283-285 MCLEOD STREET

DESIGN BRIEF

August 12, 2021

Zyer Developments

grc architects

VIEW LOOKING OUT FROM SITE

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SECTION 1

1.1 POLICY AND REGULATORY FRAMEWORK

City of Ottawa Official Plan

- Designated General Urban Area – planned as complete and sustainable communities including areas with a full range and choice of housing types, in combination with conveniently located employment, retail, service, cultural, leisure, entertainment and institutional uses.
- Redevelopment and intensification depend on factors such as existing built context, and proximity to major roads and transit. To achieve compatibility between existing and planned built form, emphasis is placed on good urban design and architecture.
- Generally supports low-rise heights in the General Urban Area, unless a Secondary Plan or the Zoning by-law establishes different heights.
- Infill development must respect urban design and compatibility policies. Proposals will be evaluated based on compatibility with the existing context and the planned function of the area.
- Requests for greater building heights will be considered under specific criteria including proximity to transit priority or rapid transit, urban design and compatibility, and a comprehensive review of impacts.

Secondary Plan and Community Design Plan

- Part of the Centretown Heritage Conservation District
- Buildings identified as ‘Category 2’ buildings
- The heritage character of both buildings has significantly changed due to demolition and/or additions

Site Specific Urban Design Objectives from pre-consultation meeting include:

- Part of the Residential designation
- Supports building heights up to 4 storeys along the McLeod Street frontage and building heights up to 9 storeys along the rear of the subject property.

Zoning

- The lands are zoned “Residential Fourth Density, Subzone UD” with an exception (478) on the lands at 283 McLeod Street, and “Residential Fourth Density, Subzone UD” with an exception (479) on the lands at 285 McLeod Street.
- Exception 478 and 479 both allow dwelling units as additional permitted land uses on the subject lands.
- The maximum building height within the R4UD zone is 14.5 metres.
- A Zoning By-law Amendment is proposed to permit an increased maximum building height and address other site-specific amendments.

283-285 MCLEOD - PROJECT INFORMATION	
Municipality	**City of Ottawa**
Address	**283-285 McLeod Street**
Neighbourhood	**Centretown**
Ward	**14, Somerset**
Lot Area	**832.38m2**
Zoning By-Law	**By-law No. 2008-250**
Zone	**R4UD[478] & R4UD[479] – Residential Fourth Density, Subzone UD**
Adjacent Zoning	**R4**
Other	**Mature Neighbourhoods Overlay, Centretown Heritage Conservation District, Inner Greenbelt Development Charges, Downtown Urban Design Strategy Area, Secondary Plan/Community Design Plans (Centretown)**
Transit Buffer	**Less than 250 metres from identified Bank Street Transit Priority Corridor as per Schedule D of the Official Plan**
Zoning Schedule 1A	**Area X**
Proposed Use	**Residential**

SECTION 2

2.1 MASSING AND SCALE

PROPOSED BUILDING

EXISTING/APPROVED BUILDINGS OF SIMILAR OR GREATER HEIGHT

PROPOSED BUILDING

EXISTING/APPROVED BUILDINGS OF SIMILAR OR GREATER HEIGHT

PROPOSED BUILDING

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PROPOSED BUILDING

EXISTING/APPROVED BUILDINGS OF SIMILAR OR GREATER HEIGHT

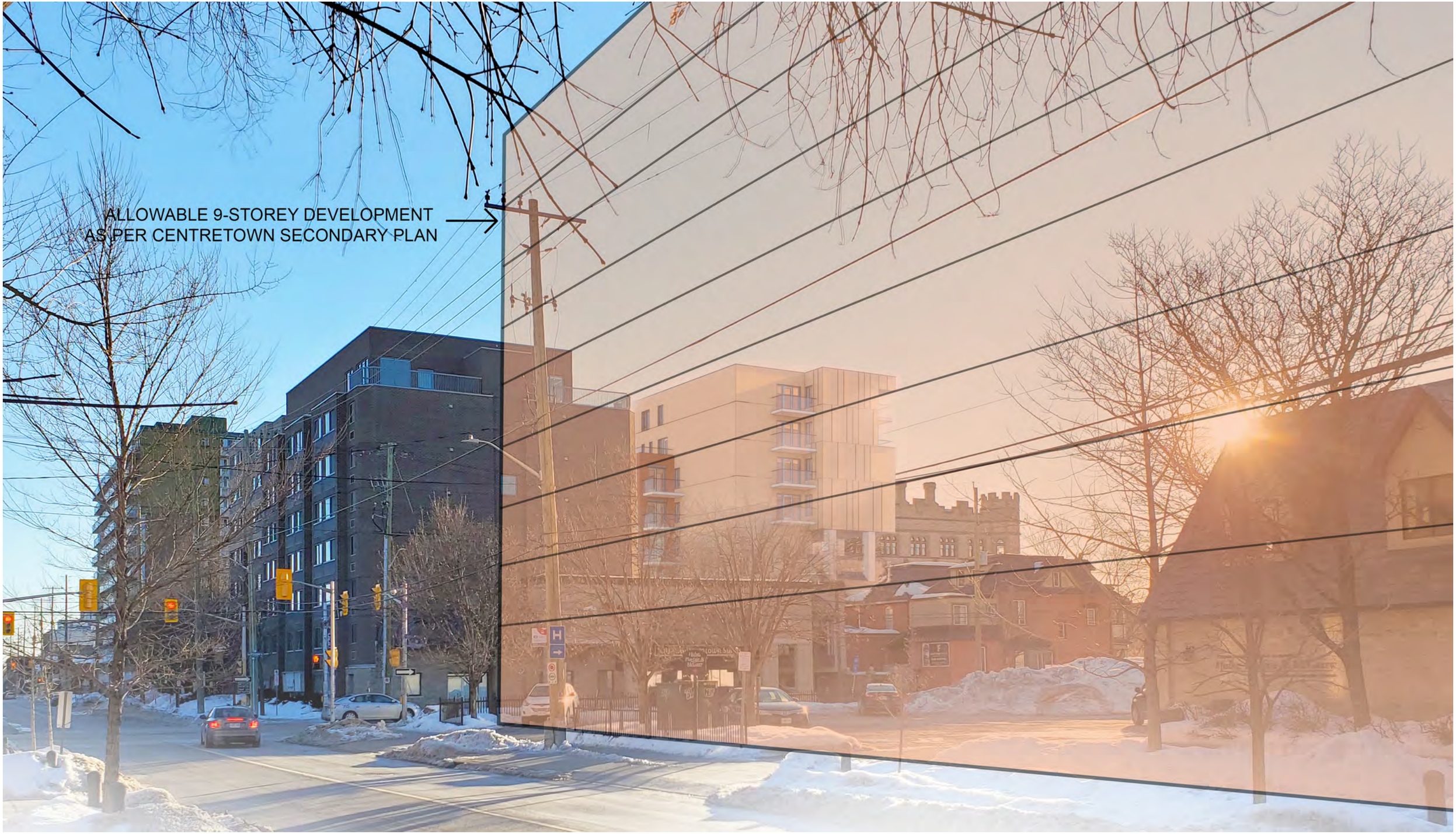
FUTURE 9-STOREY CONTEXT (AS PER CENTRETOWN SECONDARY PLAN)

2.1 MASSING AND SCALE | SOUTH-WEST VIEW (FROM O'CONNOR & MCLEOD)

2.1 MASSING AND SCALE | SOUTH-EAST VIEW (FROM MCLEOD)

283-285 MCLEOD STREET
Ottawa, Ontario

grc architects
August 12, 2021


ALLOWABLE 9-STOREY DEVELOPMENT
AS PER CENTRETOWN SECONDARY PLAN

2.1 MASSING AND SCALE | NORTH-EAST VIEW (FROM GLADSTONE & METCALFE)

283-285 MCLEOD STREET
Ottawa, Ontario

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August 12, 2021

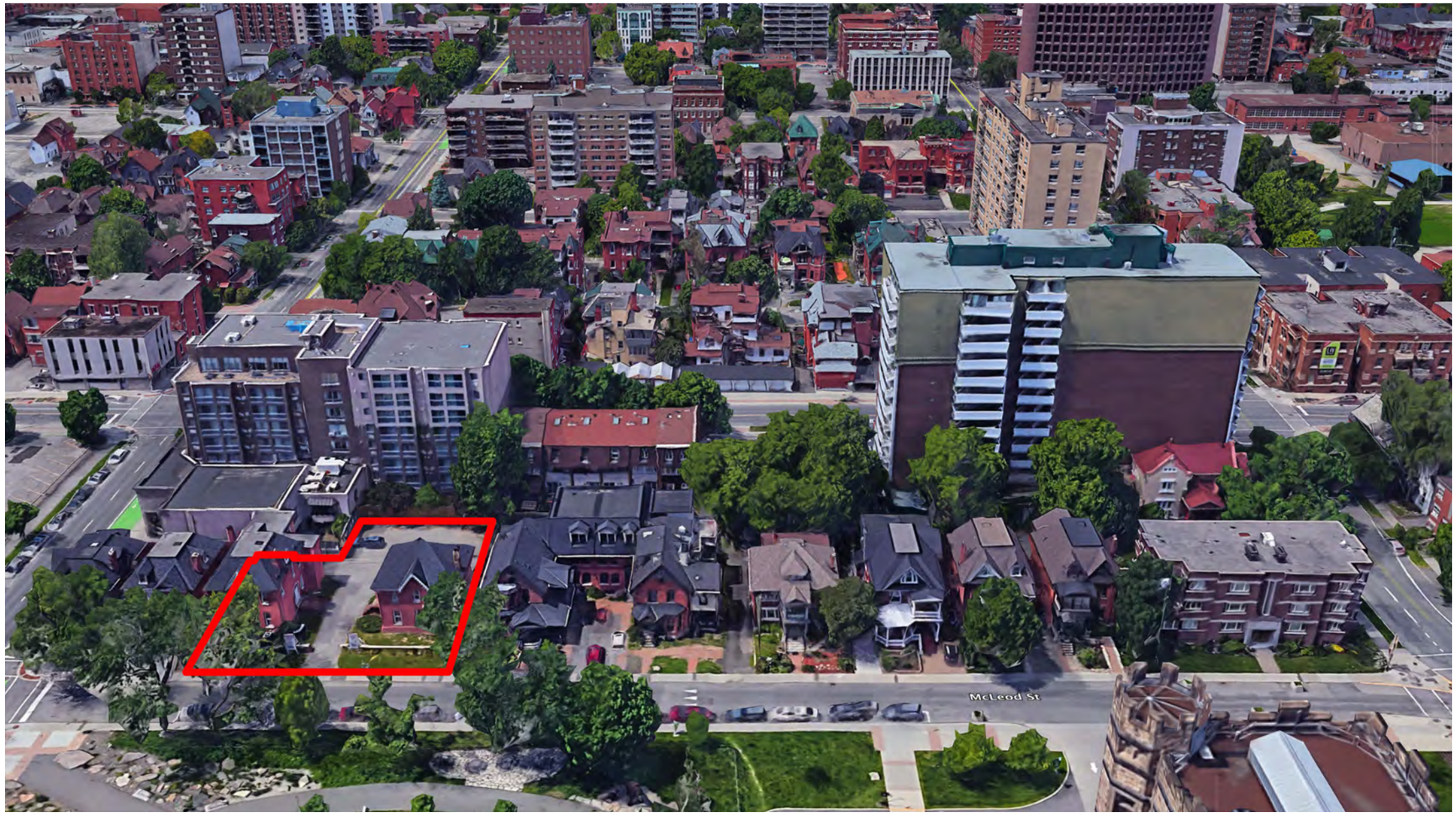
2.1 MASSING AND SCALE | NORTH-EAST VIEW (FROM GLADSTONE & METCALFE)

Existing Site Context

Centretown is a mostly residential neighbourhood developed mainly between 1890 and 1914. The neighbourhood was built to provide housing within walking distance of Parliament Hill and nearby government offices for the expanding civil service. Centretown is one of the oldest residential neighbourhoods in Ottawa and has strong historical ties to Ottawa's role as the national capital. The majority of the central area of Centretown has been designated as a Heritage Conservation District

The central area is a complex urban neighbourhood comprised of a diversity of uses and places. The area is generally characterized by a mix of smaller scale low and mid-rise buildings. Over the years, a number of larger apartment buildings have been introduced in the area and many of the heritage homes have been converted to multi-use apartments and commercial businesses. The increase in density and high level of conversion, as well as the role of Bank and Elgin Streets as commercial corridors, has transitioned the area from an area dominated by large single detached homes to a highly mixed-use apartment neighborhood. While the Centretown landscape continues to evolve with buildings of greater height and size, the sensitivity of respecting the scale of the structures, the quality of the buildings and the completeness of the streetscape make walking in this part of Centretown one of the best pedestrian experiences of the downtown. The intensification of residential and mixed-used development continues to fuel the urban and economic vibrancy in this area.

The site is located in the central area of Centretown on the north side of McLeod St., between O'Connor and Metcalfe streets facing the Canadian Museum of Nature property. The built context along this section of McLeod St. dates between pre-1888 through to the late 1930's. It is fairly consistent in that the residences are typically 2 ½ storeys in height, brick clad, with one or two storey porches, bay windows, with gables facing the street. The building styles range from vernacular Victorian, Queen Anne, Edwardian, Prairie and Art Deco (Appin Apartment). The majority of the buildings on the street relate to an important time period in the development of Centretown between the 1870's to 1912 when the Victoria Memorial Museum was constructed, through to the widespread introduction of apartment buildings in the 1930's. This section of McLeod St. has a consistent streetscape of buildings set back uniformly from the property line. The buildings generally address the street with sidewalks extending from front entrance porches with grassed and landscaped front yards.



Existing Property and Buildings

The property at 283-285 McLeod St. consists of two existing residential buildings on a double lot that is paved and predominately used for parking. The buildings are set along the east and west property lines with a common central entrance laneway that provides access to the parking area at the rear of the lot. There is a grassed front yard with low modern brick retaining walls separating the buildings from the street.

The two buildings on the property consist of a 2 ½ storey single family residence constructed between 1901-1911 (285 McLeod) and a 2 ½ storey single family residence constructed between 1925 – 1946 (283 McLeod). Both buildings were significantly altered in the 1970's.

Transition to Adjacent Uses

The project consists of a low-rise built form along McLeod St. with a mid-rise built form setback to preserve the vernacular residential character along McLeod St.

Low-Rise Portion of the Building

The low-rise portion of the building consists of the existing 2 ½ storey restored building at 285 McLeod, a new 3 storey residential scale built form replacing the existing building at 283 McLeod, and a new 1½-storey built form for the car elevator to allow for access to indoor parking.

The existing building at 285 McLeod will be restored to its original appearance and detailing circa early 1900's to compliment the two similar historic single-family residences at 287 & 289 McLeod. The building will contain one 3 storey residential unit accessed directly from McLeod St. The new 3-storey built form, replacing 283 McLeod, will contain two 2-storey single family residential units accessed directly from McLeod St., with a recessed main entrance to midrise portion of the building located. The scale and massing of the 3-storey built form, and the facade materials and fenestration patterns, are designed to be in keeping with the restored building at 285 McLeod and the adjacent historic residential buildings along McLeod St. The new 1½-storey built form for the car elevator, located between the 3-storey built form and the restored building at 285 McLeod, is recessed from the front facades and similar in scale and massing to a residential garage structure.

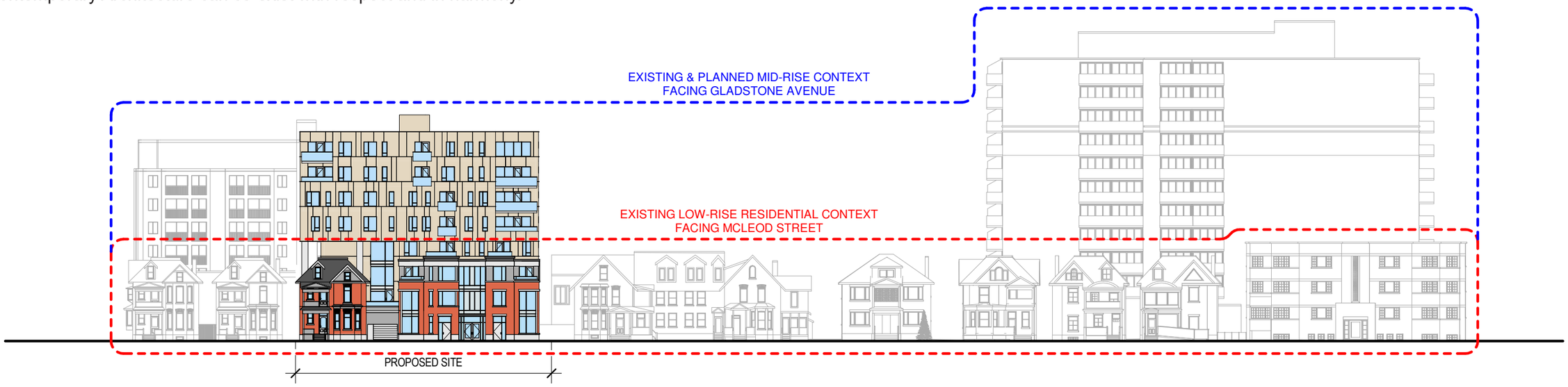
Mid-Rise Portion of the Building

The front façade of the mid-rise portion of the building is setback 6.1m from the front property line and is recessed 3.35m from the low-rise portion of the building, preserving the vernacular character on McLeod Street.

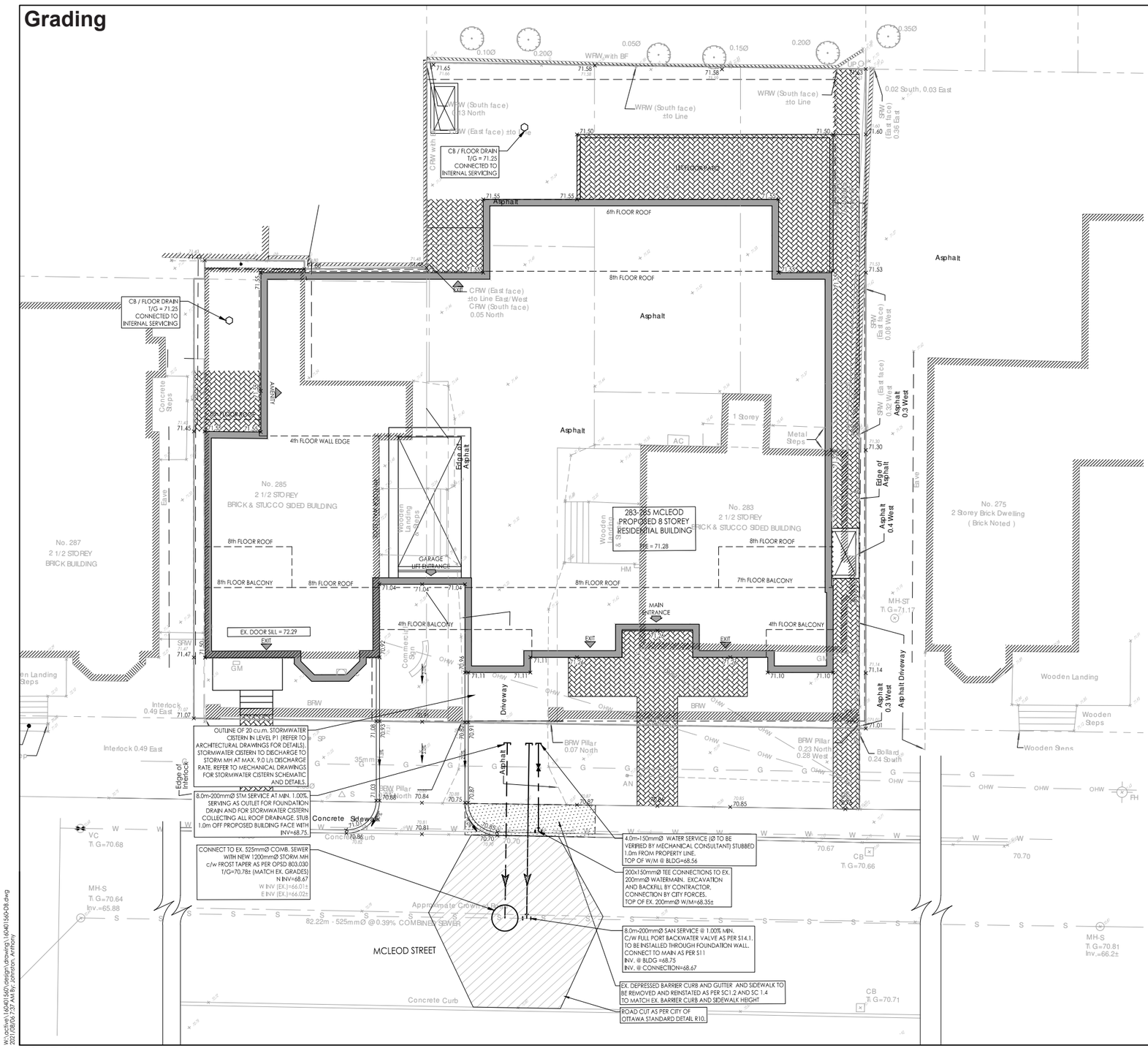
The mid-rise is built over the existing building at 285 McLeod, spaced one floor apart from the heritage roof and approximately the same distance away on the side. The cavity creates 'breathing room' for the heritage structure to appear as a free-standing house. The new built-form frames 285 McLeod celebrating its heritage glory. The top floors of the mid-rise are further carved away, articulated with balconies to soften the upper corners of the building.

The north (rear) side of the building has a 6m setback with another 3.3m step back at the 7th and 8th floors. The step back transition creates a large roof balcony for the apartment units on the adjacent 6th floor.

Unlike the existing 12-storey apartment building on the east end of McLeod Street which also faces the Canadian Museum of Nature property, the design respects the pedestrian scale of the street. Setbacks, step backs and the architectural articulation are carefully considered to shape the building to fit on the street in a complimentary and non-intrusive manner. The scale and massing of the 8-storey building is sensitive with modesty for a new development in the neighbourhood's context (other proposed developments in the immediate surroundings are much greater in size, scale and height). The built form of the project as a whole, preserves the lower scale massing of a street friendly fabric. The mid-rise is expressed in a contemporary architectural language, sensitively setback from the street to showcase the heritage charm in the foreground. The design promotes that Heritage and Contemporary Architecture can co-exist with respect and in harmony.



Grading



150mmØ WATERMAIN			
STATION	FINISHED GRADE	TOP OF W/M	ITEM
0+000	82.67	80.970	150mm x 150mm TEE
0+002	82.74	80.950	45° HORIZONTAL BEND
0+004.3	82.84	80.900	45° HORIZONTAL BEND
0+010	82.92	80.520	TOP OF PIPE
0+012.5	83.00	80.600	45° VERTICAL BEND CROSSING STORM AS PER W25.2 AND W22.
0+013.5	83.04	81.000	45° VERTICAL BEND CROSSING STORM AS PER W25.2 AND W22.
0+014.5	83.08	81.660	WATER CROSSING OVER STORM SEWER
0+015.5	83.07	81.660	45° VERTICAL BEND CROSSING STORM AS PER W25.2 AND W22.
0+016.5	83.06	80.660	45° VERTICAL BEND CROSSING STORM AS PER W25.2 AND W22.
0+020	83.02	80.620	TOP OF PIPE
0+040	83.14	80.740	TOP OF PIPE
0+060	83.33	80.930	TOP OF PIPE
0+063.6	83.40	81.000	45° HORIZONTAL BEND
0+075.6	83.44	81.040	150mmØ VALVE AND VALVE BOX
0+077.6	83.60	81.200	FIRE HYDRANT

SCHEDULE OF ROOF RELEASE RATES				
DRAIN TYPE	TRIBUTARY AREA ID	# OF DRAINS	100YR Head (m)	100YR RELEASE RATE (L/s)
WATTS ACCUFLOW (75% OPEN)	ROOF 1	4	0.141	6.0
WATTS ACCUFLOW (75% OPEN)	ROOF 3	4	0.145	6.1
WATTS ACCUFLOW (50% OPEN)	ROOF 4	4	0.149	5.0
WATTS ACCUFLOW (75% OPEN)	ROOF 5	6	0.145	9.2

SEWER AND WATERMAIN CROSSING TABLE						
CROSSING	STM INV	STM OBV	SAN INV	SAN OBV	WTR TOP	WTR BTM
1	80.24 (80.17)	80.54 (80.41)	79.46	79.66		
2	79.95 (79.88)	80.25 (80.32)	79.14 (79.07)	79.37 (79.44)	80.97	80.82
3	79.67 (79.60)	79.97 (80.04)	78.94 (78.84)	79.14 (79.21)	80.69	80.54
4			79.59	79.79	80.65	80.50
5	80.71	81.01			81.66	81.51

* BRACKETS DENOTE ADJUSTED VALUE WITH CONCRETE PIPE THICKNESS

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- PROPOSED WATERMAIN
- PROPOSED VALVE AND VALVE BOX
- PROPOSED VALVE CHAMBER
- PROPOSED REDUCER
- PROPOSED FIRE HYDRANT
- PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- PROPOSED CATCHBASIN
- CIRCULAR ORIFICE (SEE ICD TABLE ON SSP-1 AND SD-1)
- EX/FUT. WATERMAIN
- EXISTING/FUTURE VALVE AND VALVE BOX
- EXISTING/FUTURE VALVE CHAMBER
- EXISTING/FUTURE REDUCER
- EXISTING/FUTURE FIRE HYDRANT
- EXISTING/FUTURE SANITARY SEWER
- EXISTING/FUTURE STORM SEWER
- EXISTING/FUTURE CATCHBASIN MANHOLE
- EXISTING/FUTURE CATCHBASIN
- DC — PROPOSED DEPRESSED CURB LOCATIONS
- PROPOSED BARRIER CURB
- THERMAL INSULATION ON STORM SEWER WHERE COVER IS LESS THAN 1.5m. THERMAL INSULATION ON WATERMAIN WHERE COVER IS LESS THAN 2.4m AS PER W22.
- M — WATER METER
- RM — REMOTE WATER METER
- ROAD CUT AS PER CITY OF OTTAWA STANDARD DETAIL R10

Notes

1. ALL CATCH BASINS AND TRENCH DRAINS TO BE CONNECTED TO INTERNAL PLUMBING AND COLLECTED IN STORM WATER MANAGEMENT CISTERN. INSTALLATION BY OTHERS.
2. FINAL METER AND REMOTE METER LOCATINS TO BE CONFIRMED BY MECHANICAL CONSULTANT.
3. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR THEIR PROTECTION AND THE IMPLEMENTATION OF ANY NECESSARY PROCEDURES CALLED FOR IN THE APPROPRIATE STANDARD AND REGULATIONS.
4. INTERNAL PLUMBING AND SUMP PUMPS TO BE DESIGNED BY THE MECHANICAL CONSULTANT.
5. STORMWATER MANAGEMENT TO BE PROVIDED THROUGH A 52m³ CISTERN LOCATED IN THE UNDERGROUND PARKING.
6. BOOSTER PUMPS TO BE PROVIDED TO MAINTAIN MINIMUM PRESSURES FOR TOWERS 6-STOREYS AND HIGHER.

Client/Project
ZYER DEVELOPMENTS

CENTRETOWN
283-285 McLEOD STREET
OTTAWA, ON, CANADA

Title
SITE SERVICING
AND GRADING PLAN

Project No.	Scale	
160401560	1:100 (0 1 3 5m)	
Drawing No.	Sheet	Revision
SSGP-1	1 of 3	1

PLAN #

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2021/08/06 7:57 AM By: Johnston, Anthony

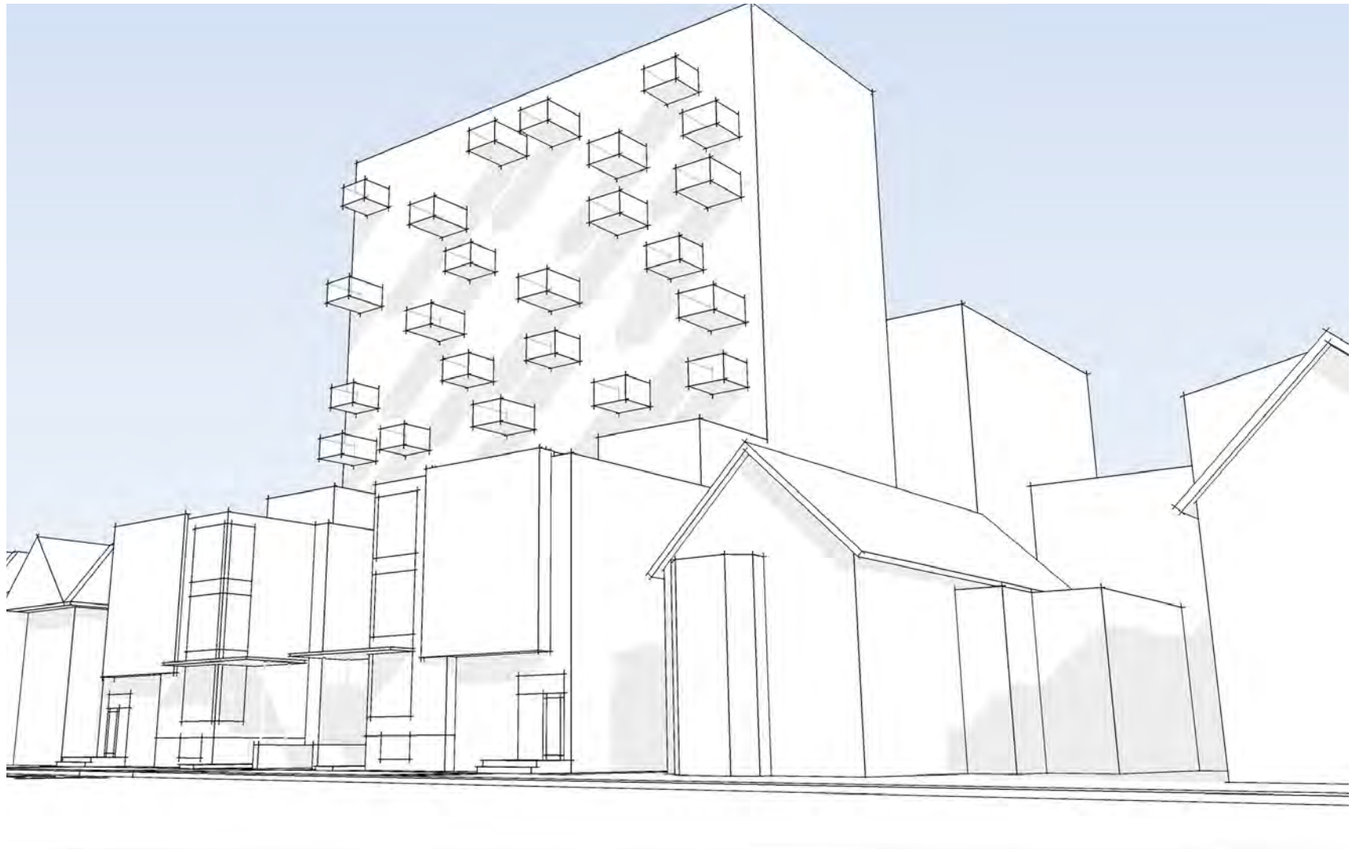
ORIGINAL SHEET - ARCH D

Alternative Building Massing

The project had explored several design options. The previous (alternate) massing designs became unviable upon preliminary review with the City and consultation with the neighbours; notably:

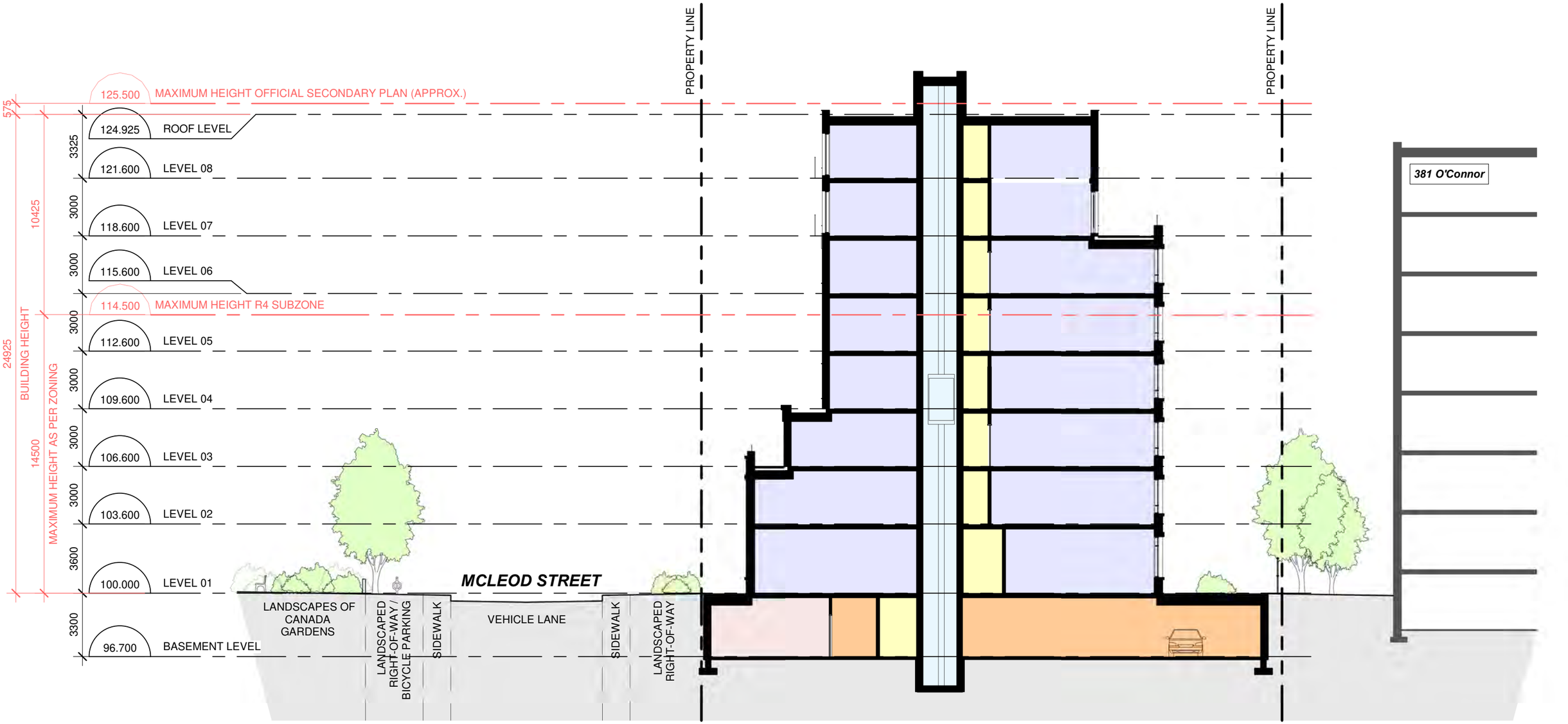
- different building massing up to 9 Stories
- 8 storey building with no step-back on the north side
- different siting on property including a 0 setback design on the north (rear) property
- preservation of both existing 283 and 285 buildings and demolition of both existing 283 and 285 buildings

0m Setback at East/North/West Property Lines Proposal
Prepared by Barry Padolski, 2019



9-Storey Proposal with Demolition of 283-285 McLeod and 2m Setback at North Property LIne
Prepared by Colizza Bruni, 2018

2.2 PUBLIC REALM



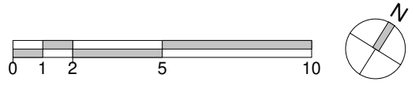
LEGEND

AMENITY	PARKING	SERVICE & STORAGE
CORRIDOR	RESIDENTIAL	VERTICAL CIRCULATION

0 1 2 5 10

corridor

GROUND FLOOR PLAN



Relationship to Public Realm

The current development contains many positive attributes through rigorous design sessions with urban planners, and listening /responding to the comments from a public consultation meeting with the neighbours.

The notable features include:

- Preservation of a scale-appropriate streetscape with improvements to enhance the Heritage fabric
- Restoring 285 McLeod back to its original character
- Walk-up Apartments with street-facing front doors
- The large 'gap' looking into a parking lot between the existing 283 and 285 McLeod has been eliminated, with the scale of the new development being more consistent with the character of the houses on the street
- Widened laneway for the neighbour: the side yard setback along the east property line is preserved. This will continue to enable the adjacent neighbour to use the project's property as a widened laneway for their access to parking and garbage removal
- 6m wide Rear Yard Setback: maintaining the backyard open-space corridor consistent with the entire block
- Respecting Privacy: Outdoor amenity spaces located on the ground floor will be fenced or landscaped to offer privacy to the adjoining neighbours. The large second floor roof terrace is located on the McLeod Street side, 'sandwiched' within the built-form of the development, controlling visual and noise privacy.
- The number of parking spaces provided meets zoning requirements
- Pedestrian Friendly Design: The design is aimed to be pedestrian friendly for the residents, neighbours or people walking along McLeod Street
- The 30-apartment unit count allows the economic viability to develop a wide variety of unit mix that are also conducive to family living, which is a much-needed type of rental living in the urban core of the city. The envisioned demographics of the residents will also contribute to the community as whole.
- Commitment to a Sustainable Design
- Negligible to No Shadow impact – one concern expressed by the neighbours during the Public Community meeting was the shadow impact on their backyards. The preservation of the rear open-space corridor with the 6m setback mitigates shadow impact onto the neighbours with the exception of the winter months during sunset hours.
- A 'backyard' will be designed as common amenity space for the residents. Semi-private patios are provided for the northern ground floor apartment units.
- The outdoor space adjacent to the Wellness Room on the ground floor will be designed with hard and soft landscape treatment.

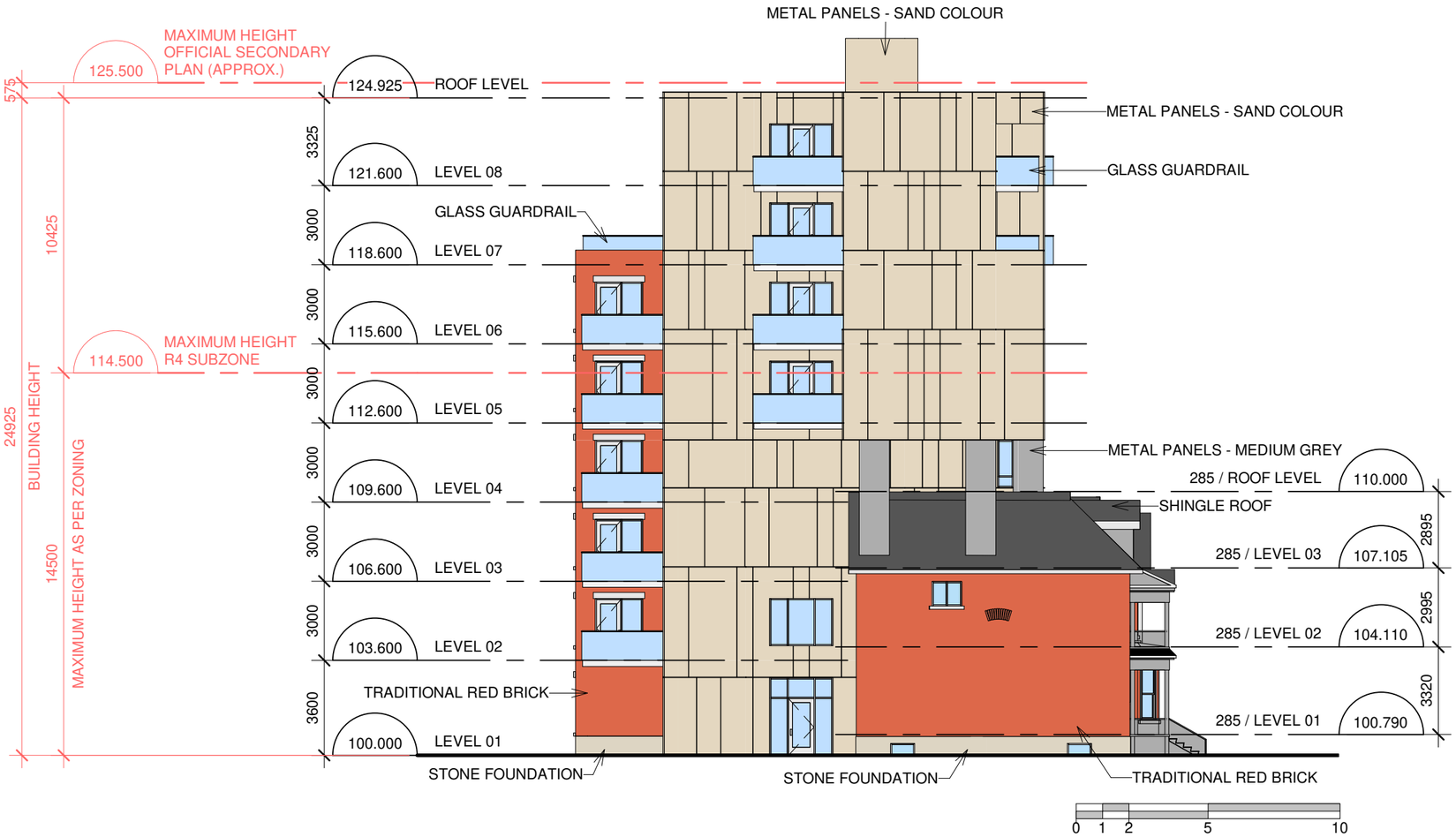
The 3-storey building facades fronting McLeod Street will align with the facades of the adjacent buildings to form a consistent street-fronting edge. Landscape treatment will articulate the walkways to the residential units with autonomy. The landscaping is intended to connect with the City's property creating a seamless transition and a united landscape strip along McLeod Street.

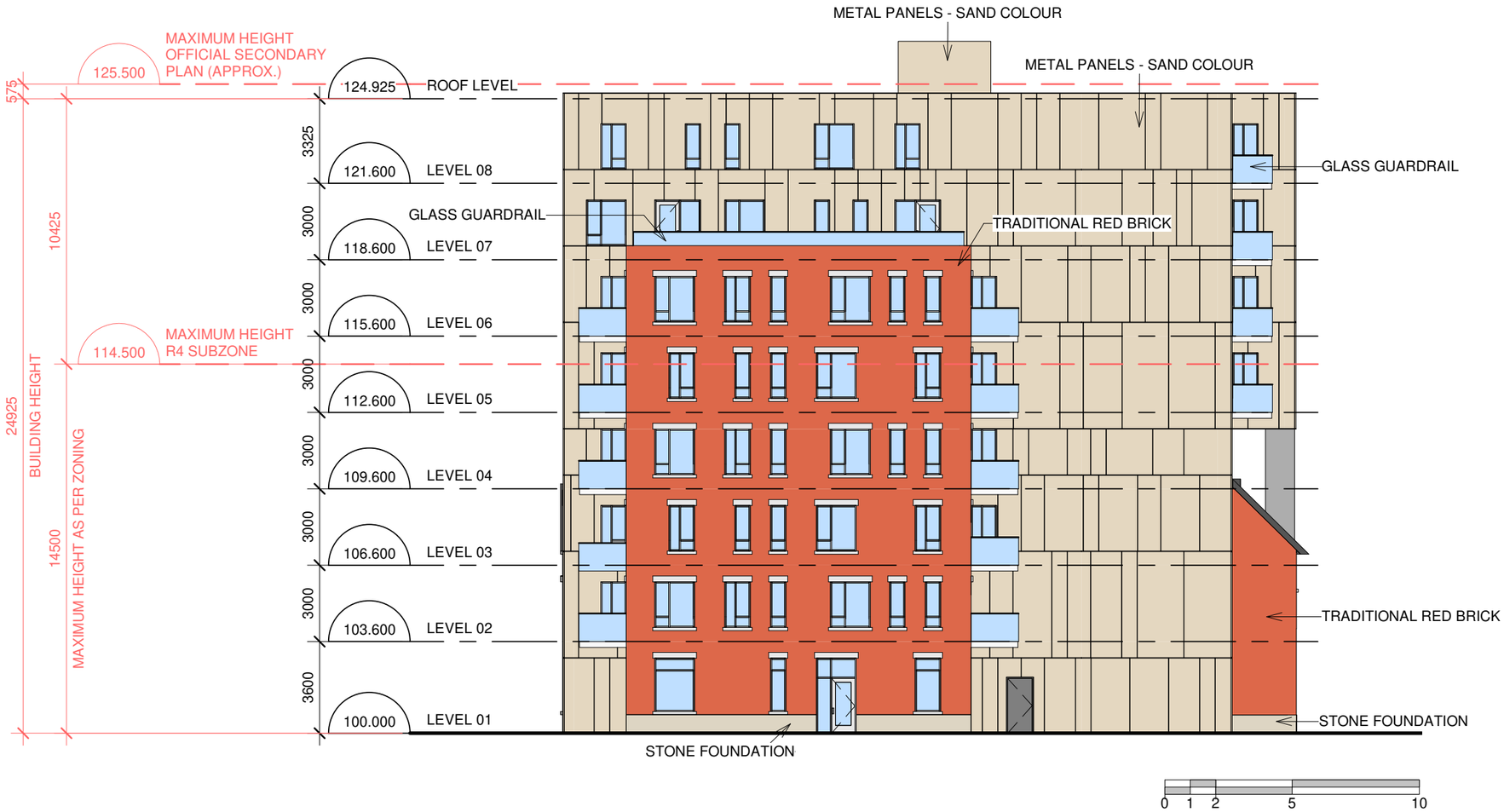
The entrance driveway leading to a recessed car elevator parking structure has also been designed to be of a residential scale and character in keeping with the typical driveways along McLeod.

The elevated terrace on the 2nd floor over the recessed car elevator provides a common amenity space that enjoys a specular view of the Landscapes of Canada Gardens and the Canadian Museum of Nature.

Refer to Section 2.5 Heritage for additional information regarding the restoration of the existing building at 285 McLeod and the design of the new low-rise portion of the building.

2.3 BUILDING DESIGN


MAXIMUM HEIGHT
OFFICIAL SECONDARY
PLAN (APPROX.)
125.500
575
MAXIMUM HEIGHT
R4 SUBZONE
114.500
24925
BUILDING HEIGHT
10425
14500
MAXIMUM HEIGHT AS PER ZONING
124.925
ROOF LEVEL
121.600
LEVEL 08
118.600
LEVEL 07
115.600
LEVEL 06
112.600
LEVEL 05
109.600
LEVEL 04
106.600
LEVEL 03
103.600
LEVEL 02
100.000
LEVEL 01
3325
3000
3000
3000
3000
3000
3600
METAL PANELS - SAND COLOUR
METAL PANELS - SAND COLOUR
GLASS GUARDRAIL
GLASS GUARDRAIL
METAL PANELS - MEDIUM GREY
285 / ROOF LEVEL
110.000
SHINGLE ROOF
285 / LEVEL 03
107.105
285 / LEVEL 02
104.110
285 / LEVEL 01
100.790
2895
2995
3320
TRADITIONAL RED BRICK
STONE FOUNDATION
STONE FOUNDATION
TRADITIONAL RED BRICK
0 1 2 5 10


METAL PANELS - SAND COLOUR
METAL PANELS - SAND COLOUR
MAXIMUM HEIGHT
OFFICIAL SECONDARY
PLAN (APPROX.)
125.500
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124.925
ROOF LEVEL
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121.600
LEVEL 08
GLASS GUARDRAIL
3000
118.600
LEVEL 07
TRADITIONAL RED BRICK
3000
115.600
LEVEL 06
MAXIMUM HEIGHT
R4 SUBZONE
114.500
3000
112.600
LEVEL 05
24925
BUILDING HEIGHT
3000
109.600
LEVEL 04
14500
3000
106.600
LEVEL 03
MAXIMUM HEIGHT AS PER ZONING
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103.600
LEVEL 02
10425
3600
100.000
LEVEL 01
GLASS GUARDRAIL
TRADITIONAL RED BRICK
STONE FOUNDATION
STONE FOUNDATION
0 1 2 5 10

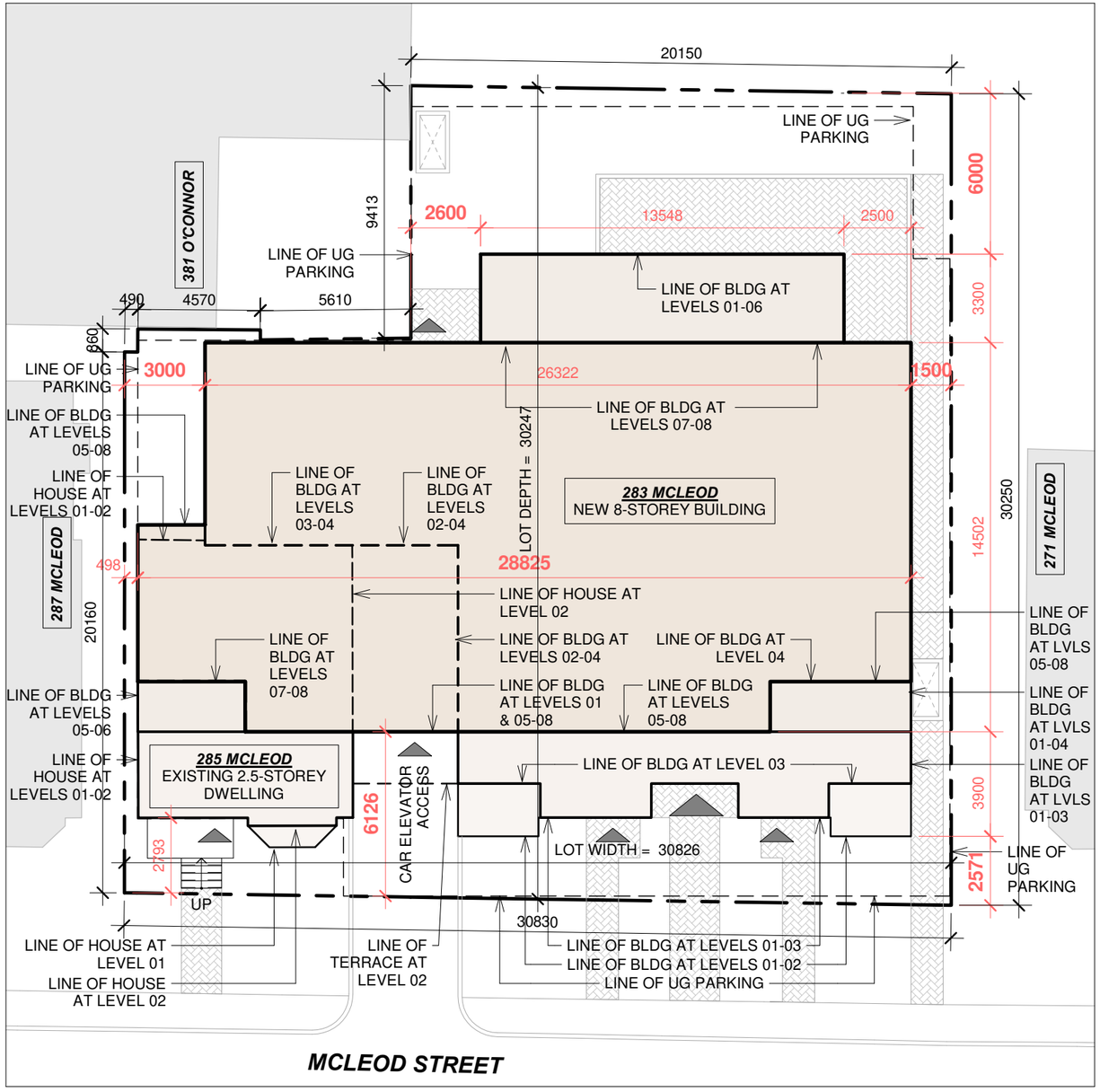

METAL PANELS - SAND COLOUR
GLASS GUARDRAIL
GLASS GUARDRAIL
METAL PANELS - DARK GREY
METAL PANELS - LIGHT GREY
METAL PANELS - MEDIUM GREY
TRADITIONAL RED BRICK
STONE FOUNDATION
GLASS GUARDRAIL
TRADITIONAL RED BRICK
STONE FOUNDATION
ROOF LEVEL 124.925
LEVEL 08 121.600
LEVEL 07 118.600
LEVEL 06 115.600
LEVEL 05 112.600
LEVEL 04 109.600
LEVEL 03 106.600
LEVEL 02 103.600
LEVEL 01 100.000
3325
3000
3000
3000
3000
3000
3600
MAXIMUM HEIGHT OFFICIAL SECONDARY PLAN (APPROX.) 125.500
MAXIMUM HEIGHT R4 SUBZONE 114.500
575
11000
14500
MAXIMUM HEIGHT AS PER ZONING
24925
BUILDING HEIGHT
0 1 2 5 10

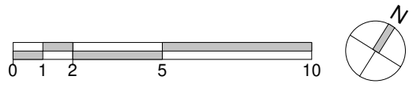
ZONING INFORMATION - R5B ZONING

Provision	Required	Proposed
Minimum Lot Width	22.5m	30.83m
Minimum Lot Area	675m²	832m²
Maximum Groos Floor Area (GFA)	No maximum	100m² existing / 2070m² new
Maximum Building Height	Maximum building height is either shown with an H(#) on the Zoning Map, on a Schedule or in the exception zone	24.90m
Minimum Front Yard Setback	3.0m May be reduced to 1.5m (per Section 123)	2.29m
Minimum Interior Yard Setback	Abutting an R4 zone: 7.5m	0.50m on West side 1.50m on East side
Minimum Rear Yard Setback	Equal to 25% of the lot depth 30.25 metres x 25% = 7.5m	6.00m
Additions	An addition to a building in an area to which a heritage overlay applies is permitted only if: a. the height of the walls and the height and slope of the roof of the addition do not exceed those of the building **b. the side yard setback of the addition is at least 60 cm. greater than that of the wall of the building located closest to the side lot line** c. it is not located within the front yard	Same setback as existing house on West side
Permitted Projections above Height Limit (Sec. 64)	Mechanical / Service / Elevator Penthouse = 4.5m	Max. 4.50m
Landscaped Area	30% of lot area is required to be landscaped	31%
Amenity Area	6.0m² / dwelling unit, where 50% is required as communal 30 units x 6.0m² = 180m² 90m² required as communal	390m² total 181m² communal

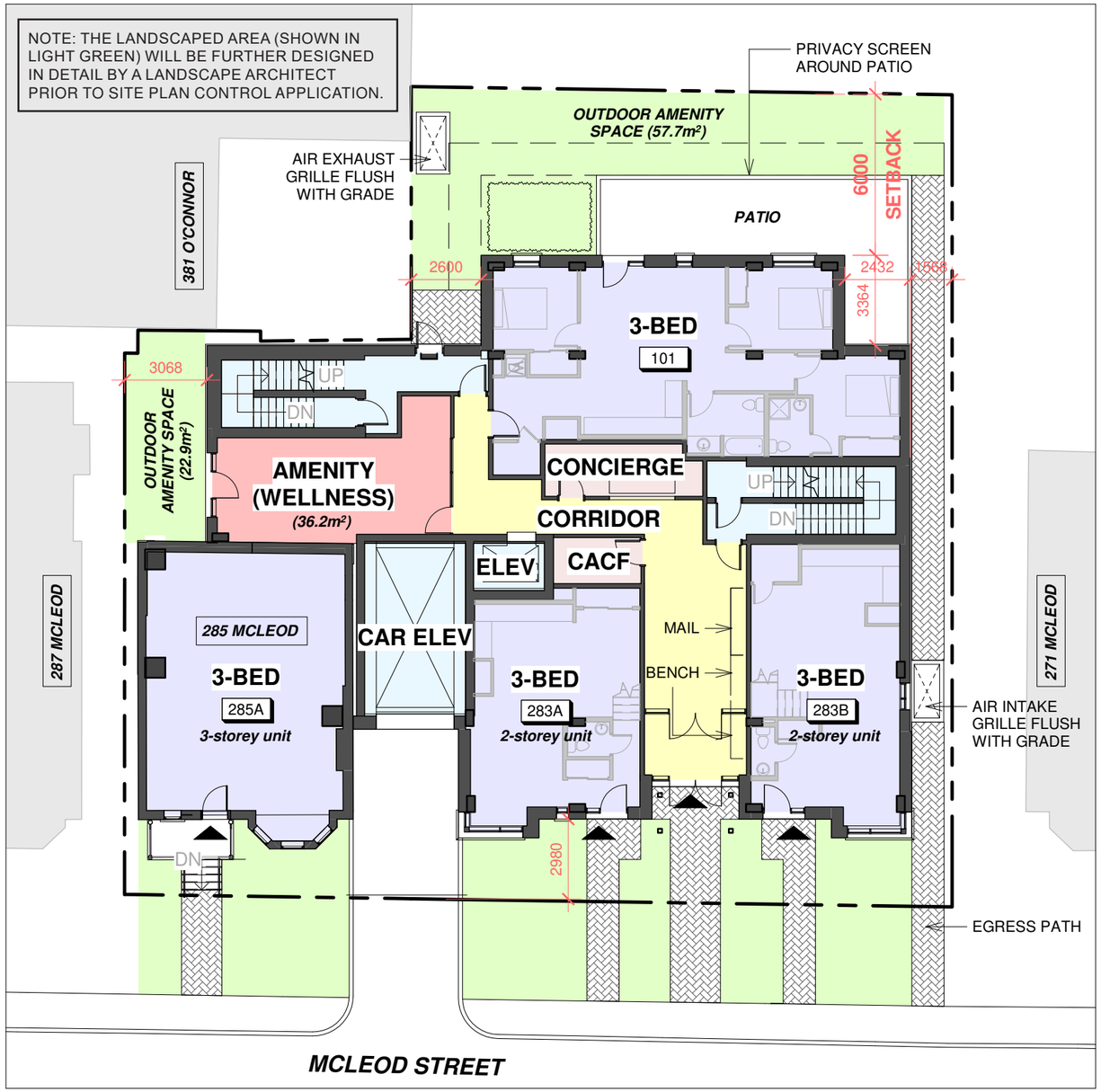
PARKING PROVISIONS

Provision	Required	Provided
Required Vehicle Parking Spaces	0.5 spaces / dwelling unit, less the first 12 units 18 units x 0.5 = 9 spaces	9 spaces
Visitor Parking	0.1 / dwelling unit, less the first 12 units 18 units x 0.1 = 2 spaces	2 spaces
Driveway Aisle Width for a Parking Garage (Double Lane)	Maximum: 3.6m	3.60m
Bicycle Parking	Residential: 0.5 spaces / dwelling unit 30 units x 0.5 = 15 spaces	21 spaces





BASEMENT FLOOR PLAN



GROUND FLOOR PLAN

LEGEND

- AMENITY
- CORRIDOR
- PARKING
- RESIDENTIAL
- SERVICE & STORAGE
- VERTICAL CIRCULATION

30 RESIDENTIAL UNITS

RES. PARKING		BICYCLE PARKING		AMENITY AREA	
REQUIRED:	*8*	*REQUIRED:*	*15*	*TOTAL REQUIRED:*	*180m²*
PROVIDED:	*11*	*PROVIDED:*	*19*	*TOTAL PROVIDED:*	*398.1m²*
VISITOR PARKING				*COMMUNAL REQUIRED:*	*90m²*
REQUIRED:	*2*			*COMMUNAL PROVIDED:*	*181m²*
PROVIDED:	*0*				

0 1 2 5 10

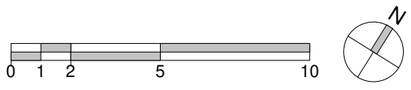
N

SECOND FLOOR PLAN

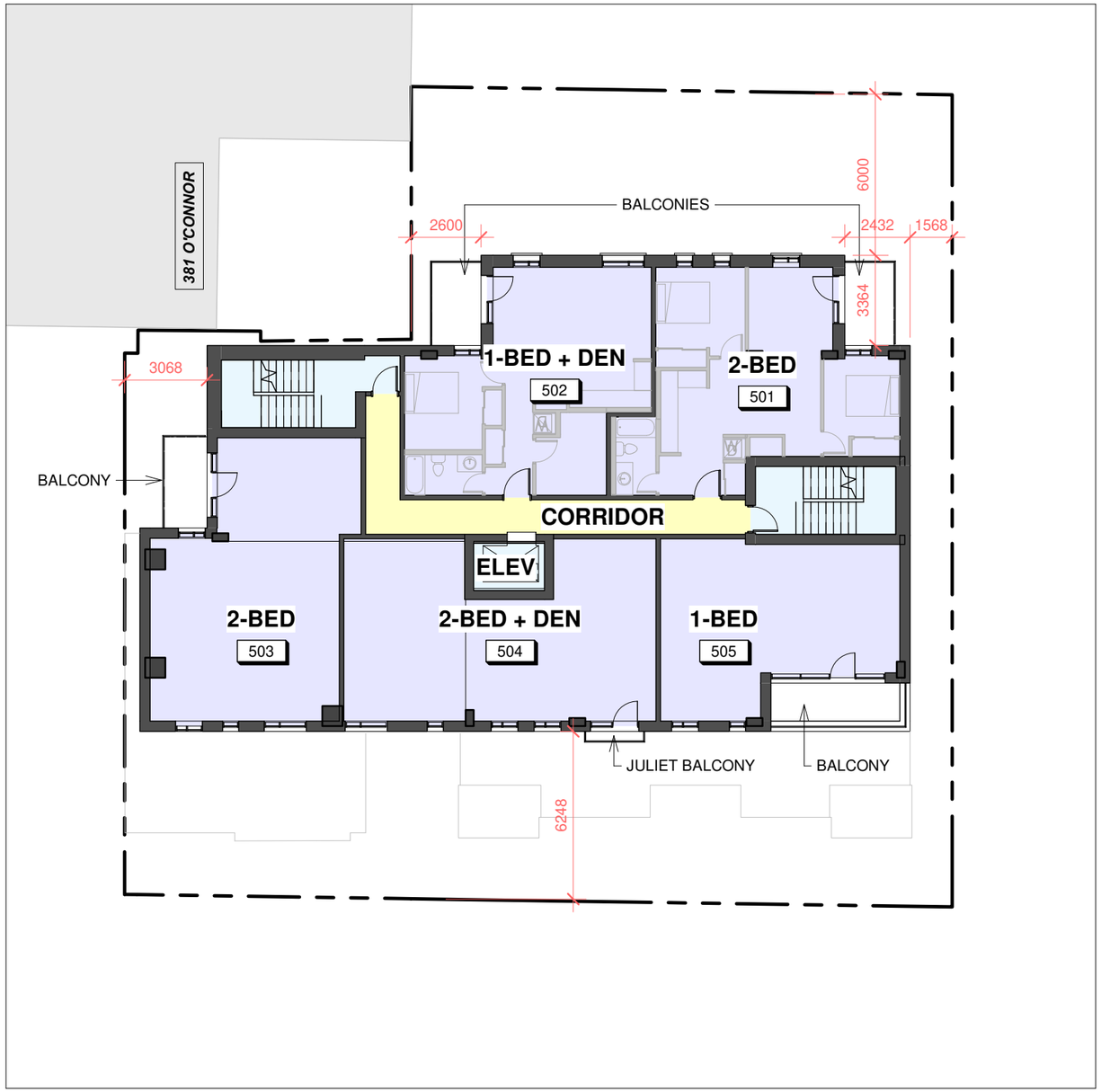
THIRD FLOOR PLAN

LEGEND

- AMENITY
- CORRIDOR
- PARKING
- RESIDENTIAL
- SERVICE & STORAGE
- VERTICAL CIRCULATION



FOURTH FLOOR PLAN

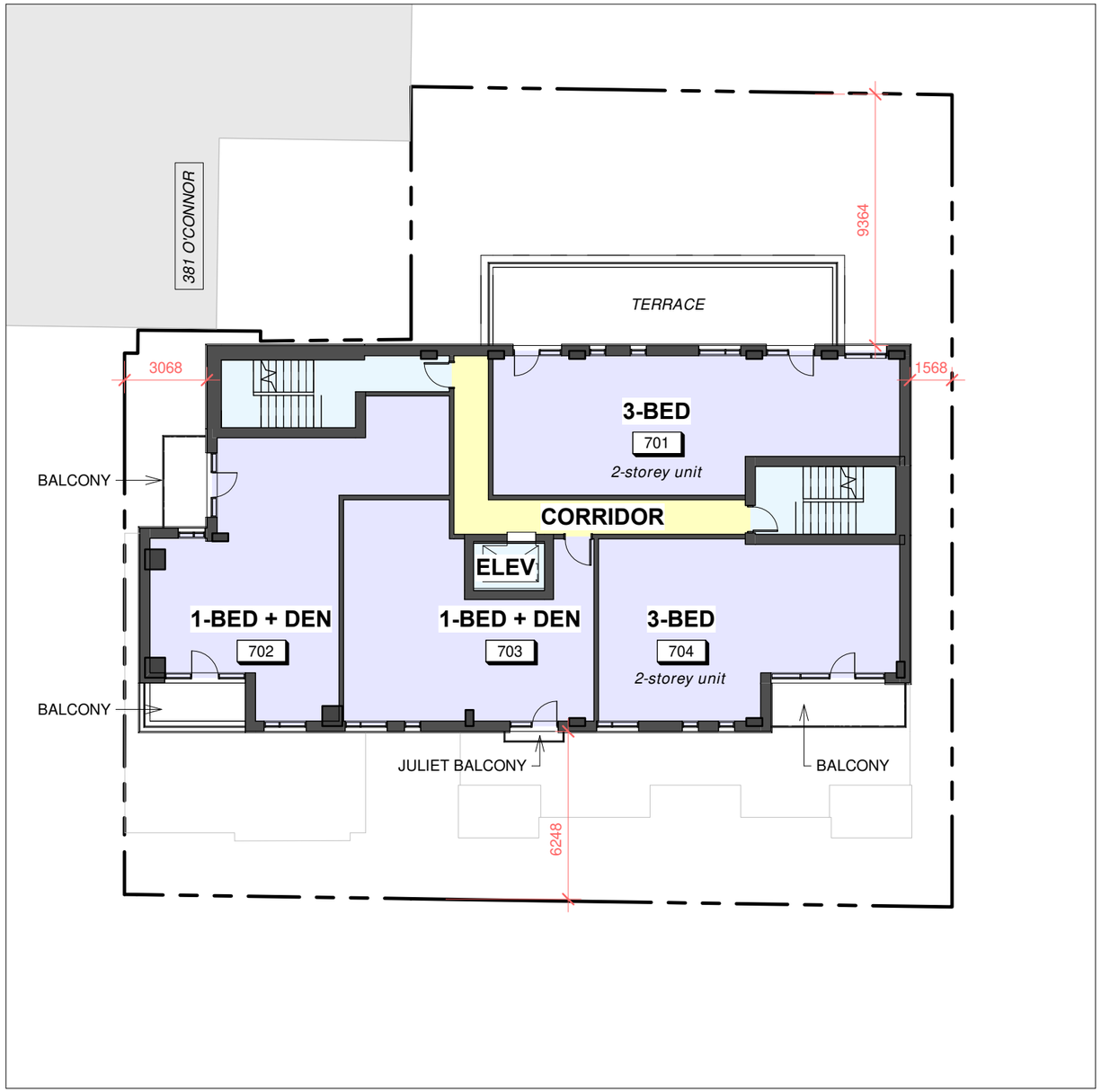


FIFTH/SIXTH FLOOR PLAN

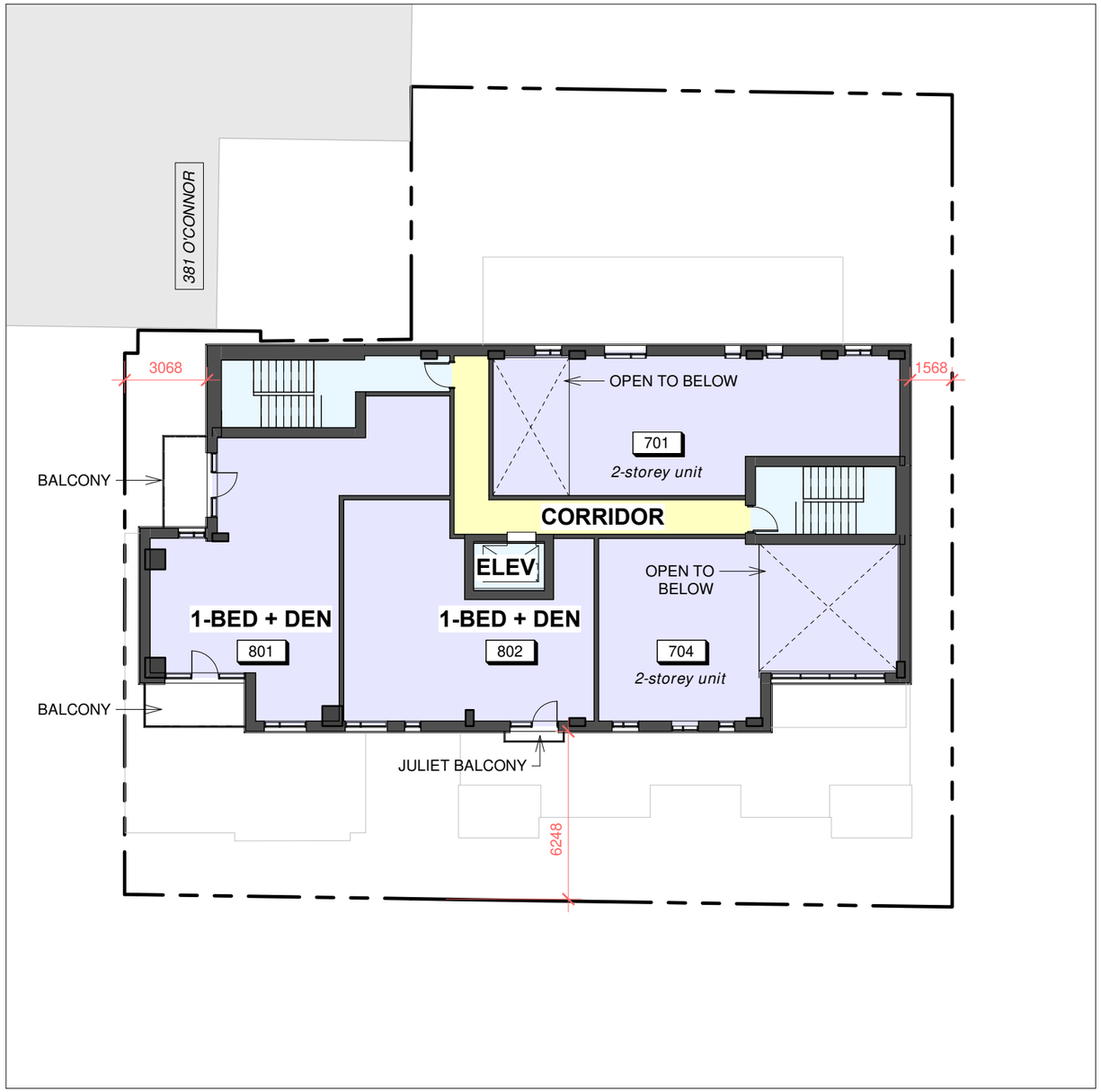
LEGEND

- AMENITY
- CORRIDOR
- PARKING
- RESIDENTIAL
- SERVICE & STORAGE
- VERTICAL CIRCULATION

0 1 2 5 10



SEVENTH FLOOR PLAN



EIGHTH FLOOR PLAN

LEGEND

- AMENITY
- CORRIDOR
- PARKING
- RESIDENTIAL
- SERVICE & STORAGE
- VERTICAL CIRCULATION

0 1 2 5 10

2.4 SUSTAINABILITY STATEMENT

Sustainability includes several facets in this project: Heritage Sustainability, Healthy Living Sustainability, and Sustainable Design of the Building

Heritage Sustainability: The proposed re-build of 285 McLeod to its original character contributes to heritage sustainability of Ottawa's history fabric.

Healthy Living Sustainability (Live, Work and Play): The project is very well aware of health and wellness, especially during the covid pandemic times which have significantly changed the live, work and play environment. With this mind, the proposed size of the development accommodates a viable unit count with a wide range of Unit Mix. The development consists of spacious units with large balconies, ground floor patios, indoor and outdoor amenity spaces. The residents have lots of opportunity to be "outside" without feeling confined. In addition, the apartment units are "work at home friendly", many apartment units have more than one bedroom, some include a den.

Located in the urban core of Ottawa, the project promotes the concept of '15-minute neighbourhoods' for day-to-day needs that are within walking distance of amenities such as public transit, grocery stores, retail shops, restaurants, fitness facilities, community centres, parks and greenspaces. The convenience of travelling on foot will reduce the dependency on cars and greenhouse gas emissions. As well, the building design and its amenities promote health and wellness, accessibility and inclusivity. The development consists of spacious units, most of which are 2-bedrooms and 3 bedrooms. The project aims to foster a diverse demographic mix and family living, creating an environment where the residence will have opportunities for social connection and contribute to a greater sense of community.

Sustainable Design: The building is designed holistically with fundamental principals of sustainable development.

.1 Siting, building form, and orientation of the building
The proposed building is carefully designed to adapt to the compact site with its relatively compact form, especially the massing of the 8-storey mid-rise. The apartment units have large and operable windows which allow natural light and fresh air. Large balconies are incorporated in most units with privacy from adjoining units. Many apartment units are 'corner' units which have the benefit of cross ventilation of fresh air, reducing the need of air conditioning. The corner units will also have more natural light and great views.

.2 Energy Performance
The building will be designed in compliance with supplementary standard SB-10 of the Ontario Building Code. A durable, and well detailed and insulated building envelope will be complimented with high efficiency electrical and mechanical equipment and systems. Cool (white/high-albedo) roof will be designed to mitigate heat island effect.

.3 Operational Systems
The building site is located in close proximity to multiple bus routes and bus stops all within a 5 minute walk or less; notably Gladstone Avenue to the north, Bank Street to the West, and Elgin Street on the East. This encourages tenants to use public transportation, which in turn lessens the load on parking spaces and contributes to greenhouse gas reduction. Cycling is also encouraged. A lockable bike storage room located in the parking garage will attract tenants who cycle.

.4 Space and Use Parameters
A variety of indoor and outdoor amenity spaces are provided. Indoor amenity spaces include a wellness room on the ground floor and a common lounge on the 2nd floor. Both indoor amenity spaces open up onto the outdoor spaces. The wellness room leads to a small patio and the common lounge c/w a small kitchenette spills out onto a large roof terrace. The roof terrace is nestled within the development, offering the neighbours full privacy and protecting the neighbours from potential noise. This elevated terrace overlooks the Landscapes of Canada Gardens and the Canadian Museum of Nature. Other outdoor amenity spaces include large balconies, a landscaped backyard, and private patios for the northern apartment units on the ground floor.

Specific energy performance strategies for this project include:

- Stormwater management system.
- Air to Air Heat Pumps operated to efficient exterior temperatures, and digital remote controls on individual unit HVAC system.
- High-efficient LED lighting throughout building common areas.
- Automatic dimming controls for lighting in stairwells and parking garage.
- Faucets, showers, and water closets within the suites to be selected for ultra-low water consumption.
- Durable building envelope, thermally broken window frames with low-E glazing, punched windows (no curtain wall)

(More information on Sustainability will be provided upon further M/E design development)


287 McLeod


285 & 283 McLeod


263 McLeod

Existing Heritage Character

285 McLeod is one of three (the other ones being 287 and 289 McLeod) nearly identical Vernacular Queen Anne style single family residences constructed between 1901-1911 on the north side of McLeod adjacent to O'Connor St. The building's original features included an asymmetrical front façade with a two storey front porch and projecting bay window, red brick facades with stone foundations, and decorative wood detailing. Alterations in the 1970's included removal of the front porch and projecting bay window, relocation of the main entrance to the side east façade, alteration of the existing fenestration pattern, relocation of the central roof dormer, and the introduction of stucco finishes on the front and east facades. A new 2 storey addition was also constructed on the east façade at the rear of the building.

283 McLeod is one of two Vernacular Prairie style single family residences constructed between 1925 - 1946 on the north side of McLeod between Metcalfe and O'Connor St., with the other located at 263 McLeod. The building's original features included a low pitch hip roof with a central hipped dormer, horizontal orientation of windows, a two storey front porch, dark yellow brick facades with concrete foundations, and wood detailing. Alterations in the 1970's included removal of the front porch, relocation of the main entrance to the side west façade, alteration of the existing fenestration pattern, and the introduction of stucco finishes on the front, west and east facades.

Building Design and Heritage Character

The existing building at 285 McLeod will be restored to its original appearance and detailing circa early 1900's to compliment the two similar historic single-family residences at 287 & 289 McLeod. The scope of restoration work includes the reinstatement of the two-storey front porch, projecting bay window & offset roof dormer, the relocation of the main entrance back to the front facade, the reinstatement of the original fenestration pattern, and the reinstatement of red brick facades with stone accents and decorative wood detailing on the front and east facades.

The new low-rise portion of the building has been designed to be in keeping with the scale and massing of the restored building at 285 McLeod and the adjacent historic houses on McLeod. The front facade will align with the facades of the adjacent buildings to form a consistent street-fronting edge, and the façade materials and fenestration patterns will compliment the adjacent heritage facades.

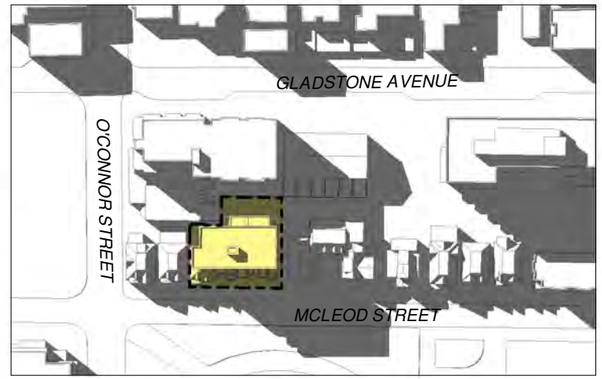
The front faccade of the mid-rise will be clad in a lightweight warm colour metal cladding material, with random vertical seams that further add a subtle texture to the facade. The composition of the cladding material, the large windows and the balconies is intended to serve as a contemporary but calm backdrop to the heritage street front of the development.

APPENDIX 1: SHADOW STUDY

JUNE 21 - 9:00am

JUNE 21 - 12:00pm

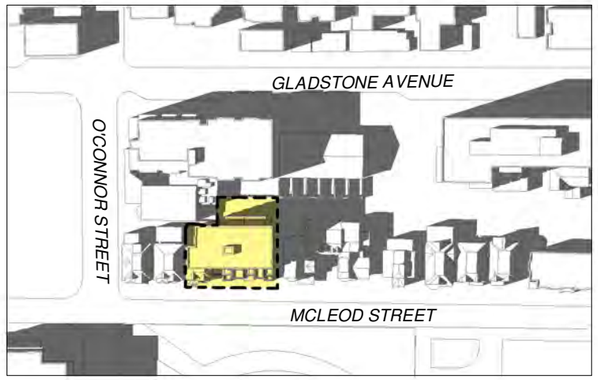
JUNE 21 - 3:00pm



JUNE 21 - 6:00pm

SEPTEMBER 21 - 9:00am

SEPTEMBER 21 - 12:00pm



SEPTEMBER 21 - 3:00pm

SEPTEMBER 21 - 6:00pm

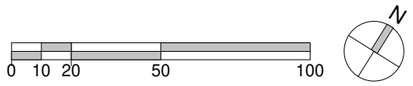
DECEMBER 21 - 9:00am

DECEMBER 21 - 12:00pm

DECEMBER 21 - 3:00pm

DECEMBER 21 - 6:00pm

NOTE: A SHADOW STUDY DOCUMENTING THE EXTENTS OF THE BUILDING SHADOW AT EVERY HOUR OF THE DAY CAN BE PROVIDED UPON REQUEST.



APPENDIX 2: EXAMPLES OF NEIGHBOURING BUILDINGS IN CENTRETOWN

Centretown is an architecturally diverse neighbourhood where heritage homes, many of which have been converted to multi-unit apartments or commercial uses, exist in close proximity with newer, taller apartment buildings. This results in a layered character reflecting the evolution of the area over the years, from a low-rise, low-density district to a vibrant, denser community. It is not rare to observe a 10-storey or higher apartment building adjacent to a 2-storey heritage structure. The following images represent a sample of the conditions that can be found in the area and demonstrate that the increased scale and minimal setbacks between the various building typologies is an established characteristic of the neighbourhood.

APPENDIX 3: WIND STUDY

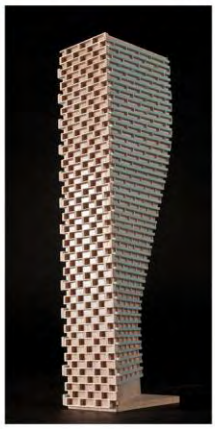
(Refer to following pages.)

GRADIENTWIND
ENGINEERS & SCIENTISTS

PEDESTRIAN LEVEL WIND STUDY

283/285 McLeod Street
Ottawa, Ontario

Report: 21-249-PLW



August 3, 2021

PREPARED FOR

Zyer Developments
285 McLeod Street, Unit 1
Ottawa, ON K2P 1A1

PREPARED BY

Daniel Davalos, MESc., Junior Wind Scientist
Justin Ferraro, P.Eng., Principal

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

EXECUTIVE SUMMARY

This report describes a pedestrian level wind (PLW) study undertaken to satisfy the requirements for concurrent Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBLA) application submissions for the proposed hotel development located at 283 and 285 McLeod Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). Our mandate within this study is to investigate pedestrian wind comfort and safety within and surrounding the subject site, and to identify any areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

The study involves simulation of wind speeds for selected wind directions in a three-dimensional (3D) computer model using the computational fluid dynamics (CFD) technique, combined with meteorological data integration, to assess pedestrian wind comfort and safety within and surrounding the subject site according to City of Ottawa wind comfort and safety criteria. The results and recommendations derived from these considerations are detailed in the main body of the report (Section 5), illustrated in Figures 3A-4D, and summarized as follows:

1) All grade-level areas within and surrounding the subject site are predicted to be acceptable for the intended pedestrian uses throughout the year. Specifically, wind conditions over the surrounding sidewalks along McLeod Street, O'Connor Street, and Gladstone Avenue, within the grade-level amenity areas serving the proposed development, as well as adjacent to all building access points within and adjacent to the proposed development, are considered acceptable for the intended pedestrian uses throughout the year.

2) Wind conditions within the amenity terrace serving the proposed development at Level 2 are predicted to be calm and suitable for sitting throughout the year.

3) Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no pedestrian areas within and surrounding the subject site were found to experience conditions that could be considered dangerous.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 165177 Canada Inc. to undertake a pedestrian level wind (PLW) study to satisfy the requirements for concurrent Official Plan Amendment (OPA) and Zoning By-law Amendment (ZBLA) application submissions for the proposed development located at 283 and 285 McLeod Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). Our mandate within this study is to investigate pedestrian wind comfort and safety within and surrounding the subject site, and to identify areas where wind conditions may interfere with certain pedestrian activities so that mitigation measures may be considered, where required.

Our work is based on industry standard computer simulations using the computational fluid dynamics (CFD) technique and data analysis procedures, City of Ottawa wind comfort and safety criteria, architectural drawings prepared by Barry Padolsky Associates Inc. Architects, in July 2021, surrounding street layouts and existing and approved future building massing information obtained from the City of Ottawa, as well as recent satellite imagery.

2. TERMS OF REFERENCE

The subject site is situated on a city block bordered by McLeod Street to the south, O'Connor Street to the west, Gladstone Avenue to the north, and Metcalfe Street to the east. The proposed development comprises three buildings, including a 2-storey building (referred to as 285 McLeod Street) with a rectangular planform, a 2-storey building with a square planform (referred to as 283 McLeod Street), and a 6-storey building with an approximate rectangular planform. The 6-storey building features office space on the ground floor, while residential units serve the remaining floors. The 6-storey building also includes below-grade parking, as well as amenity terrace at Level 2.

The near- and far-field surroundings of the subject site comprise residential dwellings in all directions. There is a mixture of mid- and high-rise buildings in the northern far-field, a small cluster of mid-rise buildings in the eastern far-field, a cluster of low-rise buildings in the southern far-field and a cluster of mid- and high-rise buildings in the western far-field.

Key areas under consideration include the surrounding sidewalks adjacent to the subject site, building access points, and the proposed common amenity spaces (grade and Level 8). Figure 1 illustrates the subject site and surrounding context, while Figures 2A-2D illustrate the computational model used to conduct the study.

3. OBJECTIVES

The principal objectives of this study are to (i) determine pedestrian level wind comfort and safety conditions at key areas within and surrounding the development site; (ii) identify areas where wind conditions may interfere with the intended uses of outdoor spaces; and (iii) recommend suitable mitigation measures, where required.

4. METHODOLOGY

The approach followed to quantify pedestrian wind conditions over the site is based on CFD simulations of wind speeds across the study site within a virtual environment, meteorological analysis of the Ottawa area wind climate, and synthesis of computational data with City of Ottawa wind comfort and safety criteria[1]. The following sections describe the analysis procedures, including a discussion of the noted pedestrian wind criteria.

[1] City of Ottawa Terms of References: Wind Analysis
https://documents.ottawa.ca/sites/default/files/torwindanalysis_en.pdf

4.1 Computer-Based Context Modelling

A computer based PLW study was performed to determine the influence of the wind environment on pedestrian comfort over the proposed development site. Pedestrian comfort predictions, based on the mechanical effects of wind, were determined by combining measured wind speed data from CFD simulations with statistical weather data obtained from Ottawa Macdonald-Cartier International Airport. The general concept and approach to CFD modelling is to represent building and topographic details in the immediate vicinity of the study site on the surrounding model, and to create suitable atmospheric wind profiles at the model boundary. The wind profiles are designed to have similar mean and turbulent wind properties consistent with actual site exposures.

An industry standard practice is to omit trees, vegetation, and other existing and planned landscape elements from the model due to the difficulty of providing accurate seasonal representation of vegetation. The omission of trees and other landscaping elements produces slightly more conservative (i.e., windier) wind speed values.

4.2 Wind Speed Measurements

The PLW analysis was performed by simulating wind flows and gathering velocity data over a CFD model of the site for 12 wind directions. The CFD simulation model was centered on the study building, complete with surrounding massing within a diameter of approximately 820 m.

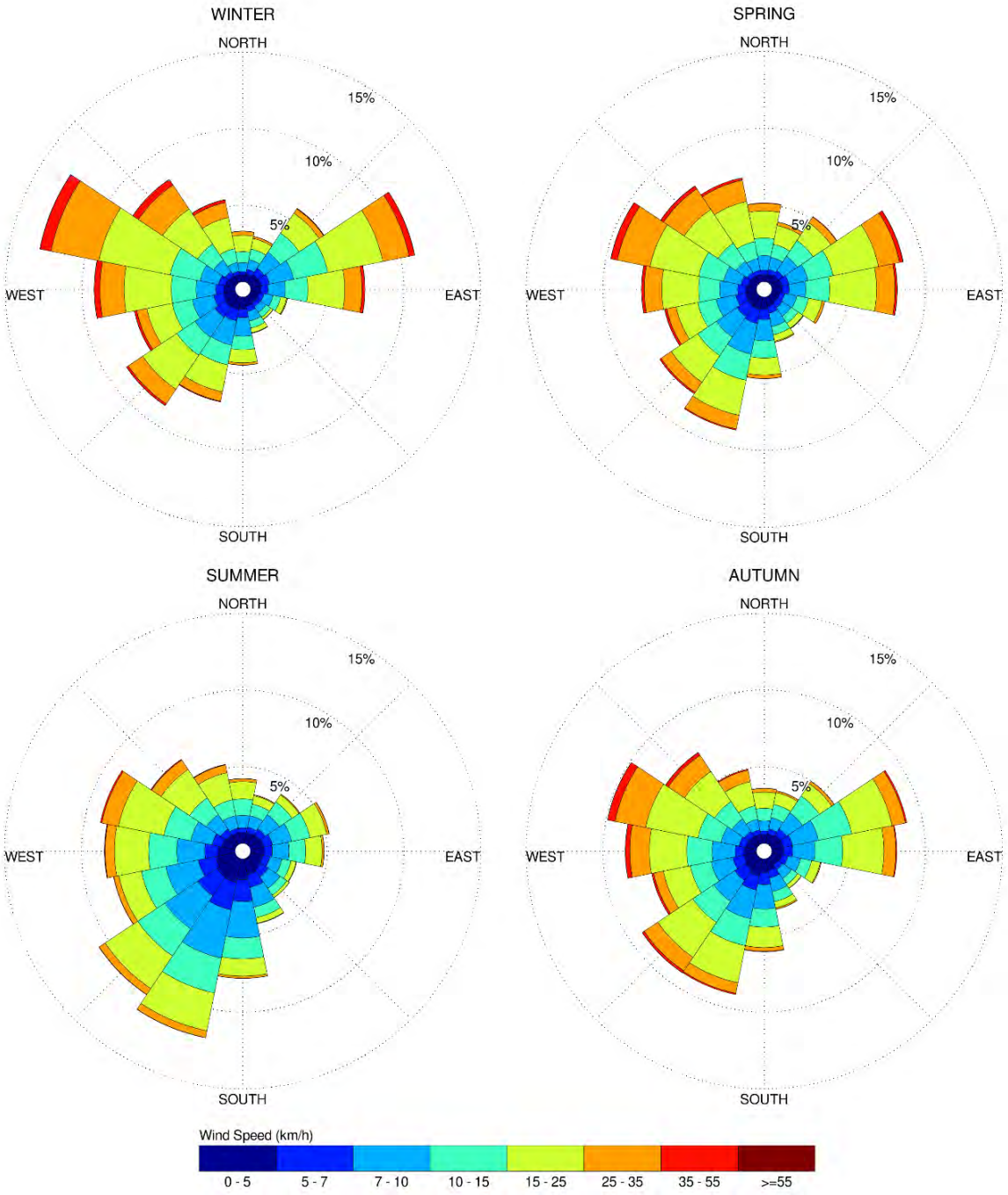
Mean and peak wind speed data obtained over the study site for each wind direction were interpolated to 36 wind directions at 10° intervals, representing the full compass azimuth. Measured wind speeds approximately 1.5 m above local grade and the common amenity terrace at Level 2 were referenced to the wind speed at gradient height to generate mean and peak velocity ratios, which were used to calculate full-scale values. Gradient height represents the theoretical depth of the boundary layer of the earth's atmosphere, above which the mean wind speed remains constant. Further details of the wind flow simulation technique are presented in Appendix A.

4.3 Meteorological Data Analysis

A statistical model for winds in Ottawa was developed from approximately 40 years of hourly meteorological wind data recorded at Ottawa Macdonald-Cartier International Airport and obtained from Environment and Climate Change Canada. Wind speed and direction data were analyzed for each month of the year to determine the statistically prominent wind directions and corresponding speeds, and to characterize similarities between monthly weather patterns.

The statistical model of the Ottawa area wind climate, which indicates the directional character of local winds on a seasonal basis, is illustrated on the following page. The plots illustrate seasonal distribution of measured wind speeds and directions in kilometers per hour (km/h). Probabilities of occurrence of different wind speeds are represented as stacked polar bars in sixteen azimuth divisions. The radial direction represents the percentage of time for various wind speed ranges per wind direction during the measurement period. The preferred wind speeds and directions can be identified by the longer length of the bars. For Ottawa, the most common winds occur for westerly wind directions, followed by those from the east, while the most common wind speeds are below 36 km/h. The directional preference and relative magnitude of wind speed changes somewhat from season to season.

SEASONAL DISTRIBUTION OF WIND
OTTAWA MACDONALD-CARTIER INTERNATIONAL AIRPORT



Notes:

1. Radial distances indicate percentage of time of wind events.
2. Wind speeds are mean hourly in km/h, measured at 10 m above the ground.

4.4 Pedestrian Comfort and Safety Criteria – City of Ottawa

Pedestrian comfort and safety criteria are based on the mechanical effects of wind without consideration of other meteorological conditions (i.e., temperature, relative humidity). The comfort criteria assume that pedestrians are appropriately dressed for a specified outdoor activity during any given season. Five pedestrian comfort classes are based on 20% non-exceedance mean wind speed ranges, which include (1) Sitting; (2) Standing; (3) Strolling; (4) Walking; and (5) Uncomfortable. More specifically, the comfort classes and associated mean wind speed ranges are summarized as follows:

1) **Sitting:** Mean wind speeds no greater than 10 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 16 km/h.

2) **Standing:** Mean wind speeds no greater than 14 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 22 km/h.

3) **Strolling:** Mean wind speeds no greater than 17 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 27 km/h.

4) **Walking:** Mean wind speeds no greater than 20 km/h occurring at least 80% of the time. The equivalent gust wind speed is approximately 32 km/h.

5) **Uncomfortable:** Uncomfortable conditions are characterized by predicted values that fall below the 80% target for walking. Brisk walking and exercise, such as jogging, would be acceptable for moderate excesses of this criterion.

The pedestrian safety wind speed criterion is based on the approximate threshold that would cause a vulnerable member of the population to fall. A 0.1% exceedance gust wind speed of 90 km/h is classified as dangerous. The gust speeds, and equivalent mean speeds, are selected based on 'The Beaufort Scale', presented on the following page, which describes the effects of forces produced by varying wind speed levels on objects. Gust speeds are included because pedestrians tend to be more sensitive to wind gusts than to steady winds for lower wind speed ranges. For strong winds approaching dangerous levels, this effect is less important because the mean wind can also create problems for pedestrians.

THE BEAUFORT SCALE

Number	Description	Wind Speed (km/h)		Description
		Mean	Gust	
2	Light Breeze	6-11	9-17	Wind felt on faces
3	Gentle Breeze	12-19	18-29	Leaves and small twigs in constant motion; wind extends light flags
4	Moderate Breeze	20-28	30-42	Wind raises dust and loose paper; small branches are moved
5	Fresh Breeze	29-38	43-57	Small trees in leaf begin to sway
6	Strong Breeze	39-49	58-74	Large branches in motion; Whistling heard in electrical wires; umbrellas used with difficulty
7	Moderate Gale	50-61	75-92	Whole trees in motion; inconvenient walking against wind
8	Gale	62-74	93-111	Breaks twigs off trees; generally impedes progress

Experience and research on people's perception of mechanical wind effects has shown that if the wind speed levels are exceeded for more than 20% of the time, the activity level would be judged to be uncomfortable by most people. For instance, if a mean wind speed of 10 km/h were exceeded for more than 20% of the time most pedestrians would judge that location to be too windy for sitting. Similarly, if mean wind speed of 20 km/h at a location were exceeded for more than 20% of the time, walking or less vigorous activities would be considered uncomfortable. As these criteria are based on subjective reactions of a population to wind forces, their application is partly based on experience and judgment.

Once the pedestrian wind speed predictions have been established throughout the site, the assessment of pedestrian comfort involves determining the suitability of the predicted wind conditions for discrete regions within and surrounding the subject site. This step involves comparing the predicted comfort classes to the desired comfort classes, which are dictated by the location type for each region (i.e., a sidewalk, building entrance, amenity space, or other). An overview of common pedestrian location types and their desired comfort classes are summarized on the following page.

DESIRED PEDESTRIAN COMFORT CLASSES FOR VARIOUS LOCATION TYPES

Location Types	Desired Comfort Classes
Primary Building Entrance	Standing
Secondary Building Access Point	Standing / Strolling / Walking
Primary Public Sidewalk	Strolling / Walking
Secondary Public Sidewalk / Bicycle Path	Walking
Outdoor Amenity Space	Sitting / Standing / Strolling
Café / Patio / Bench / Garden	Sitting
Transit Stop	Sitting / Standing
Public Park / Plaza	Standing / Strolling
Garage / Service Entrance	Walking
Parking Lot	Strolling / Walking
Vehicular Drop-Off Zone	Standing / Strolling / Walking

5. RESULTS AND DISCUSSION

The following discussion of predicted pedestrian wind conditions is accompanied by Figures 3A-3D illustrating seasonal wind comfort conditions at grade level, as well as by Figures 4A-4D illustrating seasonal wind conditions over the Level 2 amenity terrace serving the proposed development. Wind conditions are presented as continuous contours of wind comfort within and surrounding the subject site.

The colour contours indicate various wind comfort classes predicted for certain regions, which correspond to the City of Ottawa wind comfort criteria in Section 4.4. Wind conditions comfortable for sitting or more sedentary activities are represented by the colour green, standing are represented by yellow, strolling by orange, and walking by blue. Uncomfortable conditions are represented by magenta.

In all locations studied, the wind conditions are predicted to be acceptable following the introduction of the proposed development.

5.1 Wind Comfort Conditions – Grade Level

Following the introduction of the proposed development, wind conditions along the public sidewalks surrounding the subject site, within the grade-level amenity areas serving the proposed development, as well as in the vicinity of building entrances serving the proposed development, illustrated in Figures 3A-3D, are predicted to be suitable for sitting throughout the year. The noted conditions are considered acceptable according to the City of Ottawa wind comfort criteria.

5.2 Wind Comfort Conditions – Level 2 Common Amenity Terrace

Wind conditions within the common amenity terrace at Level 2, illustrated in Figures 4A-4D, are predicted to be calm and suitable for sitting throughout the year. The noted wind conditions are considered acceptable according to the City of Ottawa wind comfort criteria.

5.3 Wind Safety

Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no pedestrian areas within and surrounding the subject site were found to experience conditions that could be considered dangerous, as defined in Section 4.4.

5.4 Applicability of Results

Wind conditions over surrounding sidewalks beyond the subject site, as well as at nearby primary building entrances, will be acceptable for their intended pedestrian uses during each seasonal period upon the introduction of the subject site. Pedestrian wind comfort and safety have been quantified for the specific configuration of existing and foreseeable construction around the study site. Future changes (i.e., construction or demolition) of these surroundings may cause changes to the wind effects in two ways, namely: (i) changes beyond the immediate vicinity of the site would alter the wind profile approaching the site; and (ii) development in proximity to the site would cause changes to local flow patterns. For example, development in urban centers generally creates reduction in the mean wind speeds and localized increases in the gustiness of the wind.

Regarding primary and secondary building access points, wind conditions predicted in this study are only applicable to pedestrian comfort and safety. As such, the results should not be construed to indicate wind loading on doors and associated hardware.

6. CONCLUSIONS AND RECOMMENDATIONS

A complete summary of the predicted wind conditions is provided in Section 5 and illustrated in Figures 3A-4D. Based on computer simulations using the CFD technique, meteorological data analysis of the Ottawa wind climate, City of Ottawa wind comfort and safety criteria, and experience with numerous similar developments, the study concludes the following:

1) All grade-level areas within and surrounding the subject site are predicted to be acceptable for the intended pedestrian uses throughout the year. Specifically, wind conditions over the surrounding sidewalks along McLeod Street, O'Connor Street, and Gladstone Avenue, within the grade-level amenity areas serving the proposed development, as well as adjacent to all building access points within and adjacent to the proposed development, are considered acceptable for the intended pedestrian uses throughout the year.

2) Wind conditions within the amenity terrace serving the proposed development at Level 2 are predicted to be calm and suitable for sitting throughout the year.

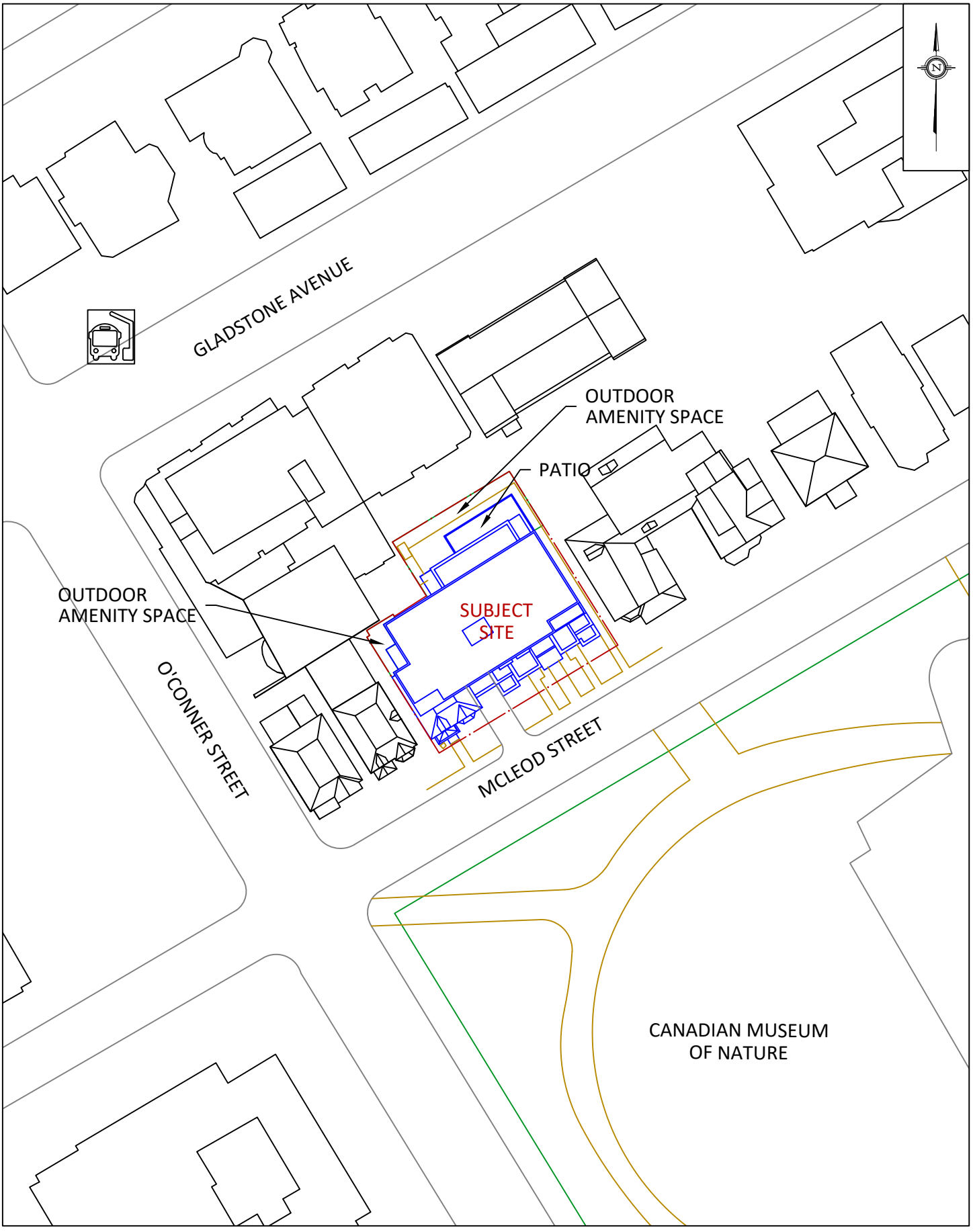
3) Within the context of typical weather patterns, which exclude anomalous localized storm events such as tornadoes and downbursts, no pedestrian areas within and surrounding the subject site were found to experience conditions that could be considered dangerous.

Sincerely,

Gradient Wind Engineering Inc.

Daniel Davalos, MESc.
Junior Wind Scientist

Justin Ferraro, P.Eng.
Principal



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ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON
613 836 0934 • GRADIENTWIND.COM

PROJECT	283-285 MCLEOD STREET, OTTAWA PEDESTRIAN LEVEL WIND STUDY		DESCRIPTION
SCALE	1:750	DRAWING NO. 21-249-PLW-1	FIGURE 1: PROPOSED SITE PLAN AND SURROUNDING CONTEXT
DATE	AUGUST 3, 2021	DRAWN BY N.M.P.	

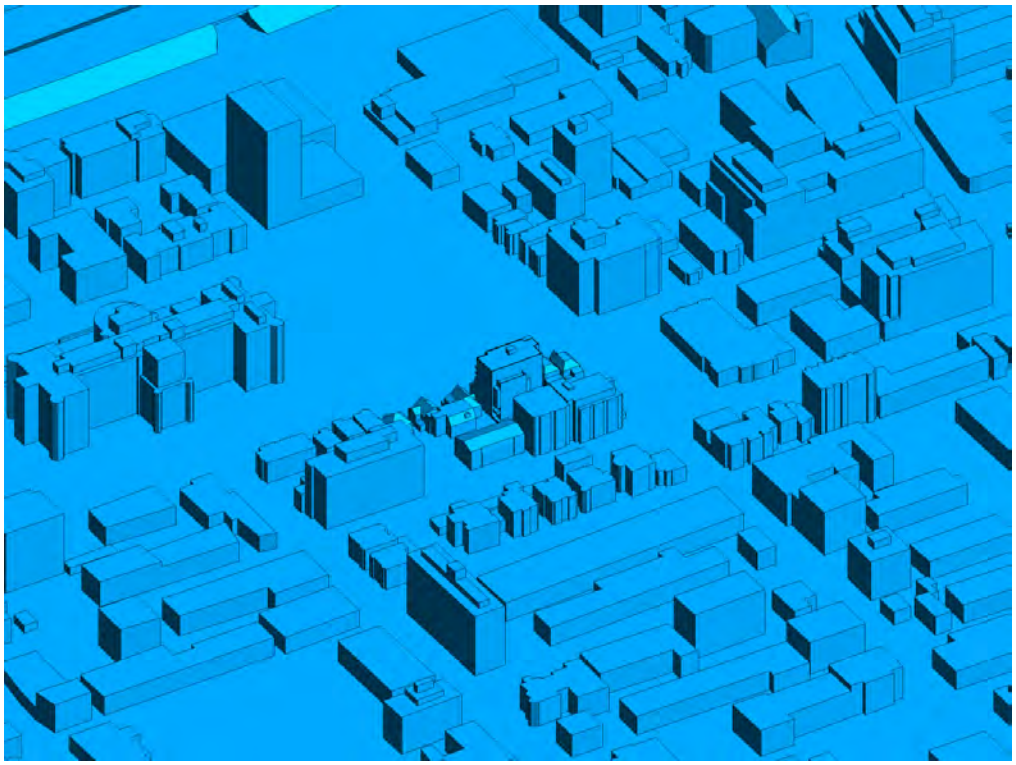

FIGURE 2A: COMPUTATIONAL MODEL, NORTH PERSPECTIVE

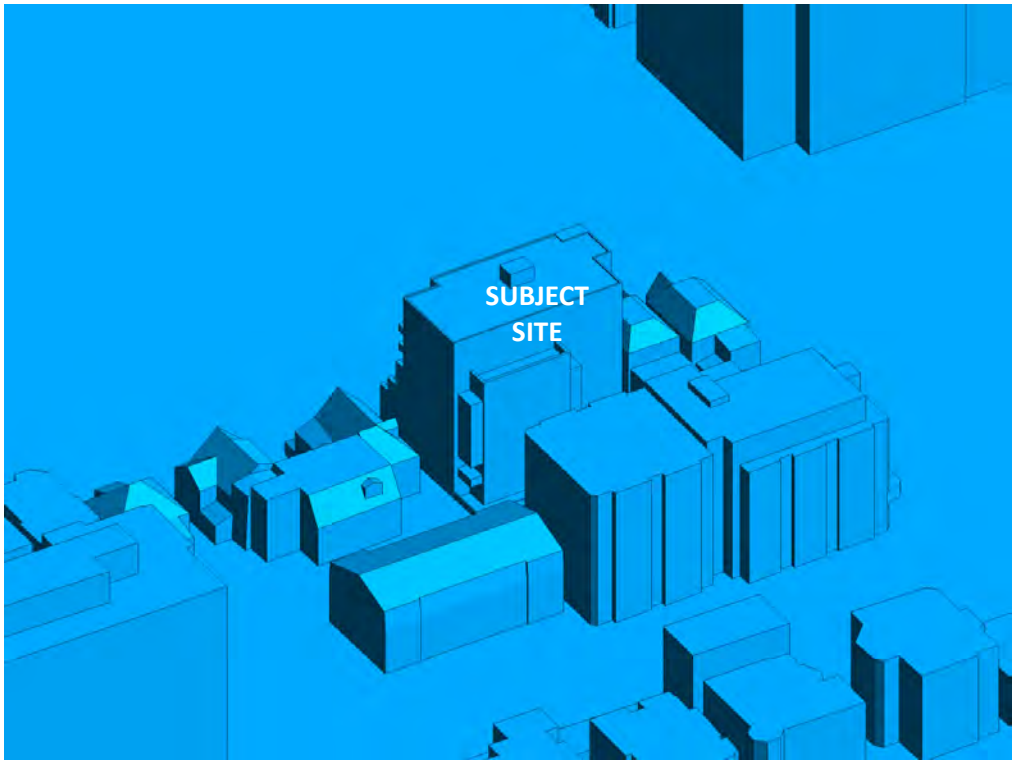

FIGURE 2B: CLOSE UP OF FIGURE 2A

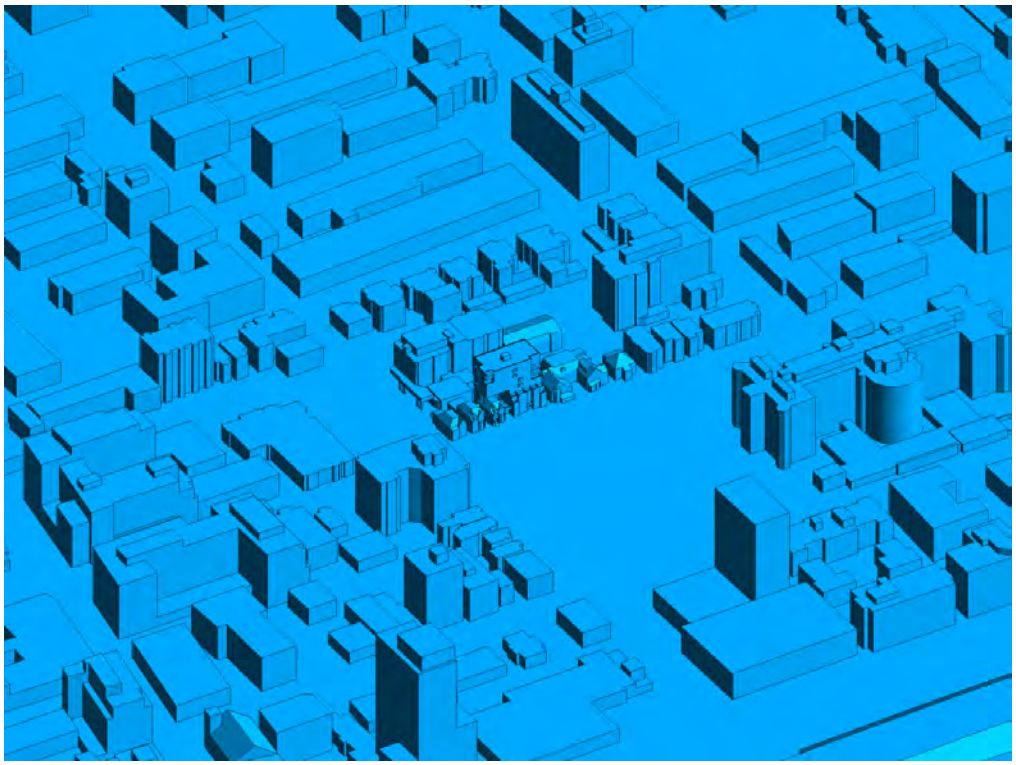

FIGURE 2C: COMPUTATIONAL MODEL, SOUTH PERSPECTIVE

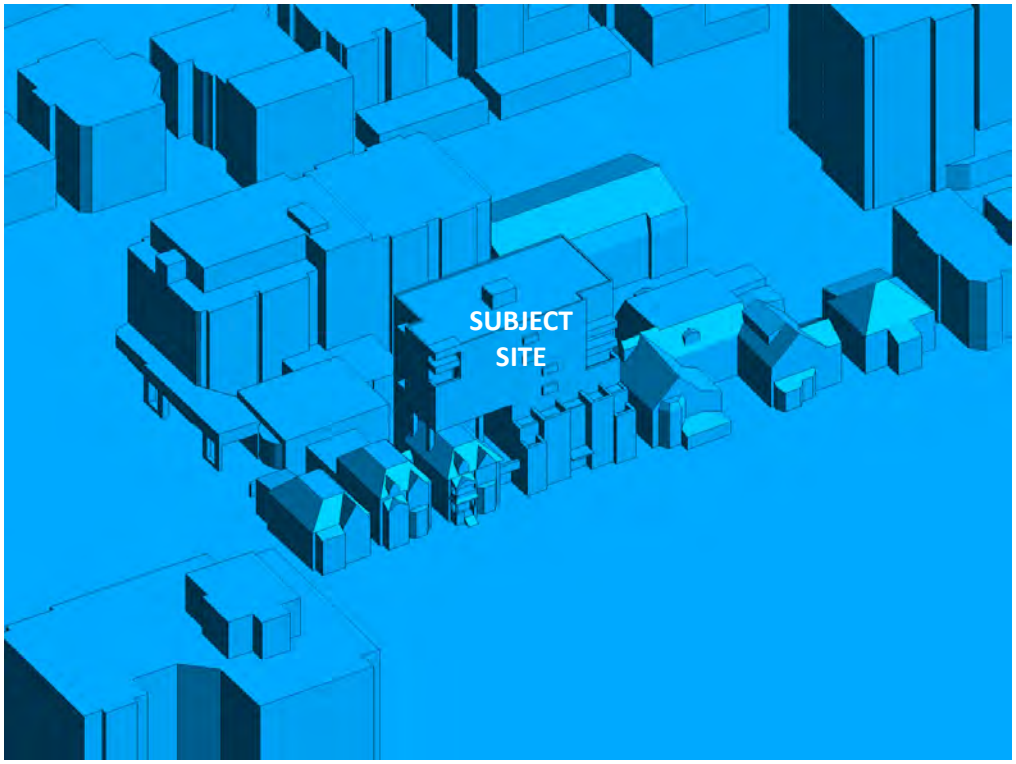

FIGURE 2D: CLOSE UP OF FIGURE 2C

FIGURE 3A: SPRING – WIND COMFORT, GRADE LEVEL

FIGURE 3B: SUMMER – WIND COMFORT, GRADE LEVEL

FIGURE 3C: AUTUMN – WIND COMFORT, GRADE LEVEL

FIGURE 3D: WINTER – WIND COMFORT, GRADE LEVEL

FIGURE 4A: SPRING – WIND COMFORT, LEVEL 2 AMENITY TERRACE

FIGURE 4B: SUMMER – WIND COMFORT, LEVEL 2 AMENITY TERRACE

FIGURE 4C: AUTUMN – WIND COMFORT, LEVEL 2 AMENITY TERRACE

FIGURE 4D: WINTER – WIND COMFORT, LEVEL 2 AMENITY TERRACE

APPENDIX A

SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

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SIMULATION OF THE ATMOSPHERIC BOUNDARY LAYER

The atmospheric boundary layer (ABL) is defined by the velocity and turbulence profiles according to industry standard practices. The mean wind profile can be represented, to a good approximation, by a power law relation, Equation (1), giving height above ground versus wind speed (1), (2).

$$U = U_g \left(\frac{Z}{Z_g}\right)^{\alpha} \qquad \text{Equation (1)}$$

where, $\boldsymbol{U}$ = mean wind speed, $\boldsymbol{U_g}$ = gradient wind speed, $\boldsymbol{Z}$ = height above ground, $\boldsymbol{Z_g}$ = depth of the boundary layer (gradient height), and α is the power law exponent.

For the model, U_g is set to 6.5 metres per second (m/s), which approximately corresponds to the 60% mean wind speed for Ottawa based on historical climate data and statistical analyses. When the results are normalized by this velocity, they are relatively insensitive to the selection of gradient wind speed.

Z_g is set to 540 m. The selection of gradient height is relatively unimportant, so long as it exceeds the building heights surrounding the subject site. The value has been selected to correspond to our physical wind tunnel reference value.

α is determined based on the upstream exposure of the far-field surroundings (i.e., the area that it not captured within the simulation model).

Table 1 presents the values of α used in this study, while Table 2 presents several reference values of α. When the upstream exposure of the far-field surroundings is a mixture of multiple types of terrain, the α values are a weighted average with terrain that is closer to the subject site given greater weight.

TABLE 1: UPSTREAM EXPOSURE (ALPHA VALUE) VS TRUE WIND DIRECTION

Wind Direction (Degrees True)	Alpha Value (α)
0	0.28
49	0.26
74	0.24
103	0.24
167	0.25
197	0.24
217	0.24
237	0.25
262	0.25
282	0.27
302	0.3
324	0.3

TABLE 2: DEFINITION OF UPSTREAM EXPOSURE (ALPHA VALUE)

Upstream Exposure Type	Alpha Value (α)
Open Water	0.14-0.15
Open Field	0.16-0.19
Light Suburban	0.21-0.24
Heavy Suburban	0.24-0.27
Light Urban	0.28-0.30
Heavy Urban	0.31-0.33

The turbulence model in the computational fluid dynamics (CFD) simulations is a two-equation shear-stress transport (SST) model, and thus the ABL turbulence profile requires that two parameters be defined at the inlet of the domain. The turbulence profile is defined following the recommendations of the Architectural Institute of Japan for flat terrain (3).

$$I(Z) = \begin{cases} 0.1\left(\frac{Z}{Z_g}\right)^{-\alpha-0.05}, & Z > 10\ \text{m} \\ 0.1\left(\frac{10}{Z_g}\right)^{-\alpha-0.05}, & Z \leq 10\ \text{m} \end{cases} \qquad \text{Equation (2)}$$

$$L_t(Z) = \begin{cases} 100\ \text{m}\sqrt{\frac{Z}{30}}, & Z > 30\ \text{m} \\ 100\ \text{m}, & Z \leq 30\ \text{m} \end{cases} \qquad \text{Equation (3)}$$

where, I = turbulence intensity, L_t = turbulence length scale, Z = height above ground, and α is the power law exponent used for the velocity profile in Equation (1).

Boundary conditions on all other domain boundaries are defined as follows: the ground is a no-slip surface; the side walls of the domain have a symmetry boundary condition; the top of the domain has a specified shear, which maintains a constant wind speed at gradient height; and the outlet has a static pressure boundary condition.

REFERENCES

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[3] Y. Tamura, H. Kawai, Y. Uematsu, K. Kondo and T. Okhuma, "Revision of AIJ Recommendations for Wind Loads on Buildings," in *The International Wind Engieering Symposium, IWES 2003*, Taiwan, 2003.