	
Time Period	Leq (dBA)
07:00 – 23:00 (16 hr.)	55 Outdoor Living area
07:00 – 23:00 (16 hr.)	55 Plane of Window
23:00 – 07:00 (8 hr.)	50 Plane of Bedroom window

Where noise levels estimated at the Plane of the Window (POW) are equal to or less than the values listed in Table 1, no noise control measures are required. Where noise levels exceed Table 1 values, the following Table 2 action is required:

TABLE 2 –Noise Control Requirements

Time Period	Noise Level Leq (dBA)	Action Required
07:00 - 23:00 Daytime (OLA)	56 to 60	Warning Clause Type "A"
07:00 - 23:00 Daytime (OLA)	> 60	Barrier & Warning Clause Type "B"
07:00 – 23:00 Daytime (POW)	>55	Provision for A/C, Warning Clause "C"
07:00 – 23:00 Daytime (POW)	>65	Central A/C, Warning Clause "D"
07:00 – 23:00 Daytime (POW)	>65	Building Component Specification
23:00 to 07:00 Nighttime (POW)	> 50	Provision for A/C and Warning Clause Type "C"
23:00 to 07:00 Nighttime (POW)	> 60 > 60	Building Component Specification Central Air and Warning Clause Type "D"

Where nighttime noise levels exceed 60 dBA, building components must be designed to meet Table 3 indoor sound level limits.

TABLE 3 - Indoor Road Sound Levels Limits

Indoor Location	Leq (dBA) Road
Living/Dining 7:00 – 23:00	45
Bedroom 23:00 - 07:00	40

3.2 ROAD NOISE

Predicted road traffic noise levels were calculated for the combined Barton Street East & Centennial Parkway North, the main road noise sources in the proposed site area. The 2019 AADT for both road traffic volumes were sourced from the City of Hamilton Transportation Data Management System website. (See Appendix "A")

The MECP computer program STAMSON version 5.04 was used to carry out prediction calculations (See Appendix "A"). Traffic data is summarized in Table 4.

The daytime/nighttime volume ratios relative to Barton Street East & Centennial Parkway North is typically calculated using a 90/10 split and a 16/8 hr assessment as required by the MECP. The percentage of annual growth for Barton Street East & Centennial Parkway Drive North was figured at 2% over 14 years. The AADT (Annual Average Daily Traffic) volumes used are reflective of the worst-case scenario.

Truck volumes for both roadways were factored at 2% medium and 4% heavy of the total vehicle volumes for the roadway.

The MECP computer prediction program Stamson version 5.04. Table 4 following summarizes the future calculated traffic volume (2033) for the Barton Street East & Centennial Parkway North.

TABLE 4 – Future Road Traffic Volumes (2033)			
Barton Street East	AADT 31968 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	27045	575	1151
Night	3005	64	53
Centennial Parkway North	AADT 38213 Vehicles		
	Cars	Medium Trucks	Heavy Trucks
Day	32329	688	1376
Night	3592	76	153

The following Table 5A represents the free field noise levels of 12 receptor locations of road traffic from Barton Street East. See Figure 3 Receptor Locations.

TABLE 5A – Free Field Traffic Noise (dBA) Barton Street East		
Location	07:00 – 23:00	23:00 – 07:00
R1 – 2nd Floor South Façade (6.5m)	65 dBA	58 dBA
R2 – 6th Floor OLA South Facade (20m)	67 dBA	N/A
R3 – 17th Floor South Façade (51m)	67 dBA	61 dBA
R4 – 2nd Floor North Façade (6.5m)	54 dBA	47 dBA
R5 – 6th Floor OLA North Façade (20m)	57 dBA	N/A
R6 – 17th Floor North Façade (51m)	59 dBA	53 dBA
R7 – 2nd Floor West Façade (6.5m)	58 dBA	52 dBA
R8 – 17th Floor West Façade (51m)	62 dBA	56 dBA
R9 – 2nd Floor East Façade (6.5m)	58 dBA	51 dBA
R10 – 6th Floor OLA East Façade (20m)	64 dBA	N/A
R11 – 17th Floor East Façade (51m)	61 dBA	54 dBA
R12 – 6th Floor OLA South Façade Mitigated 0.91m	50 dBA	N/A

The following Table 5B represents the free field noise levels of 12 receptor locations of road traffic from Centennial Parkway North. See Figure 3 Receptor Locations.

TABLE 5B – Free Field Traffic Noise (dBA) Centennial Parkway North		
Location	07:00 – 23:00	23:00 – 07:00
R1 – 2nd Floor South Façade (6.5m)	57 dBA	51 dBA
R2 – 6th Floor OLA South Facade (20m)	61 dBA	N/A
R3 – 17th Floor South Façade (51m)	62 dBA	55 dBA
R4 – 2nd Floor North Façade (6.5m)	57 dBA	51 dBA
R5 – 6th Floor OLA North Façade (20m)	61 dBA	N/A
R6 – 17th Floor North Façade (51m)	62 dBA	55 dBA
R7 – 2nd Floor West Façade (6.5m)	60 dBA	54 dBA
R8 – 17th Floor West Façade (51m)	65 dBA	58 dBA
R9 – 2nd Floor East Façade (6.5m)	53 dBA	47 dBA
R10 – 6th Floor OLA East Façade (20m)	59 dBA	N/A
R11 – 17th Floor East Façade (51m)	59 dBA	53 dBA
R12 – 6th Floor OLA South Façade Mitigated 0.91m	49 dBA	N/A

The following Table 5C represents the combined free field noise levels of 12 receptor locations of road traffic from both roadways. See Figure 3 Receptor Locations.

TABLE 5B – Combined Free Field Traffic Noise (dBA) Barton Street East & Centennial Parkway North		
Location	07:00 – 23:00	23:00 – 07:00
R1 – 2nd Floor South Façade (6.5m)	65 dBA	59 dBA
R2 – 6th Floor OLA South Facade (20m)	68 dBA	N/A
R3 – 17th Floor South Façade (51m)	68 dBA	62 dBA
R4 – 2nd Floor North Façade (6.5m)	59 dBA	52 dBA
R5 – 6th Floor OLA North Façade (20m)	63 dBA	N/A
R6 – 17th Floor North Façade (51m)	64 dBA	57 dBA
R7 – 2nd Floor West Façade (6.5m)	62 dBA	56 dBA
R8 – 17th Floor West Façade (51m)	67 dBA	60 dBA
R9 – 2nd Floor East Façade (6.5m)	59 dBA	52 dBA
R10 – 6th Floor OLA East Façade (20m)	65 dBA	N/A
R11 – 17th Floor East Façade (51m)	63 dBA	56 dBA
R12 – 6th Floor OLA South Façade Mitigated 0.91m	53 dBA	N/A

3.3 VIBRATION

The City of Hamilton Construction Management Plan 2022 requires pre-condition surveys of area buildings within the area of influence (to be established), noise and vibration protocol, shoring approval and vibration monitoring during shoring and all heavy construction activities prior to mobilizing of construction equipment. Further information will be provided prior to the issuance of a building permit or as The City of Hamilton staff require the documents for approval.

4.0 RECOMMENDATIONS - NOISE CONTROL

4.1 OUTDOOR LIVING AREAS

Calculated road noise levels for all receptors exceed the 55 dBA daytime criteria outlined in Table 1. All residential units have standard balconies that are less than 4m in depth and do not require noise mitigation measures. The 6th floor OLA requires a 0.91m (3 ft) safety railing or equivalent to meet the MECP guidelines.

In compliance with MECP guidelines, a noise barrier must have a minimum face density of 20kg/m^2 and be designed and constructed without cracks or gaps. Any gaps under the noise barrier that are necessary for drainage purposes must be minimized (2”) and localized and must not deteriorate acoustical performance. (See Figure 4, Noise Barrier Location)

4.2 INDOOR NOISE LEVELS

Calculated nighttime road noise levels at the Plane of Window (POW) exceeds the 50 dBA criteria outlined in Table 1 for indoor space. Specific building components (walls, windows, doors etc.) are required and confirmed using the STC (Sound Transmission Class) method. Building design specifications were not made available during report writing therefore, STC calculations summarized in Table 6 following with minimum window door and wall construction specified for each floor.

It is more cost efficient to use the highest noise level STC-34 rated windows for all units, therefore eliminating any chance of incorrect STC value windows being installed.

The STC values were calculated for each room type, based on typical acoustically tested window to floor ratios of 20% for bedrooms and 30% for living areas. A maximum of two components were factored per room. Receptor locations are labelled on Figure 3. Acoustically tested windows must be installed and verified by a letter from the appropriate window company be issued to confirm the STC values have been achieved.

TABLE 6 –Door and Window Construction Requirements

LOCATION	Window STC To Be Achieved	Patio Door Construction	Exterior Walls STC Rating
All Units	Example	Example	Example
Bedroom All Facades	34	34	43
Living Room All Facades	34	34	43

5.0 STATIONARY NOISE ASSESSMENT CRITERIA

5.1 AREA STATIONARY NOISE SOURCES ESSO GAS STATION & CAR WASH & TIM HORTONS

The commercial properties are located on the northeast corner of Barton Street East & Centennial Parkway North. These commercial properties include an ESSO gas station and car wash and a Tim Hortons Drive Thru. Both the ESSO Gas Station and Car Wash and the Tim Hortons drive thru are located at 2471 Barton Street East. The ESSO gas station is exempt, as it is governed by the Federal Government. The ESSO car wash noise levels were acquired and are noted in Section 5.2. Tim Hortons drive thru has a menu board with a small speaker system. Tim Horton has one small cooling compressor located on the west side of the building at ground level. The noise levels from the speaker were obtained and recorded at 60 dBA at 1m. Noise levels calculated to the proposed building will not have an acoustical impact on the proposed development as the background noise level exceeds the calculated Tim Hortons drive thru.

The ESSO car wash has one automated car wash bay and is closed during the evening and nighttime hours. The car wash is equipped with sprayers and automated blower system. This blower system is located approximately 6m (20 ft) inside the bay area and the blowers are vented towards the north. The bay doors are closed while the vehicle is being washed and dried. A car wash cycle lasts approximately 5 minutes from start to finish. See Appendix “B’ Area Stationary Noise Sources.

5.2 MR. LUBE

Mr. Lube is located at 258 Centennial Parkway North, approximately 50m northwest of the proposed development. Mr. Lube operates during daytime house only and during a recent site visit, on December 14th, 2022, a discussion with the Manager confirms that the bay doors are kept closed at all times, unless required for vehicles entering and exiting. The noise level from Mr. Lube is not audible at the property line, with the bay doors closed, and is not considered to have an acoustical impact on the proposed development.

5.3 TAYLOR CHRYSLER DODGE INC.

Taylor Chrysler Dodge is located at 260 Centennial Parkway North, approximately 60m north of the proposed development. Taylor Chrysler Dodge has 7 bay doors at the rear of the building on the east side, approximately 100m from the proposed development and are the bay doors are completely shielded by the connected building. The rooftop HVAC units will not have an acoustical impact on the proposed development, due to the distance separation and the background noise level.

5.4 OTHER AREA STATIONARY NOISE SOURCES

A recent site visit confirmed has determined that Dominion Scrap Metals has minimal daily operations and Herc Rentals is a rental company with minimal daily operations. Speedy Auto Glass work is completed indoors. None of the above businesses will have an acoustical impact on the proposed development.

5.5 STATIONARY NOISE MONITORING

On December 14, 2022, noise monitoring of the automatic car wash during normal car wash operations. The noise monitor used was a SoundPro DL, Serial Number BIJ090028 capable of obtaining and recording hourly Leq. The sound level meter was equipped with a wind screen and calculated before and after noise monitoring was conducted. The weather conditions were favorable for noise monitoring with a moderate westerly breeze that favours higher noise levels at the proposed site development. The predominant wind for this area is from the west. A one-hour period was modelled assuming that the car wash doors are closed for 55 minutes and open for 5 minutes out of the 60-minute period.

Noise monitoring was calculated for daytime noise levels over an hourly period and calculated at the residential development plan 1st floor and top floor, approximate locations were selected for a plane of window receptor modelled at 6.5m and 51m height.

The nearest outdoor receptor facades considered at 17m from the automatic car wash exit. The noise monitoring was conducted at the south side of the exit of the bay and measured at 69.3 dba at 3m from the exit door noise source. It should be noted that once the vehicles leave, the bay doors open, and the blowers begin to shut down until the next vehicle approaches the blowers. The noise calculations are as follows for the proposed development facades.

The noise source (69.3 dBA) at 3m from the exit bay door. Reflective surface was included in the noise monitoring. The angle of the source to receiver is -90 and is a -3 dBA at the receptor. It was confirmed that the blowers are off 50% of an hour during worst case scenarios. Therefore, the sound level calculations are as follows:

3m Source ÷ 17m Receptor = - 15 dBA (3÷17 (Logx20) = -15 dBA (69.3 dBA -15 dBA = 54 dBA – 3 dBA = 51 dBA 30min ÷ 60min = (Log x 20) = -6 dBA, therefore the total overall noise level of 45 dBA for first floor and 47 dBA for top floor.

The calculated background noise level, as noted in Table 5, clearly indicates that the Esso car wash does not have an acoustical impact on the proposed development.

Tim Horton speakers are restricted to high levels of sound by an interior sound limiter controlled in the office. The noise level produced at 1m from the speaker was recorded at 60 dba. 1m Source ÷ 27m Receptor = - 28.6 (29 dBA) (1÷27 (Logx20) = -29 dBA (60 dBA -29 dBA = 31 dBA therefore the total overall noise level of 31 dBA for first floor and 34 dBA for top floor.

The calculated background noise level, as noted in Table 5B, clearly indicates that the Esso Car Wash and Tim Hortons do not have an acoustical impact on the proposed development.

5.6 CLASS 1 NOISE LEVEL CRITERIA

The areas surrounding “2481 Barton Street East Residential Development” is indicative of a “Class 1 Area” as defined in MECP Publication NPC-300, Stationary & Transportation Sources-Approval & Planning.

The applicable sound limits are the higher of:

- **The existing ambient sound level; or**
- The minimum values of Table 7A & 7B.

No restrictions apply to stationary sources if the one-hour equivalent sound exposure (Leq) is lower than the levels in the following Table 7A and Table 7B.

Table 7A
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)
Outdoor Points of Reception

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00-19:00	50	50	45	55
19:00-23:00	50	45	40	55

Table 7B
Exclusion Limit Values of One-Hour Equivalent Sound Level (Leq, dBA)
Plane of Window of Noise Sensitive Spaces

Time of Day	Class 1 Area	Class 2 Area	Class 3 Area	Class 4 Area
07:00-19:00	50	50	45	60
19:00-23:00	50	50	40	60
23:00-07:00	45	45	40	55

6.0 VENTILATION / WARNING CLAUSES

Ventilation and warning clause requirements for specific units are presented in Table 8 following. It is recommended that the appropriate warning clauses be inserted into all Offers and Agreements of Purchase and Sale or Lease. Minimum building component requirements will satisfy the MECP criterion for noise control relative to indoor living space.

TABLE 8 - Ventilation and Warning Clause Requirements		
LOCATION	VENTILATION	WARNING CLAUSE
All Units	Central Air Conditioning	Type “B” & “D”

The following warning clause may be used in combination:

TYPE B:

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the buildings 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 Municipality’s and the MECP’s noise criteria.”

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 Municipality’s and the MECP’s noise criteria.”

7.0 SUMMARY OF RECOMMENDATIONS

The following noise control measures are required to satisfy the indoor and outdoor noise level criterion:

- Central Air Conditioning for all units as recommended in Table 8.
- Window, Door, and Wall construction as recommended in Table 6.
- Type's "B" & "D" Warning Clause for all residential units are required and Registered on Title.
- Prior to final Site Plan Approval pre-condition surveys and noise and vibration monitoring as per Hamilton Management Construction Plan 2022.
- A letter from the window company be issued to confirm STC values for all proposed windows to be installed and an Acoustical Certificate to be sent to the City of Hamilton confirming that STC values have been achieved.
- It is recommended that a qualified acoustical consultant certify that the required noise control measures have been incorporated into the builder's plans prior to issuance of a building permit.
- It is recommended that a qualified acoustical consultant certify that the required control measures have been properly installed prior to an occupancy permit.

8.0 CONCLUSIONS

dBA Acoustical Consulting Inc. has provided a noise & vibration study on behalf of Barton Street Developments Inc., for the proposed "2481 Barton Street East" Mixed-Use Building" consisting of a 5-story and 17-storey attached apartment building with 207 residential units and 2 commercial units.

The study determined the noise impact from Barton Street East and Centennial Parkway North vehicular traffic and area stationary noise sources that impacted the proposed residential development as required OPA/ZBA application approval for the City of Hamilton.

This study detailed noise impact relative to the site plan and recommended noise control measures necessary to meet MECP Publication NPC-300 entitled "Stationary & Transportation Sources- Approval & Planning guidelines while satisfying the planning requirements of the City of Hamilton.

FIGURE 1
KEY PLAN

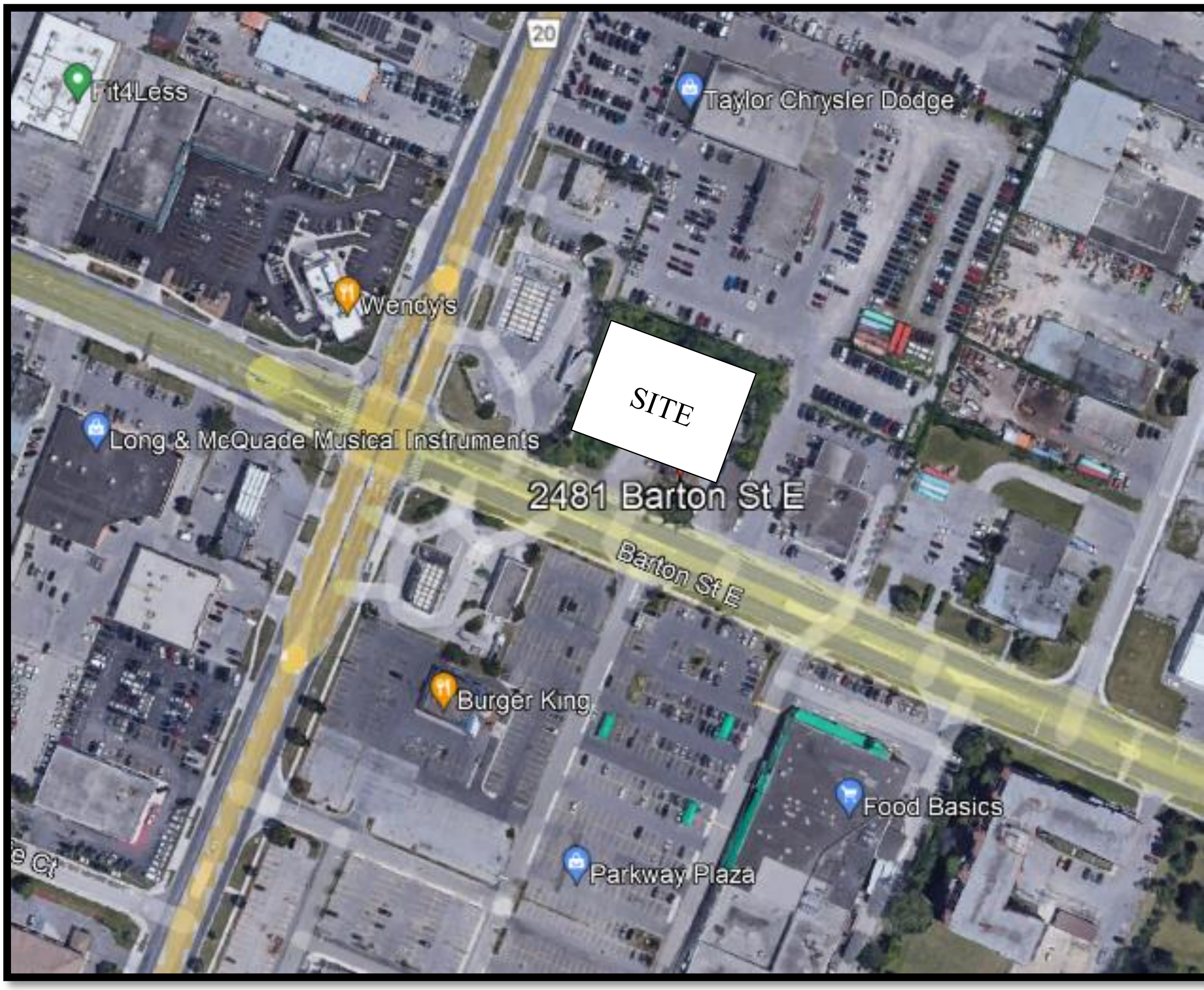


FIGURE 2
SITE PLAN

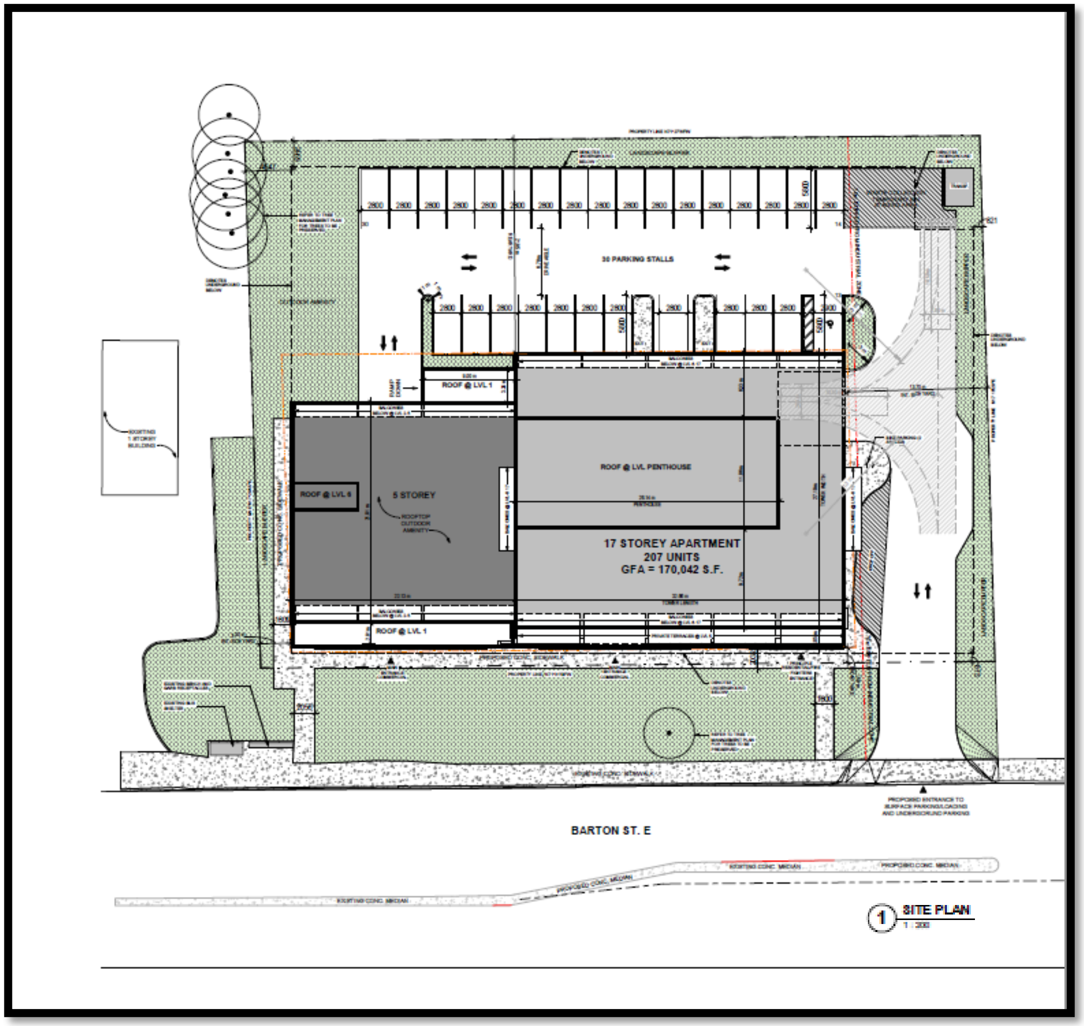
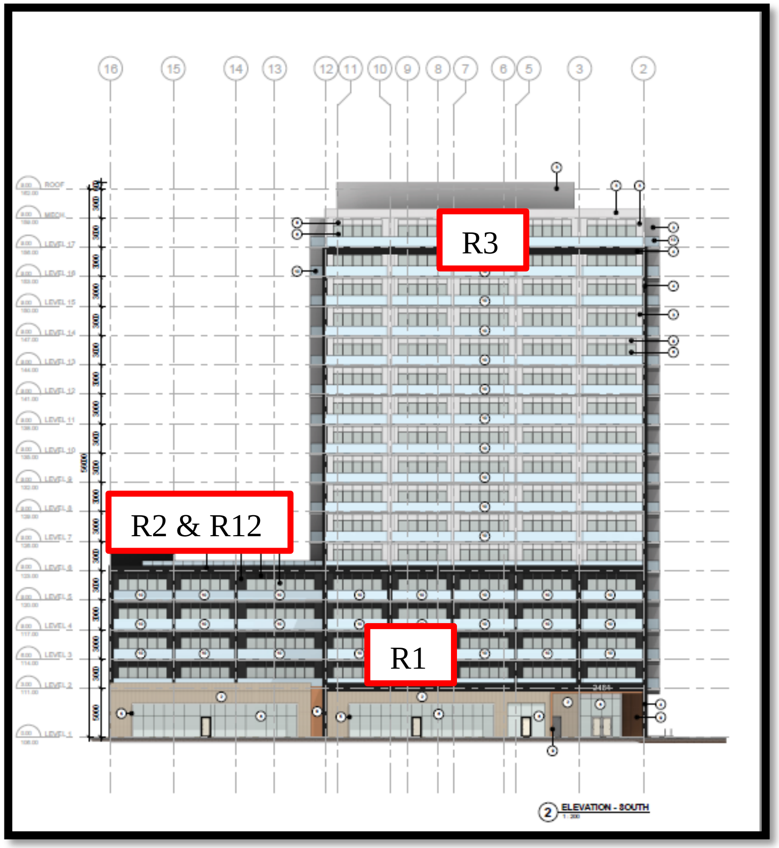
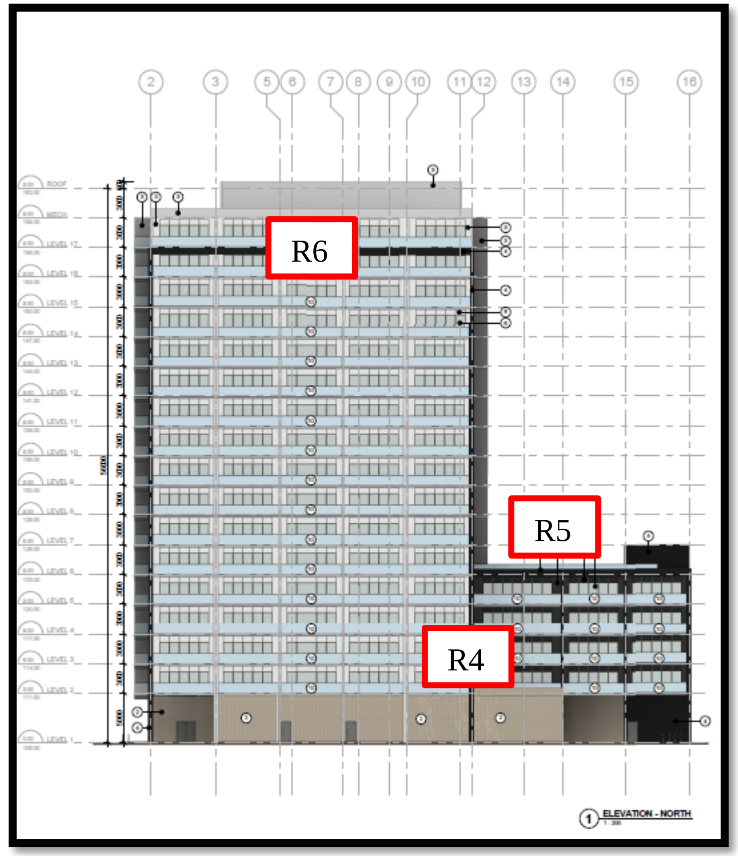


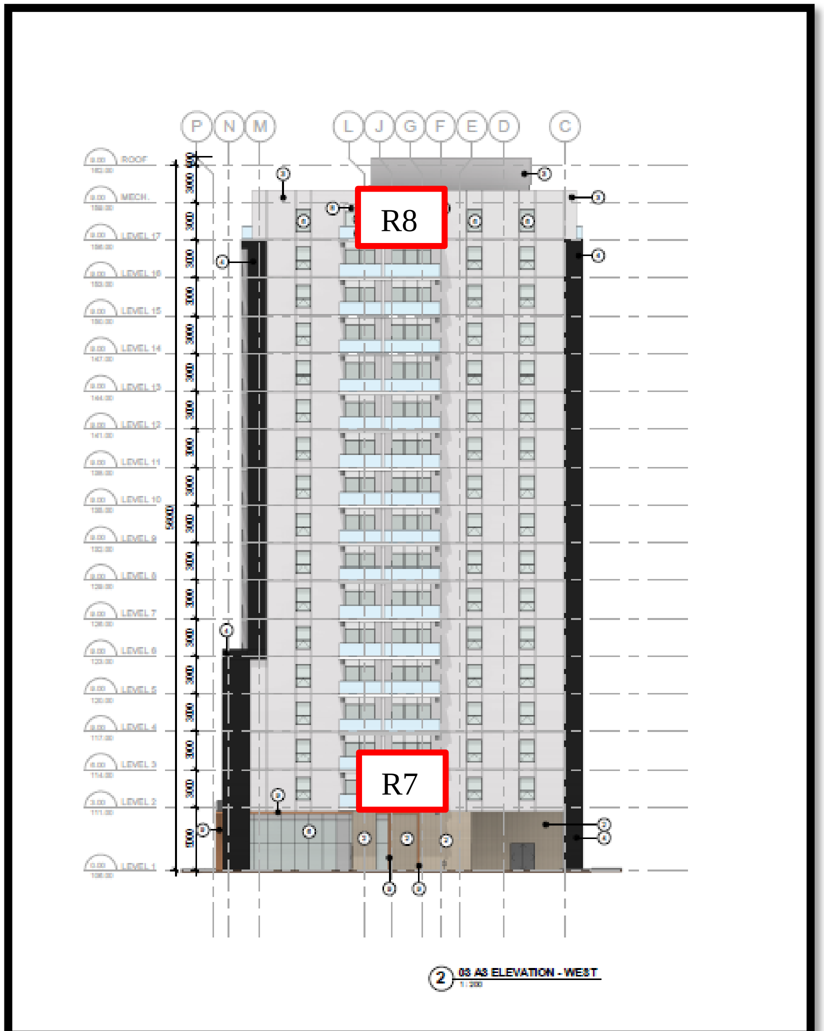
FIGURE 3
RECEPTOR LOCATIONS



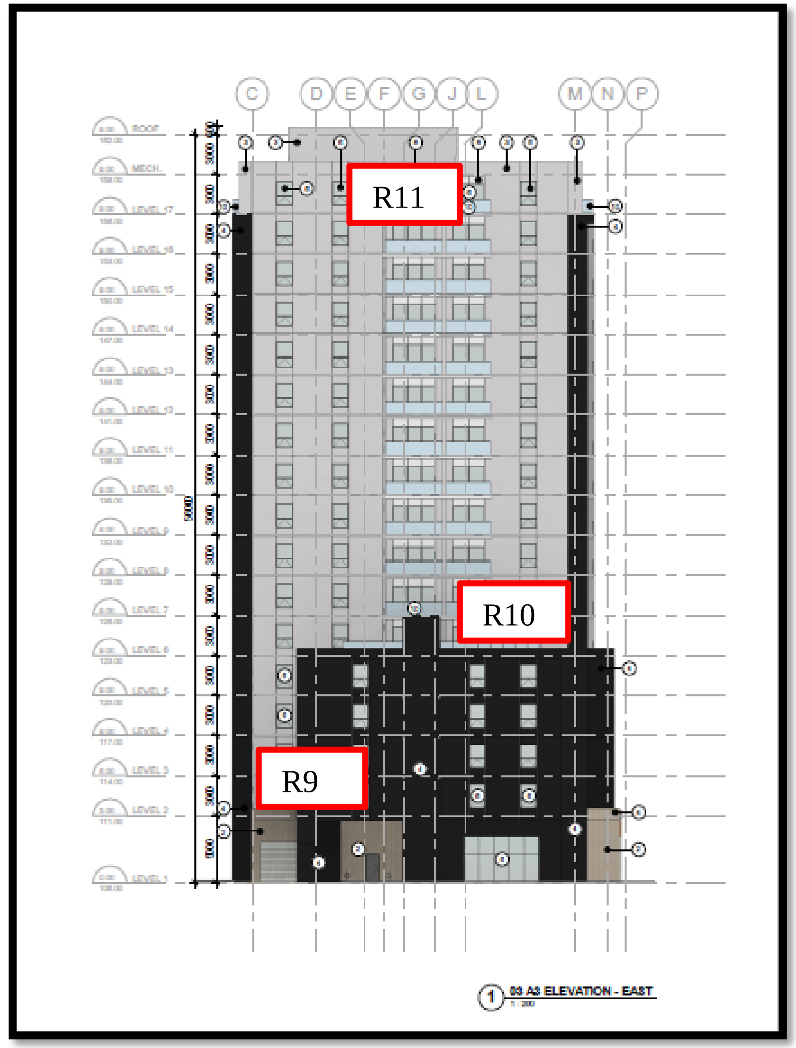
South Facade



North Facade

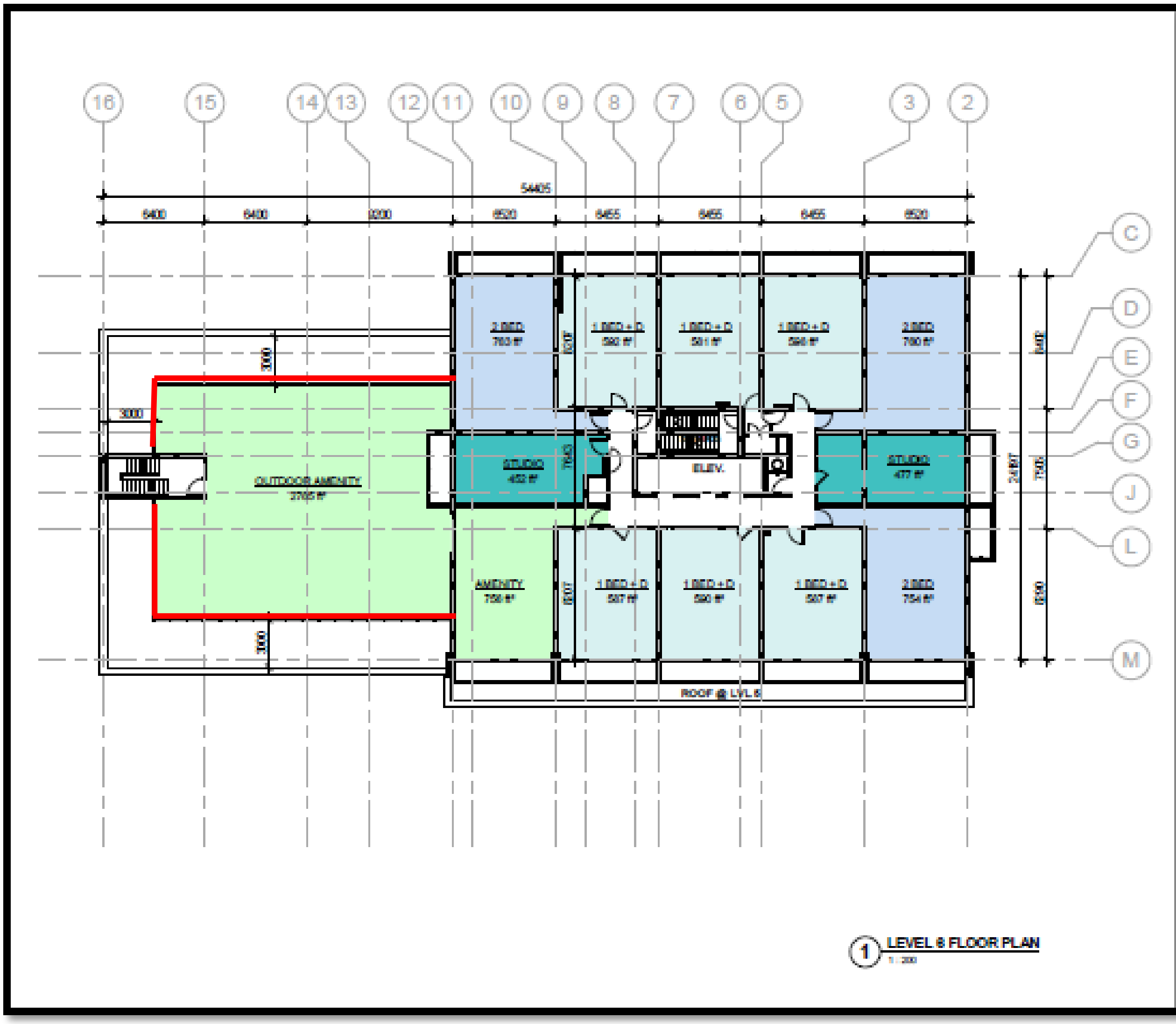


West Facade



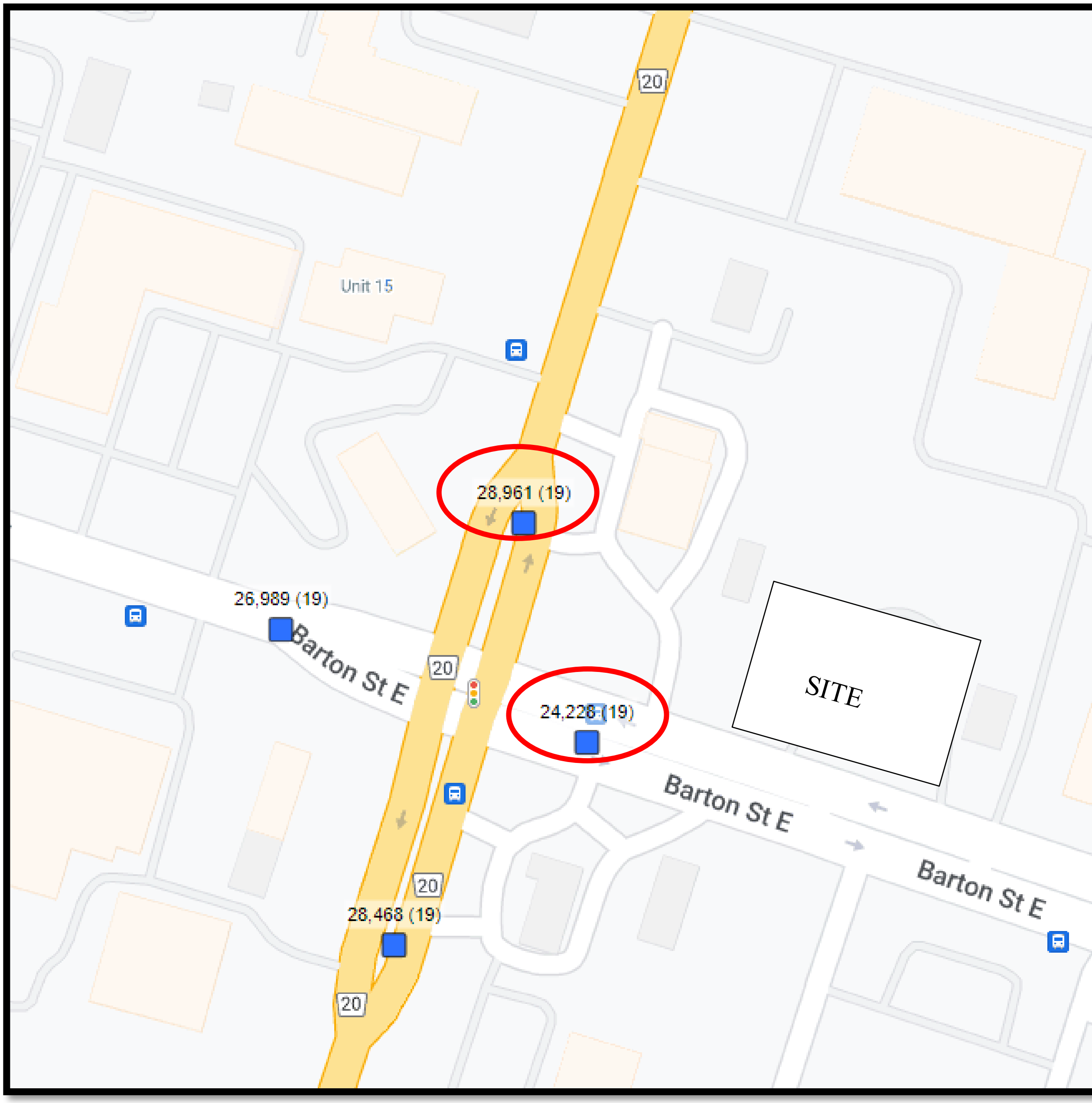
East Facade

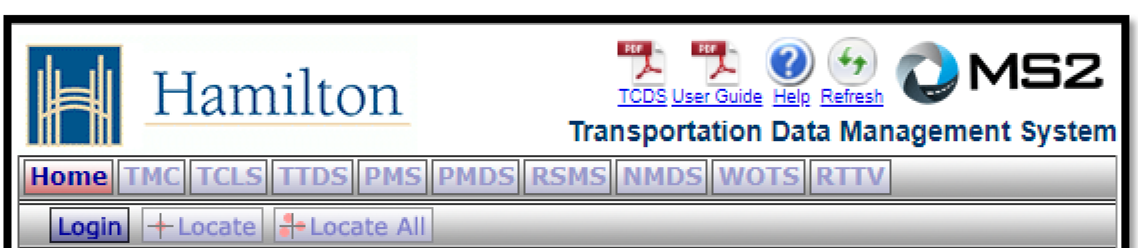
FIGURE 4
OLA – 0.91m (3 ft) SAFETY GLASS RAILING OR EQUIVALENT



APPENDIX "A"

2019 CITY OF HAMILTON
TRAFFIC DATA
BARTON STREET EAST & CENTENNIAL PARKWAY NORTH





STAMSON CALCULATIONS

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 16:36:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1Cent.te            Time Period: Day/Night 16/8 hours
Description: R1 South Facade Facing Barton St
                      TOTAL Leq FROM ALL SOURCES                  (DAY): 65.36
                                                                  (NIGHT): 58.83

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth       :   2.00
    Number of Years of Growth         :  14.00
    Medium Truck % of Total Volume    :   2.00
    Heavy Truck  % of Total Volume    :   4.00
    Day (16 hrs) % of Total Volume    :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2          : -90.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      2       (Reflective ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height          :   6.50 / 6.50   m
Topography               :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth       :   2.00
    Number of Years of Growth         :  14.00
    Medium Truck % of Total Volume    :   2.00
    Heavy Truck  % of Total Volume    :   4.00
    Day (16 hrs) % of Total Volume    :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2          :  -0.00 deg   90.00 deg
Wood depth               :      0       (No woods.)
No of house rows         :      0 / 0
Surface                  :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height          :   6.50 / 6.50   m
Topography               :      1       (Flat/gentle slope; no barrier)
Reference angle          :   0.00
```

```
Result summary (day)
--------------------

                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    64.62 !    64.62
 2.Centennial       !     1.41 !    57.31 !    57.31
--------------------+---------+---------+---------
                      Total                    65.36 dBA

Result summary (night)
----------------------

                     !  source  !   Road   !  Total
                     !  height  !   Leq    !   Leq
                     !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    58.09 !    58.09
 2.Centennial       !     1.41 !    50.78 !    50.78
--------------------+---------+---------+---------
                      Total                    58.83 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 16:52:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2cent.te            Time Period: Day/Night 16/8 hours
Description: R2 South Facade Facing Barton St
                      TOTAL Leq FROM ALL SOURCES                   (DAY): 67.72

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    66.74 !    66.74
 2.Centennial       !     1.41 !    60.78 !    60.78
--------------------+----------+----------+---------
                      Total                  67.72 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 17:05:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3cent.te            Time Period: Day/Night 16/8 hours
Description: R3 South Facade Facing Barton St
                              TOTAL Leq FROM ALL SOURCES           (DAY): 68.42
                                                                   (NIGHT): 61.90
Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    67.36 !    67.36
 2.Centennial       !     1.41 !    61.77 !    61.77
--------------------+---------+---------+---------
                      Total                  68.42 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    60.84 !    60.84
 2.Centennial       !     1.41 !    55.24 !    55.24
--------------------+---------+---------+---------
                      Total                  61.90 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 17:52:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4cent.te            Time Period: Day/Night 16/8 hours
Description: R4 North Facade
                      TOTAL Leq FROM ALL SOURCES           (DAY): 61.32
                                                           (NIGHT): 52.35
Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :   6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 18:25:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5cent.te            Time Period: Day/Night 16/8 hours
Description: R5 North Facade Free Field
                                      TOTAL Leq FROM ALL SOURCES           (DAY): 62.60

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    57.94 !    57.94
 2.Centennial       !     1.41 !    60.78 !    60.78
--------------------+----------+----------+---------
                      Total                  62.60 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 18:44:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6cent.te            Time Period: Day/Night 16/8 hours
Description: R6 North Facade Free Field
                              TOTAL Leq FROM ALL SOURCES                 (DAY): 63.66
                                                                         (NIGHT): 57.13

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  65.00 / 65.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    59.13 !    59.13
 2.Centennial       !     1.41 !    61.77 !    61.77
--------------------+---------+---------+---------
                      Total                  63.66 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    52.60 !    52.60
 2.Centennial       !     1.41 !    55.24 !    55.24
--------------------+---------+---------+---------
                      Total                  57.13 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 19:12:55
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7cent.te            Time Period: Day/Night 16/8 hours
Description: R7 West Facade Free Field
                      TOTAL Leq FROM ALL SOURCES                   (DAY): 62.42
                                                                   (NIGHT): 55.89

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (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  :  65.00 / 65.00  m
Receiver height           :   6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    58.26 !    58.26
 2.Centennial       !     1.41 !    60.32 !    60.32
--------------------+----------+----------+---------
                      Total                    62.42 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    51.73 !    51.73
 2.Centennial       !     1.41 !    53.79 !    53.79
--------------------+----------+----------+---------
                      Total                    55.89 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 19:28:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8cent.te            Time Period: Day/Night 16/8 hours
Description: R8 West Facade Free Field
                              TOTAL Leq FROM ALL SOURCES                 (DAY): 66.67
                                                                         (NIGHT): 60.14
Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (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  :  65.00 / 65.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    62.14 !    62.14
 2.Centennial       !     1.41 !    64.78 !    64.78
--------------------+---------+---------+---------
                      Total                  66.67 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+---------+---------+---------
 1.Barton St E      !     1.41 !    55.61 !    55.61
 2.Centennial       !     1.41 !    58.25 !    58.25
--------------------+---------+---------+---------
                      Total                  60.14 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 19:52:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R9cent.te            Time Period: Day/Night 16/8 hours
Description: R9 East Facade Free Field
                              TOTAL Leq FROM ALL SOURCES                    (DAY): 58.99
                                                                          (NIGHT): 52.46

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  55.00 / 55.00  m
Receiver height           :   6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :   6.50 / 6.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    57.63 !    57.63
 2.Centennial       !     1.41 !    53.28 !    53.28
--------------------+----------+----------+---------
                      Total                  58.99 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    51.10 !    51.10
 2.Centennial       !     1.41 !    46.75 !    46.75
--------------------+----------+----------+---------
                      Total                  52.46 dBA
```

```
STAMSON 5.04        SUMMARY REPORT       Date: 21-12-2022 20:14:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10cent.te           Time Period: Day/Night 16/8 hours
Description: R10 East Facade Free Field
                      TOTAL Leq FROM ALL SOURCES                   (DAY): 65.12

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    63.73 !    63.73
 2.Centennial       !     1.41 !    59.49 !    59.49
--------------------+----------+----------+---------
                      Total                    65.12 dBA
```

```
STAMSON 5.04        SUMMARY REPORT       Date: 21-12-2022 20:30:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11cent.te           Time Period: Day/Night 16/8 hours
Description: R11 East Facade Free Field
                      TOTAL Leq FROM ALL SOURCES                   (DAY): 62.97
                                                                   (NIGHT): 56.45
Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  70.00 / 70.00  m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  51.00 / 51.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

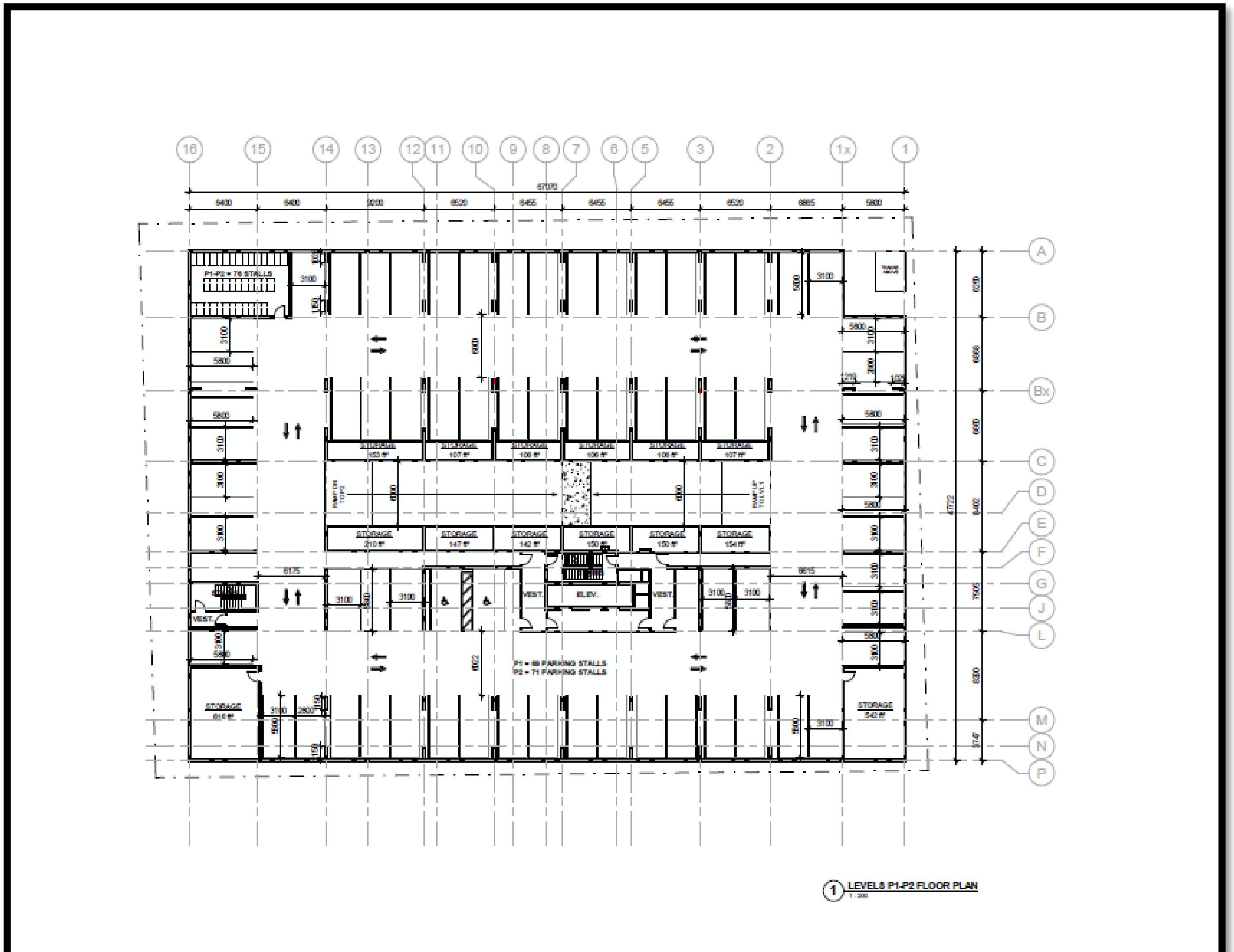
```
Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    60.67 !    60.67
 2.Centennial       !     1.41 !    59.11 !    59.11
--------------------+----------+----------+---------
                      Total                    62.97 dBA

Result summary (night)
----------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+----------+---------
 1.Barton St E      !     1.41 !    54.15 !    54.15
 2.Centennial       !     1.41 !    52.58 !    52.58
--------------------+----------+----------+---------
                      Total                    56.45 dBA
```

```
STAMSON 5.04        SUMMARY REPORT        Date: 21-12-2022 20:45:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12cent.te           Time Period: Day/Night 16/8 hours
Description: R12 6th Floor OLA Mitigated
                      TOTAL Leq FROM ALL SOURCES                   (DAY): 52.66 (OLA)

Road data, segment # 1: Barton St E (day/night)
-----------------------------------------------
Car traffic volume  : 27045/3005  veh/TimePeriod  *
Medium truck volume :   575/64    veh/TimePeriod  *
Heavy truck volume  :  1151/128   veh/TimePeriod  *
Posted speed limit  :    50 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):  24228
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 1: Barton St E (day/night)
---------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  30.00 / 30.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -0.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.91 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :  20.00 m
Reference angle           :   0.00

Road data, segment # 2: Centennial (day/night)
----------------------------------------------
Car traffic volume  : 32329/3592  veh/TimePeriod  *
Medium truck volume :   688/76    veh/TimePeriod  *
Heavy truck volume  :  1376/153   veh/TimePeriod  *
Posted speed limit  :    50 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):  28961
    Percentage of Annual Growth        :   2.00
    Number of Years of Growth          :  14.00
    Medium Truck % of Total Volume     :   2.00
    Heavy Truck  % of Total Volume     :   4.00
    Day (16 hrs) % of Total Volume     :  90.00

Data for Segment # 2: Centennial (day/night)
```

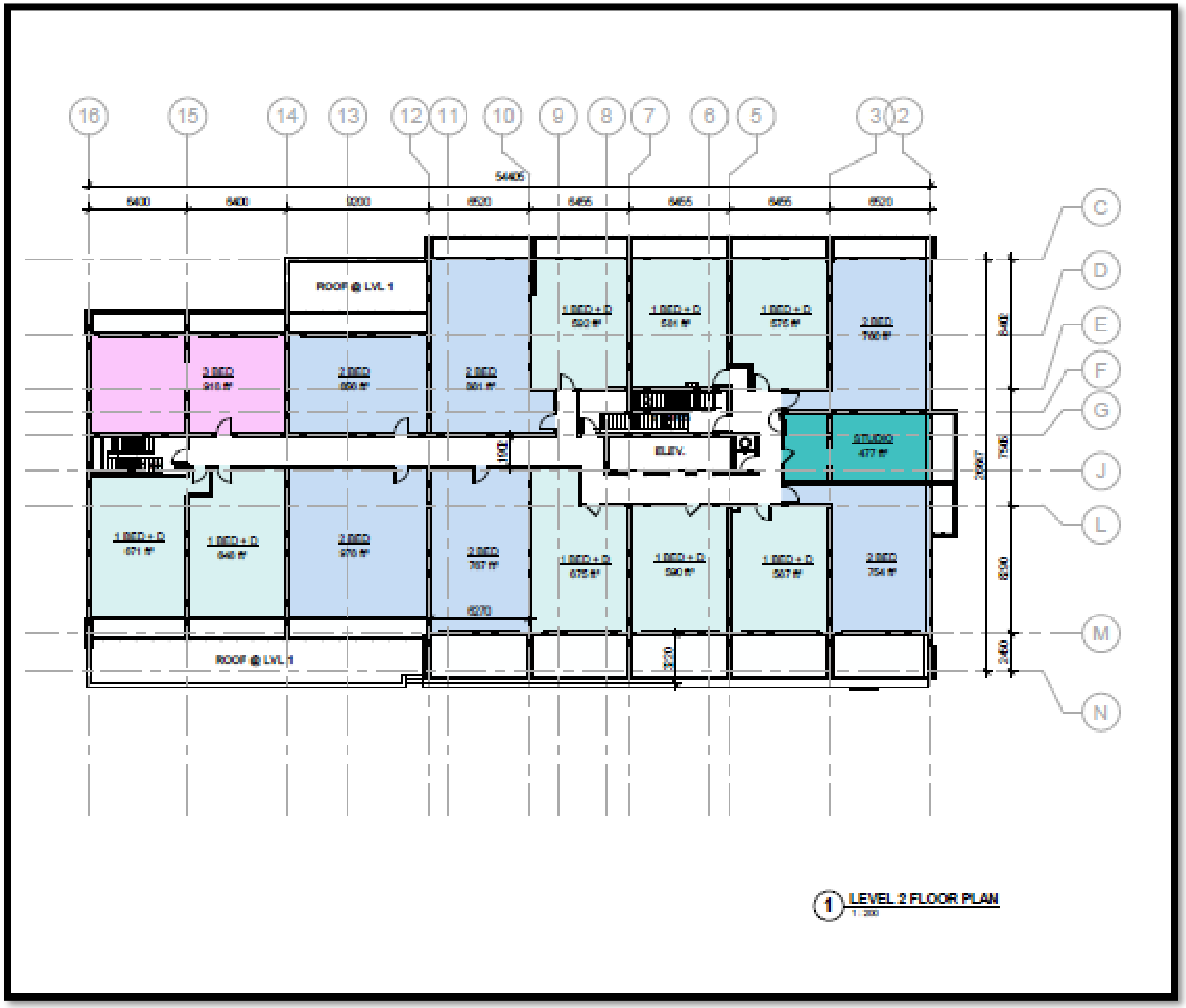
```
--------------------------------------------
Angle1   Angle2           :  -0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  20.00 / 20.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -0.00 deg   Angle2 : 90.00 deg
Barrier height            :   0.91 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :  20.00 m
Reference angle           :   0.00

Result summary (day)
--------------------

                    !  source  !   Road   !  Total
                    !  height  !   Leq    !   Leq
                    !   (m)    !  (dBA)   !  (dBA)
--------------------+----------+---------+---------
 1.Barton St E      !     1.41 !    50.03 !    50.03
 2.Centennial       !     1.41 !    49.24 !    49.24
--------------------+----------+---------+---------
                      Total                    52.66 dBA
```

FLOOR PLANS

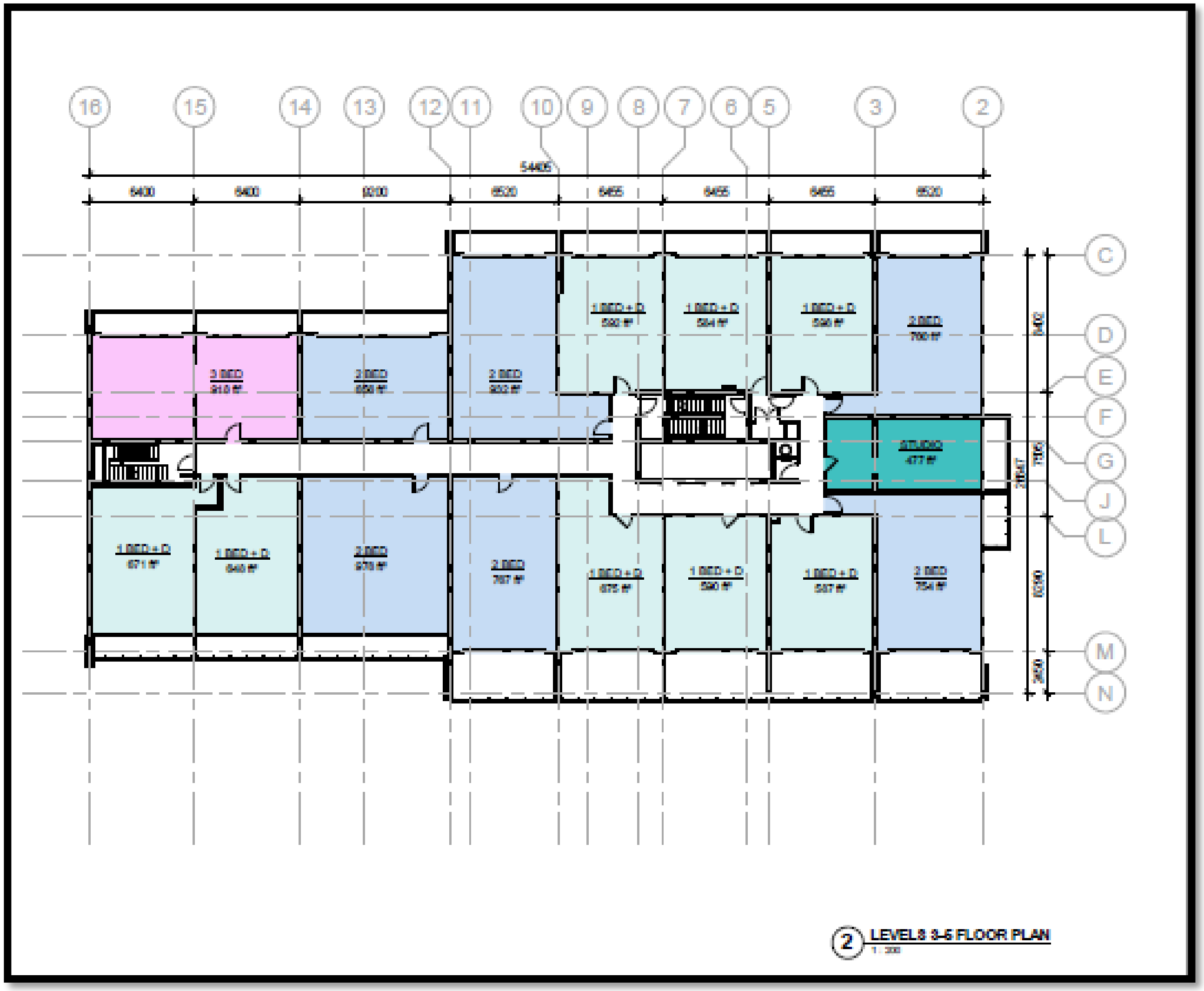
LEVELS P1 & P2 FLOOR PLAN



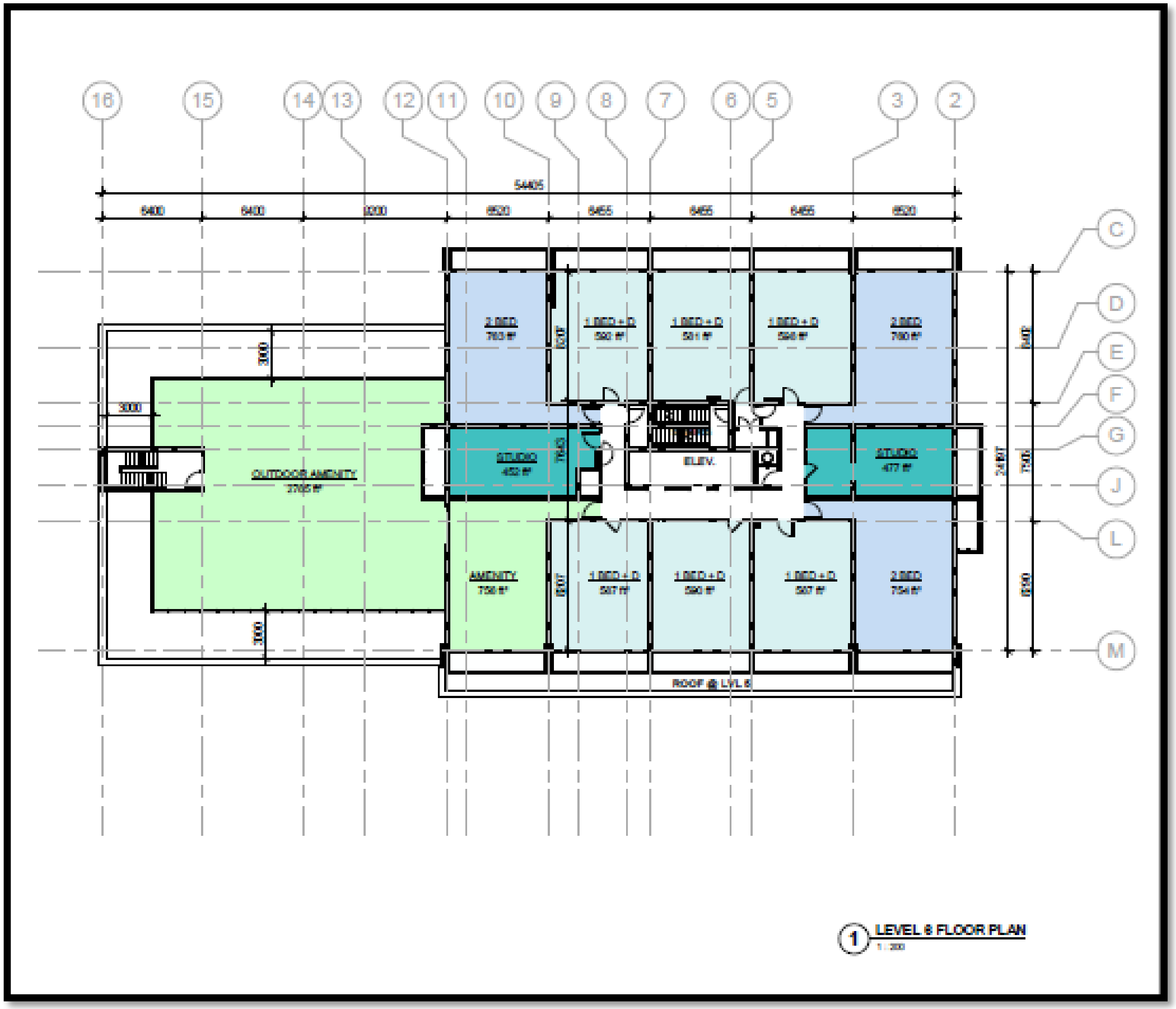
LEVEL 2 FLOOR PLAN



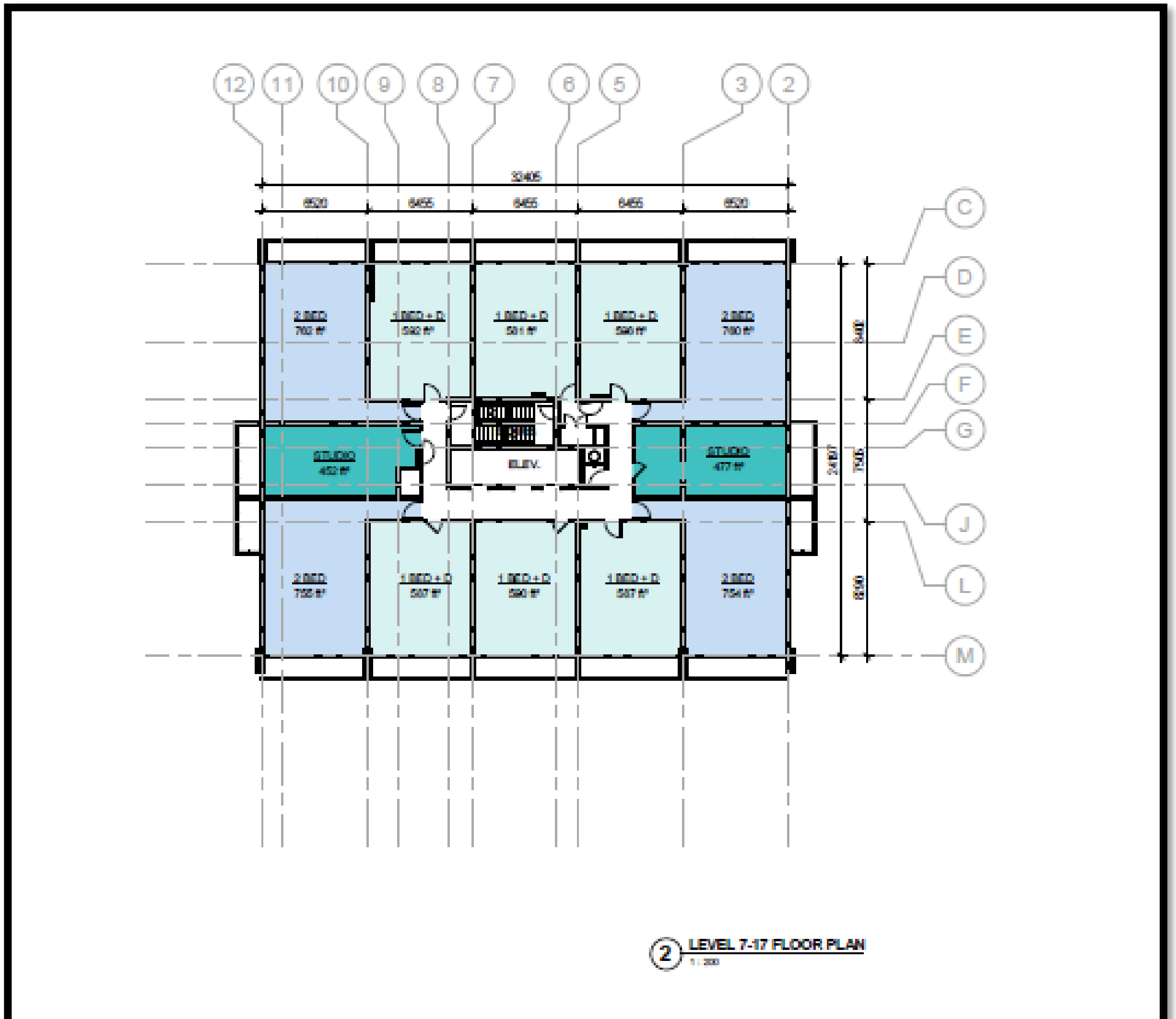
LEVEL 3 – 5 FLOOR PLANS



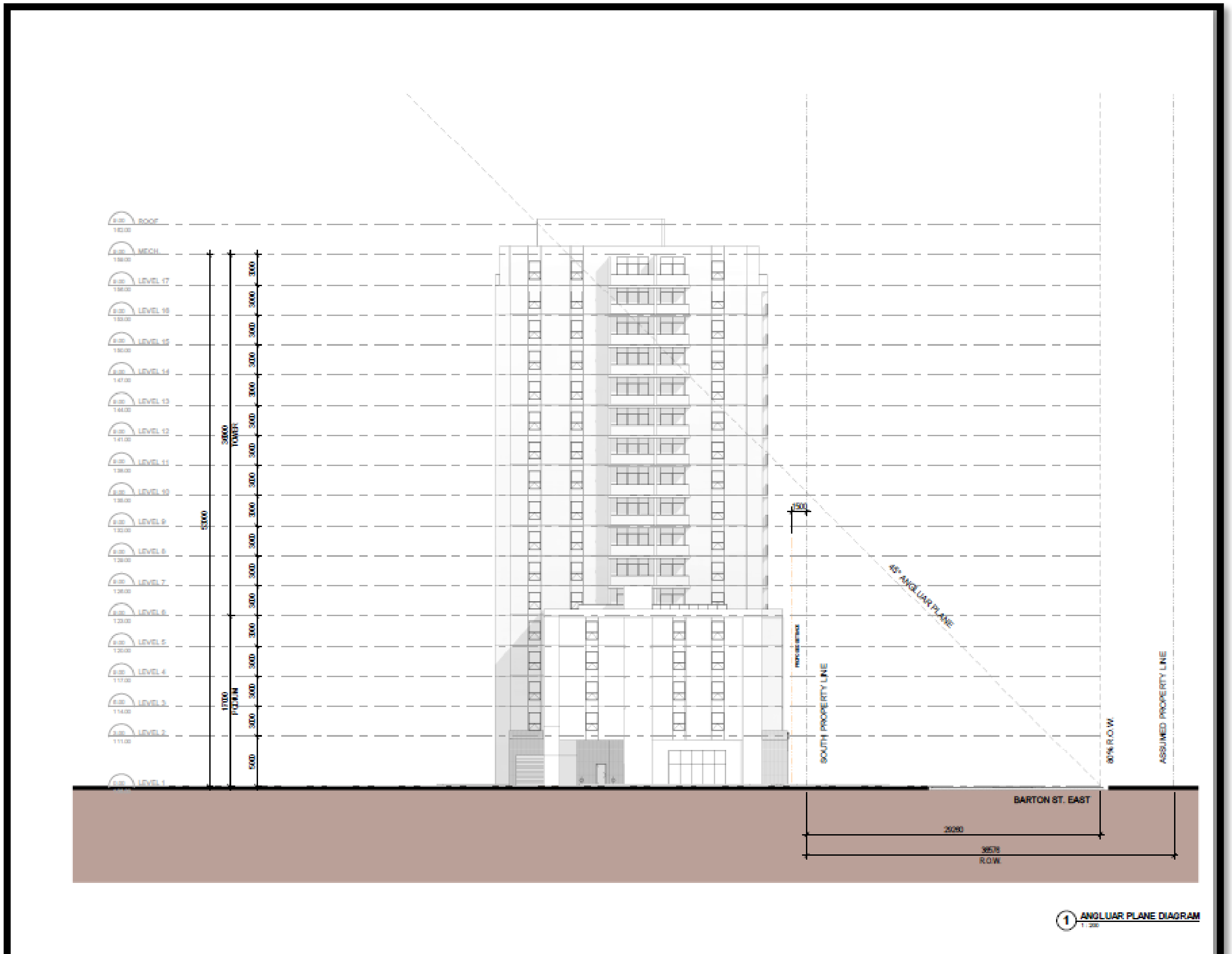
LEVEL 6 FLOOR PLAN



LEVEL 7 – 17 FLOOR PLAN

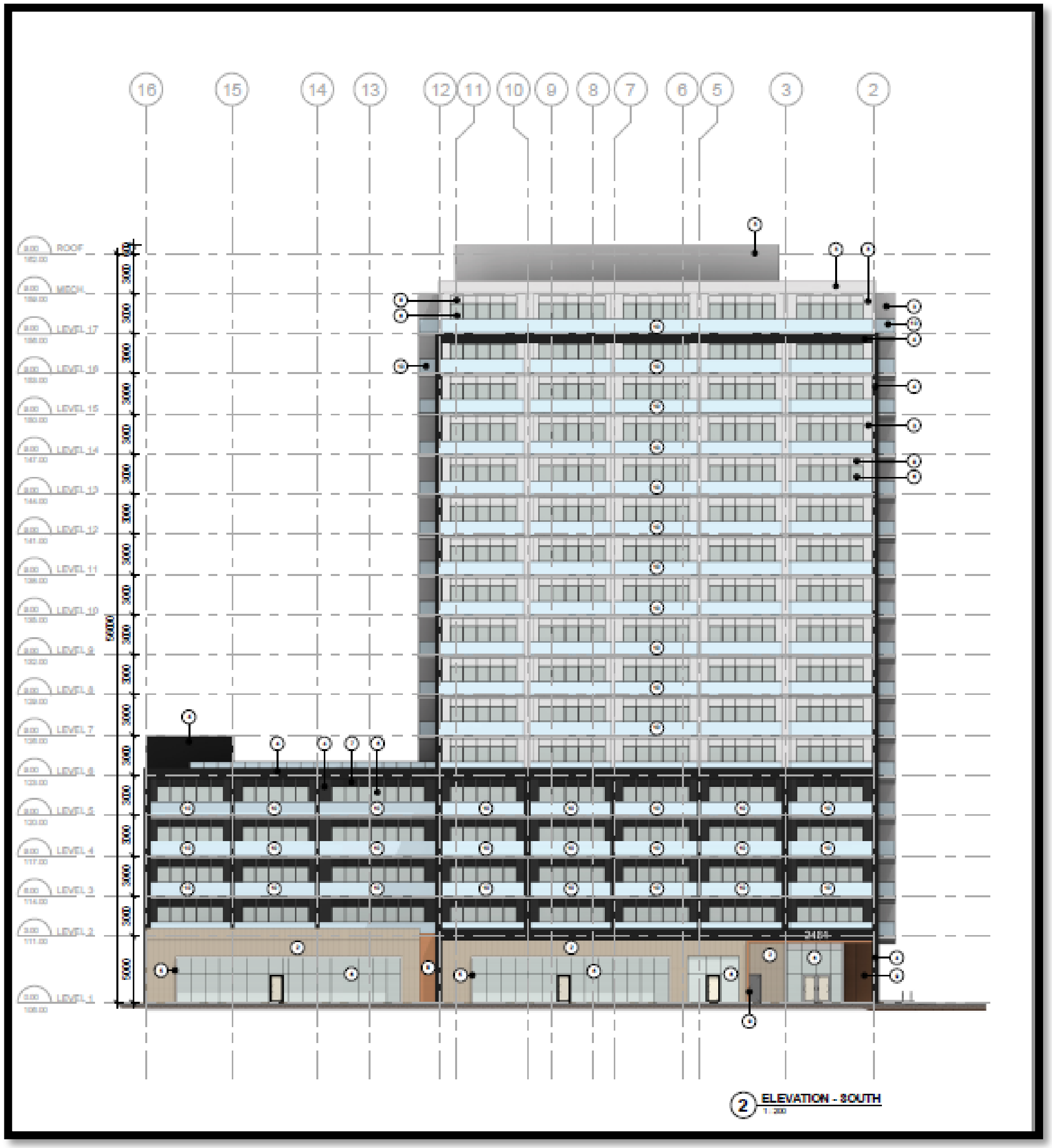


ANGULAR PLANE

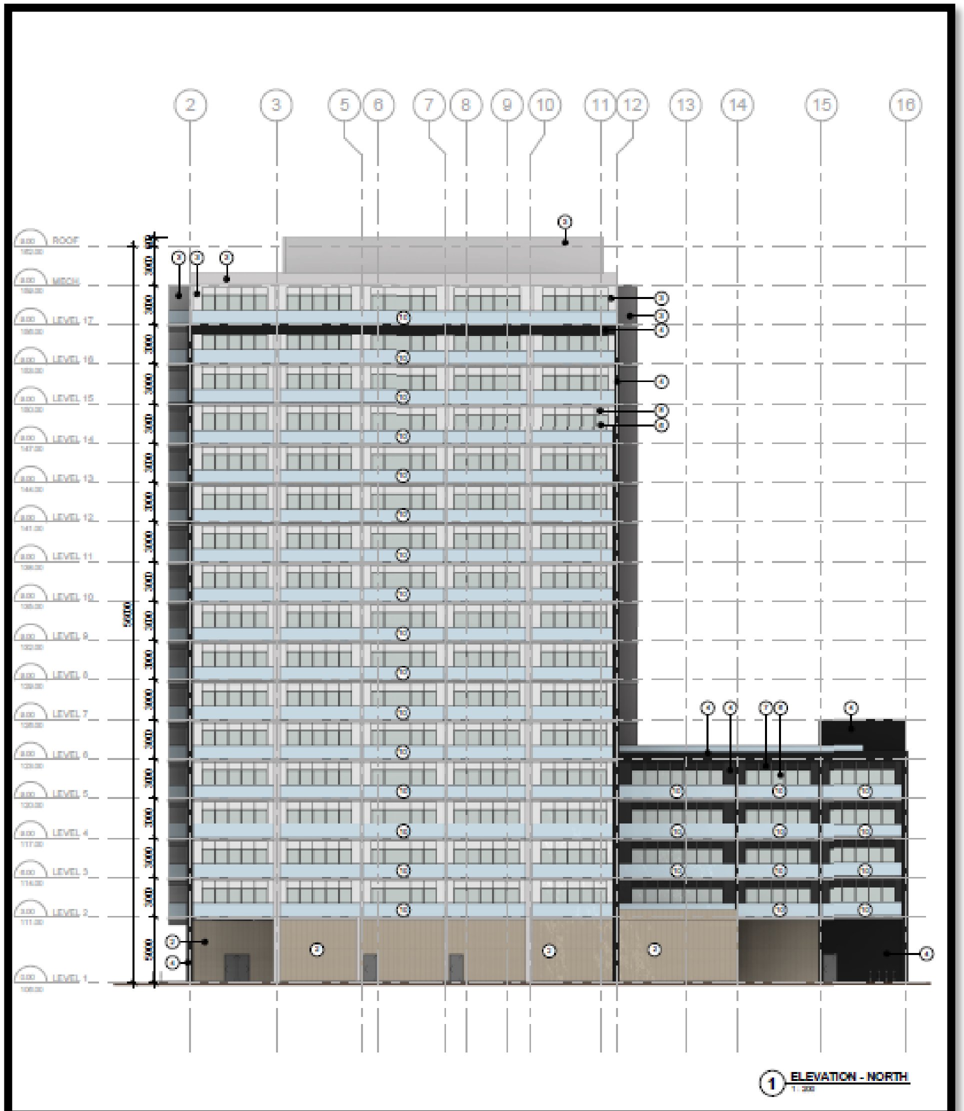


ELEVATIONS

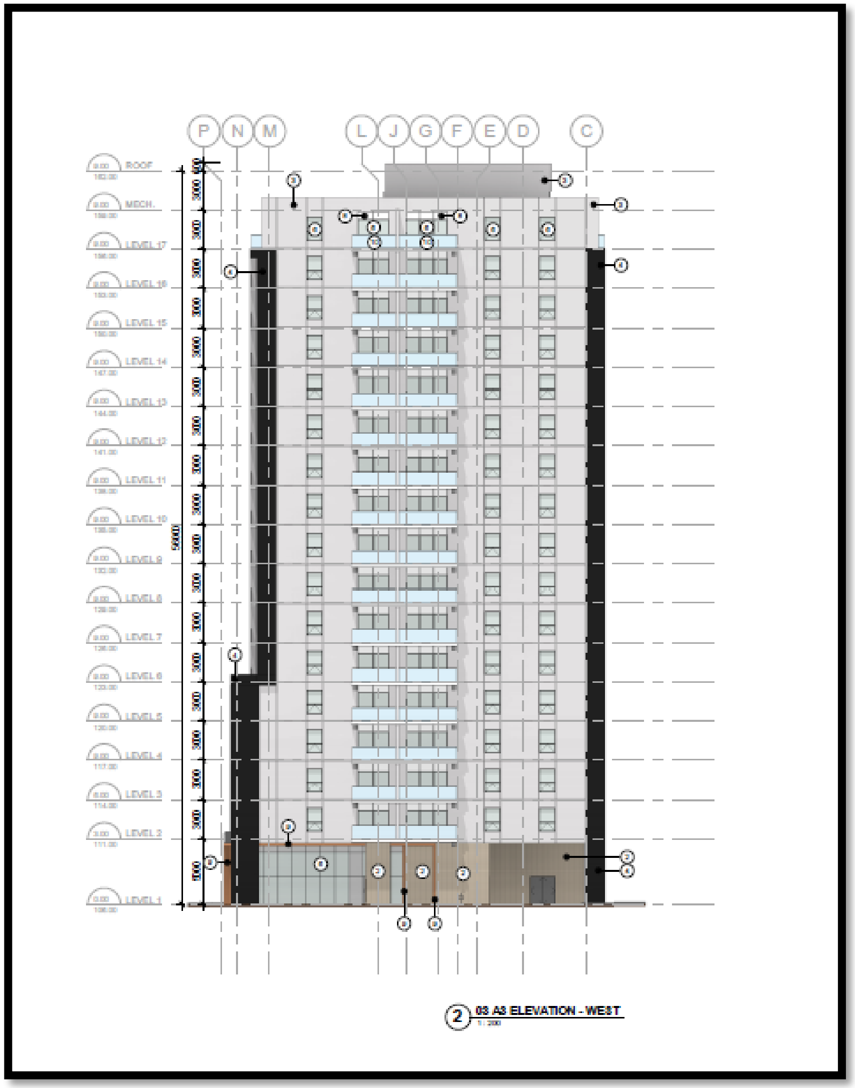
SOUTH ELEVATION



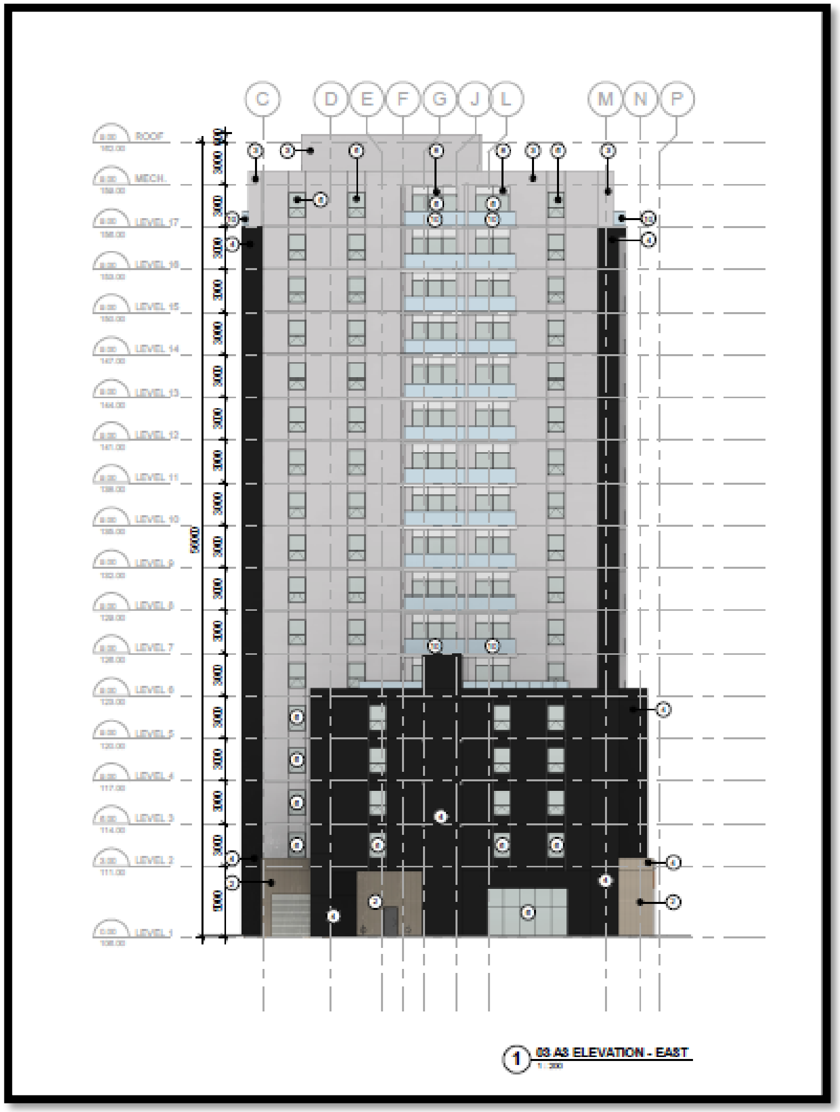
NORTH ELEVATION



WEST ELEVATION



EAST ELEVATION



RENDERINGS


2481


2481

SITE STATISTICS

SITE DATA 2481 Barton, Hamilton, ON

DATA		REQUIRED	PROVIDED
ZONING		ZONING - C4	
LOT AREA (m^2)		N/A	3,758 (m^2)
SETBACKS	FRONT YARD (m)	4.5 (m)	1.5 m
	INTERIOR SIDE YARD (m) - W	7.5 (m)	3.0 (m)
	INTERIOR SIDE YARD (m) - E	7.5 (m)	13.7 (m)
	REAR YARD (m)	7.5 (m)	21.05 (m)

BUILDING DATA

DATA	REQUIRED	PROVIDED
TOTAL DENSITY (# of units)	N/A	**207 UNITS** STUDIO < $50m^2$ = 28 (13.5%) 1BD + D > $50m^2$ = 104 (50.2%) 2 BEDS = 71 (34.3%) 3 BEDS = 4 (1.9%)
BUILDING AREA (m^2)	N/A	13,661 ft^2 (1,269 m^2)
GROSS FLOOR AREA (m^2)	N/A	170,042 ft^2 (15,797 m^2)
CONSTRUCTION FLOOR AREA (m^2) (including underground)	N/A	239,322 ft^2 (22,233 m^2)
NUMBER OF STOREYS	N/A	17 STOREY
BUILDING HEIGHT (m)	11m MIN. 40m MAX.	53 m
COMMERCIAL/RETAIL AREA (m^2)	N/A	COM. A = 2,299 ft^2 (214 m^2) COM. B = 2,810 ft^2 (261 m^2) **TOTAL = 5,109 ft^2 (475 m^2)**
AMENITY AREA (m^2)	1,186 m^2	INDOOR 1,360 ft^2 (126 m^2) OUTDOOR 9,388 ft^2 (872 m^2) BALCONIES 21,916 ft^2 (2,036m^2) **TOTAL = 26,061 ft^2 (2,421 m^2)**
LANDSCAPE AREA (percentage)	N/A	18.4 %
LANDSCAPE AREA (m^2)	N/A	7,433 ft^2 (690 m^2)

VEHICLE PARKING DATA

DATA	REQUIRED	PROVIDED
RESIDENTIAL PARKING Units >50 m^2 = 1 / unit MIN. Units <50 m^2 = 0.3 / unit MIN.	Units >50 m^2 = (179*1.0/ unit) 179 stalls Units <50 m^2 = (28*0.3 / unit) 8.4 stalls 179 + 8.4 = 187	Units >50 m^2 = (179 x 1.0/ unit) 179 stalls Units <50 m^2 = (28 x 0.3 / unit) 9 stalls *(- 10% Bicycle Parking) 187 – 18.7 = 168.3 (168) Provided stalls = 170 stalls
BARRIER FREE PARKING (included)	1 + 3% = 6 stalls (MIN.)	6 stalls (included above)
VISITOR PARKING	0.X / units	TBC
COMMERCIAL PARKING	2 Commercial units <450 m^2 = 0 stalls	0 stalls
PARKING PROVIDED	177 stalls	UG TOTAL = 140 stalls SURFACE = 30 stalls
TOTAL	**159 STALLS***	**170 STALLS**

BICYCLE PARKING DATA

DATA	REQUIRED	PROVIDED
SHORT TERM PARKING	10 STALLS	10 STALLS
LONG TERM PARKING	90 STALLS**	102 STALLS

EXTERIOR WALL STC RATINGS

EXTERIOR WALL STC RATINGS

Wall Configuration	EW1	EW2	EW3	EW4	EW1R	EW2R	EW3R	EW5	EW4R	EW6	EW7 EW5R	EW8
STC Rating	**38**	**40**	**43**	**46**	**47**	**48**	**49**	**54**	**55**	**57**	**58**	**62**

Source: National Research Council, Division of Building Research

NOTES:

1 The common structure of walls EW1 to EW5 is composed of 12.7mm gypsum board, vapour barrier and 38x89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.

- EW1 denotes the common structure, plus sheathing, plus wood siding or metal siding and fibre backer board
- EW2 denotes the common structure, plus rigid insulation (25 to 30 mm), and wood siding or metal siding and fibre backer board.
- EW3 denotes simulated mansard with the common structure, plus sheathing, 28 X89 mm framing, sheathing and asphalt roofing material
- EW4 denotes the common structure, plus sheathing and 20 mm stucco.
- EW5 denotes the common structure, plus sheathing, 25 mm air space, 100mm brick veneer.
- EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 100 mm back-up block 100 mm face brick.
- EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 140mm back-up block, 100 mm face brick.
- EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25 to 50 mm), 200 mm concrete.

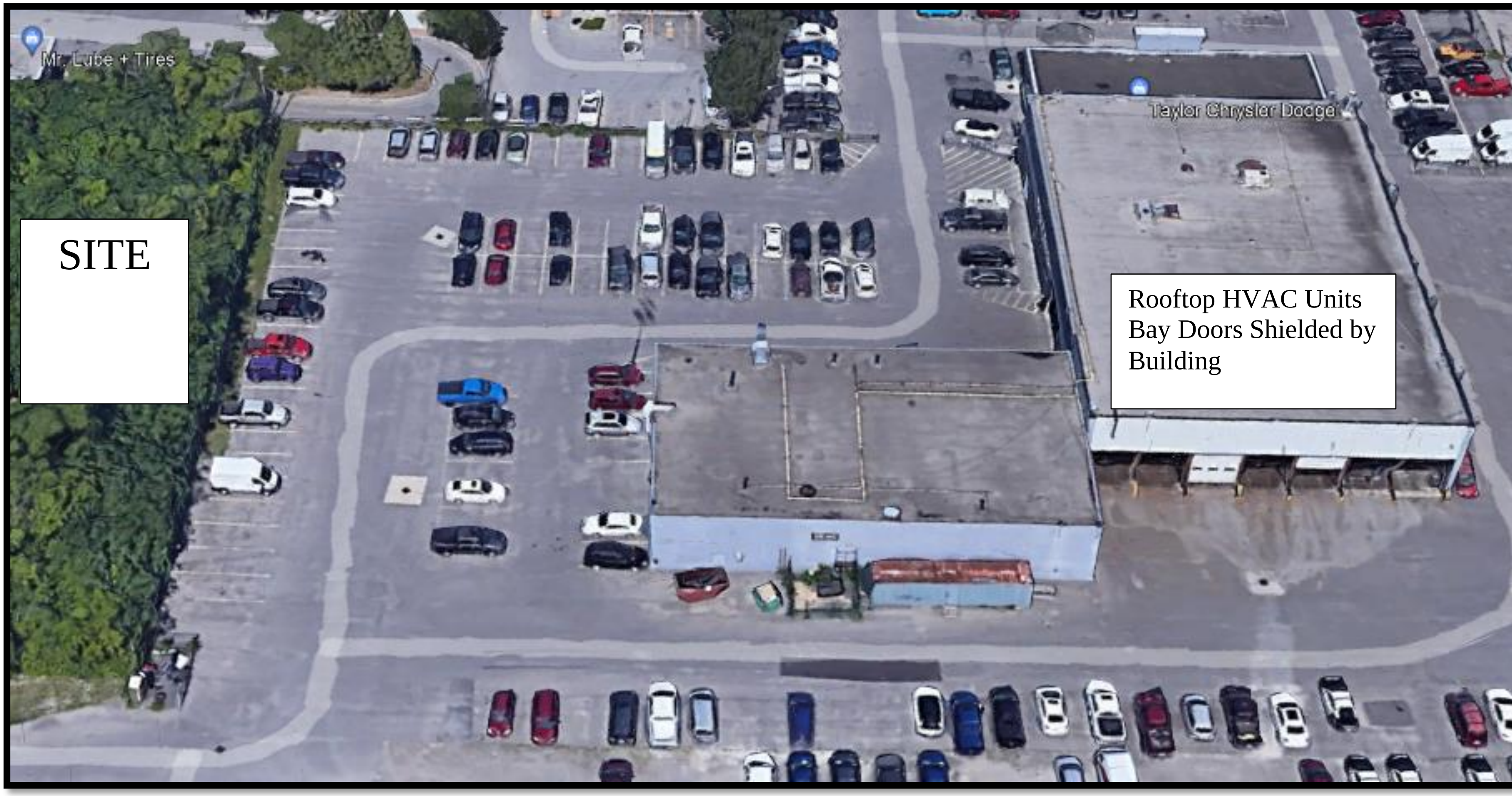
2 R signifies the mounting of the interior gypsum board on resilient clips.

3 An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25 to 50 mm), 25 mm air space, and 100 mm brick veneer has the same STC as EW6.

4 An exterior wall described in EW1 with the addition of rigid insulation (25 to 50 mm) between the sheathing and the external finish has the same STC as EW2.

APPENDIX "B"

AREA STATIONARY NOISE SOURCES


Mr. Lube + Tires
Taylor Chrysler Dodge
SITE
Rooftop HVAC Units
Bay Doors Shielded by
Building