URBAN DESIGN BRIEF

1251 AND 1253 KING STREET EAS AND 16 SHELDON AVENUE

CITY OF KITCHENER

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PART 1 SPATIAL & CONTEXTUAL ANALYSIS

1.1 **INTRODUCTION**

MacNaughton Hermsen Britton Clarkson Planning Limited (hereinafter "MHBC") has been retained Vive Development Corporation (hereinafter the "Owner"), to provide an Urban Design Brief in support of Official Plan and Zoning By-law Amendment applications for the properties municipally addressed as 1251 and 1253 King Street East and 16 Sheldon Avenue, in the City of Kitchener (hereinafter called "the subject lands"). This Report has been prepared based on the City of Kitchener Terms of Reference for Urban Design Reports.

The subject lands are located with frontage along King Street East, Sheldon Avenue South and Charles Street East, and are currently occupied by a one storey commercial development fronting onto King Street East, with a grassed area and parking fronting onto Charles Street East. The subject lands have gross lot area of 4114.4 sq,m. (0.4 hectares) and net lot area of 3931.9 sq.m. (0.39 hectares) as a result of future road widenings.

The purpose of this Report is to ensure that a comprehensive urban design plan will be implemented to promote an attractive development that is appropriate for, and well integrated with, the surrounding community. This Report has been prepared in support of a Official Plan Amendment and Zoning By-law Amendment required to facilitate a mixed use development on the subject lands.

1.2 **CONTEXTUAL ANALYSIS & SITE DESCRIPTION**

The City of Kitchener Official Plan designates the subject lands as being located in an Urban Area and Major Transit Station Area. It also identifies the site as being located on a Regional Road (King Street East), City Arterial Street (Charles Street East) and local street (Sheldon Avenue). More specifically, the lands are located within the King Street East Secondary Plan, where they are designated as Mixed Use Corridor (Special Policy Area 1), and identified as being located on a Primary Arterial Road (King Street East) and Secondary Arterial Street (Charles Street East). The subject lands comprise a parcel of land 0.39 hectares in size, available for an infill opportunity to create a high-rise residential development on an underutilized piece of property.

Uses that immediately surround the subject lands include the following:

- **NORTH:** Immediately to the north of the subject lands is King Street East, designated an existing transit corridor. The King Street corridor contains a mix of commercial uses, including retail and office uses and an auto repair shop. Further north is a stable residential neighbourhood made up of low rise residential and other neighbourhood uses such as churches and greenways.
- **EAST:** To the east of the subject lands are low and medium rise residential uses. Further east is the Rockway Centre.





- **SOUTH:** Immediately to the south of the subject lands is Charles Street East, a planned transit corridor for bus transit services. The blocks south of the subject lands are currently vacant. Further south is the Rockway Golf Course.
- **WEST:** Immediately to the west (filling out the remainder of the King, Sheldon, Charles and Sydney block is an auto repair use shop and dance academy. Both existing uses front the King Street East frontage and contain large surface parking space areas at the rear of the properties adjacent Charles Street.

The below images illustrate the subject lands and immediate surroundings. The context plan graphic illustrates the broader surrounding context including; nearby cultural facilities, parks, recreation, and employment uses; amenities within a 10 minute walking distance from the subject lands; and the location of transit stops in relation to the subject lands.





CONTEXT PLAN

Source: Google Satellite





1.3 KING STREET EAST NEIGHBOURHOOD

The subject lands are located within the King Street East Neighbourhood Secondary Plan Area. The King Street East Secondary Plan is located in the central area of Kitchener and extends from the southerly side of Montgomery Road to the northerly side of Cedar Street and from the westerly side of Charles Street East to the easterly side of Weber Street East. The neighbourhood is adjacent to the City's Urban Growth Centre (Downtown) located immediately to the north. It straddles both sides of King Street East and is the entrance to the City and Downtown from the Conestoga Parkway. This area is home to established residential uses which enjoy the amenities of an urban neighbourhood in close proximity to several retail and food stores along Weber Street East, the downtown, the Kitchener Market, and Borden Station ION stop.

Unlike the interior of the neighbourhood and the Downtown, the portions of King Street East near the subject lands have a variety of built forms, setbacks and building heights recognizing the change and redevelopment that has occurred over time.

The subject lands represent an underutilized property in the King Street East Neighbourhood and are designated as Mixed Use Corridor, allowing for multiple residential and non-residential uses with a maximum Floor Space Ratio (FSR) of 4.0. The Secondary Plan policies balance the protection of existing lower density residential enclaves with redevelopment opportunities along King Street East through the introduction of the Mixed Use Corridor which serves as the focus for higher density redevelopment. The subject lands are located adjacent a Regional road and are sufficiently separated from the interior of the neighbourhood and established residential land uses.



1.4 HERITAGE CONSIDERATIONS

The subject lands do not contain any properties 'listed' or designated on the City of Kitchener Heritage Register as per Section 27 of the *Ontario Heritage Act*. The subject lands are also not located within a designated Heritage Conservation District or located adjacent to any properties which are either 'listed' or designated under Part IV or Part V of the *Ontario Heritage Act*. Furthermore, the subject lands are not identified in the City of Kitchener Cultural Heritage Landscapes Study as being part of any residential neighbourhood which has a potential Cultural Heritage Landscape.

1.5 **ACTIVE TRANSPORTATION AND TRANSIT**

The subject lands have frontage on King Street East, an east/west Regional Road providing direct access to Grand River Transit Bus Routes. Generally, the function of Regional Roads is to provide safe, direct, accessible and multi-modal transportation links for moving people and goods throughout Waterloo Region, and to adjacent municipalities. Existing sidewalks are located on both sides of the street, providing direct access for pedestrians to north/south streets.

The subject lands additionally have frontage on Charles Street East, a east/west City Arterial Street providing access to planned multi-use pathways and connections. The Charles Street East corridor also has direct access to the Borden ION stop – providing East/West transit connections through the City of Kitchener.

The subject lands are also located proximate to existing and planned cycling routes.



PART 2 DESIGN VISION & OBJECTIVES

2.1 VISION & DESIGN OBJECTIVES

It is envisioned that the subject lands be redeveloped to provide a contemporary mixed use development, achieving transit supportive density while remaining sympathetic to the surrounding urban context. The vision for the development is to create a contemporary expression through architectural design that provides a highly desirable pedestrian environment along the King Street East transit corridor. The project vision and proposed redevelopment of the subject lands inspire to influence future redevelopment in the area.

The following goals and objectives have been identified for the purposes of achieving the vision for the redevelopment:

- 1. Create a strong visually appealing street edge and pedestrian realm along King Street East, Sheldon Avenue and Charles Street East that will improve the streetscape and encourage active transportation modes in this location. This includes the provision a building form which address the street in terms of architectural detailing, active uses having direct access to the public sidewalk, and enhanced landscaping along all public street frontages.
- 2. Provide for development that will be supportive of transit investment in the Region and alternative transit modes, and will encourage future residents to walk to and from nearby residential, commercial, office and retail uses, services and public amenities.
- 3. Introduce additional building height within lands designated urban corridor and adjacent a designated transit corridor in a manner that is sympathetic to surrounding uses.
- 4. Achieve a high-quality of architectural design and construction that is innovative and timeless, contributing positively to the area and Kitchener's identity. Encourage contemporary architecture that complements rather than competes with the surrounding development.
- 5. Design a high quality pedestrian realm along between buildings, and within the planned open spaces to create connectivity from the site to the open space network and public sidewalk system. This objective is contemplated to be realized through the combination of massing, orientation, enhanced landscape design, pedestrian entrances, mid-block connections, architectural elements/detailing, and material selections.
- 6. Create a development which incorporates sustainable design principles and techniques.



PART 3 PROPOSED DEVELOPMENT

3.1 **DESIGN PROPOSAL**

The proposed development for the site is a high quality mixed use and multiple-residential development that will provide new residential, live-work, and commercial units near downtown Kitchener and adjacent King Street East transit corridor. The current proposed development integrates the following principle elements:

- A 24 storey mixed use residential building and a 8 storey residential building with shared amenity areas and structured parking;
- 372 residential units proposed in the form of purpose built rental units to assist in the provision of attainable housing forms.
- Approximately 484.3 square metres of two storey high retail space and residential lobby area fronting the King Street East corridor.
- 5 two-story townhouse units, approximately 44.0 sq.m. each, fronting the Charles Street East corridor.
- 178 parking spaces proposed in the form of two storeys of structured parking incorporated into the ground floor and second storey of the proposed building podium, and a single level of underground parking, including residential, visitor and commercial uses parking spaces.
- Secure indoor bicycle parking.
- One vehicular access point from Sheldon Avenue which provides access to the screened parking structure, access to the building structure for garbage and servicing purposes, and access to pedestrian drop-off and loading areas internal to the structure.
- Well defined building base and prominent building entrances will provide for an attractive streetscape along King Street East, Sheldon Avenue, and Charles Street East.
- Direct pedestrian connections from public sidewalks along King Street East, Sheldon Avenue and Charles Street East to the proposed building entrances.
- Balconies for units located in upper storeys.
- Large windows to provide eyes on the street.
- A mix of building materials and colours.
- A total lot area of 0.39 hectares, with a proposed Floor Space Ratio of 7.94.

The Owner's primary objective is to provide attainable priced housing stock on lands adjacent the King Street East Transit Corridor, designated mixed use corridor, and which have direct access to higher order public transportation and in close proximity to the downtown core of Kitchener. The proposed development promotes the development of the subject lands with an attractive and cost-efficient building form.

Site Design

Vehicular access to the site is proposed from the Sheldon Avenue frontage with all proposed parking accommodated within the interior of the building to reduce heat island effect and provide shaded areas for parking. The main building accesses and residential building lobby will be designed to connect directly and be accessible to pedestrians from to the surrounding public sidewalk system. Natural weather

mitigation strategies will be incorporated including covered building entrances. Shared and connected indoor/outdoor amenity areas will be provided on the third level of the proposed building on top of the structured parking and internal to the building structure. The common outdoor amenity area on the top of the podium level will be illustrated though the detailed landscape design process, while the indoor amenity area will be detailed on floor plans in support of the future site plan approval process.

Built Form, Massing and Articulation

The massing of the building is proposed to be broken-up using a number of techniques including changes in building materials/colours; projections; recessions; and varying window sizes. A slab tower footprint is proposed with the narrowest side of the building facing the Sheldon Avenue street frontage, helping to minimize the visual and shadow impacts onto the public realm. By facing the narrowest side of the tower adjacent Sheldon Avenue street frontage, it will assist in creating a continuous streetscape and public realm along both the King Street East and Charles Street East streetscapes.

The proposed building will provide active uses located along the King Street East and Charles Street East frontages. The use of building materials, defined pedestrian entries and building orientation will assist in creating a human scale of development. Projections above the base will provide visual interest within the tower portion of the building.

The proposed development massing has been designed with consideration to the existing and planned built form context, including high rise permissions associated with the urban corridor and location on the King Street East Transit Corridor, as well as the established low-rise residential areas north of the subject lands. The subject lands, combined with the Regional road corridors and adjacent mixed use corridor designated lands, provide for an appropriate height transition between the subject lands and low-rise residential uses in the neighborhood.

Character and Architectural Treatment

The proposed development will assist in the continued intensification and development of an urban corridor, through the addition of a mixed use and residential buildings located along a Regional Transit Corridor. The proposed building design will demonstrate a contemporary architectural expression. The development will be constructed of high quality materials and will provide an attractive design for residential units at an attainable price point.

A well defined base, selective use of building materials and colours, and the incorporation of architectural articulation all add to the visual interest of the development and will result in an attractive streetscape. The building entrances are to be well defined and highly visible from King Street East, Charles Street East, and the public realm. High quality materials including a large amount of glass are to be incorporated into the facades, resulting in an attractive and visually permeable design. Repetition of lines and windows through both vertical and horizontal articulations are encouraged to break up the building mass.



CONCEPT SITE PLAN



3.2 TRANSIT SUPPORTIVE DESIGN

The proposed development has been designed to prioritize active and public transit. The building is located with the principle entrances oriented towards both the King Street East transit corridor and Charles Street East corridor, encouraging future residents to walk to and from nearby residential, commercial, office and retail uses, services and public amenities. The development is within a few minutes walk of the Borden ION stop. Existing GRT bus stops are located on King Street East and Charles Street East directly adjacent the subject lands. The subject lands are also well connected to the City and Region's arterial road network.

The development has been designed to encourage active transit through safe and comfortable pedestrian routes adjacent the site to existing public sidewalks, and on-site cycling storage areas supportive of existing/planned regional cycling routes. The application plans to implement Transportation Demand Management measures to educate the occupants on alternative forms of transportation and active transportation, by unbundling parking, providing bicycle storage facilities in excess of the minimum requirements, providing subsidized transit passes, and car share facilities.

The proposed development supports active transportation and transit investment in the Region by providing a density supportive of higher order public transportation and alternative transit modes.

3.3 SUSTAINABLE DESIGN

As a general planning and design principle, higher density development in proximity to the amenities associated with downtowns and in support of higher-order transit is considered to be sustainable development.

Future occupants wishing to seek alternative forms of transportation will have options for walking, biking, or public transit available. This will be facilitated by the provision of indoor bicycle parking, as well as the provision of future pedestrian connections to both the existing sidewalk system and surrounding uses. The proposed development is located in close proximity to a number of transit stops, making public transit a viable option. The provision of reduced parking minimizes land consumption.

Energy efficient construction practices, building technologies, and mechanical systems will be encouraged in the development of the subject lands. A sustainability statement has been submitted in support of the Official Plan and Zoning By-law Amendment applications and provides a summary of the sustainable building design elements as required by Official Plan policies.

Detailed landscape plans prepared in support of the Site Plan application will consider the incorporation of hard landscape elements and drought resistant landscaping to reduce water consumption (where appropriate). Salt tolerant landscaping in key locations will also be encouraged. Increased topsoil depths in landscaped areas are encouraged to reduce runoff volumes.

PRELIMINARY ELEVATION KING STREET EAST FRONTAGE



EAST & SHELDON AVENUE FRONTAGES **PRELIMINARY MASSING KING STREET**



KING STREET EAST FRONTAGE **PRELIMINARY MASSING**



STREET EAST FRONTAGE **PRELIMINARY MASSING** CHARLES



CHARLES STREET EAST & SHELDON AVENUE FRONTAGES **PRELIMINARY MASSING**



RESPONSE TO CITY POLICIES & GUIDELINES & DESIGN ANALYSIS

4.1 DESIGN RESPONSE TO CITY OF KITCHENER POLICIES AND GUIDELINES

CITY OF KITCHENER OFFICIAL PLAN (2014)

The subject lands are located within the King Street East Secondary Plan Area in the City of Kitchener. The subject lands are currently designated Mixed Use Corridor. The subject lands are located within an Major Transit Station Area and adjacent to existing and planned transit corridors. Lands designated urban corridors and adjacent to transit corridors are planned to support primary intensification within the urban boundaries.

Section 11 of the City of Kitchener Official Plan contains Urban Design Policies. It is intended that the Urban Design Policies will provide guidance and direction as the City grows, develops and evolves. The following is a summary of how the proposal meets the relevant policies from Section 11 (Urban Design) of the current Official Plan:

11.C.1.11 Streetscape: The City will support the character of streets through the coordination of site, building and landscape design on and between individual sites with the design of the street.

Design Response: The proposed buildings and the primary building entrances will be oriented to the street and will include a defined building base. The proposed development will have direct access to the public sidewalk system. The proposed building façades includes a defined building base which further enhance the streetscapes.

11.C.1.13, 14 & 15 Safety: The City will apply Crime Prevention through Environmental Design principles in the review of new developments, redevelopments and infrastructure projects to implement crime prevention strategies that will enhance the effective use of the space. Where feasible, and in compliance with the other policies of this Plan, the City will ensure that the efficiency of emergency medical, fire, and police services be considered in the design of communities, neighbours and individual sites. Development applications will be reviewed to ensure that they are designed to accommodate fire prevention and timely emergency response.

Design Response: General CPTED considerations are analyzed in this Brief. The subject lands are located in a built up area within close proximity to emergency services. Emergency services vehicles will be able to access the development from the surrounding road network and the building will be designed in compliance with the Ontario Building Code including aspects related to fire prevention suppression. The proposed development is located in a highly visible location with sufficient eyes on the property from surrounding buildings.

11.C.1.30 Site Design: Policy 11.C.1.30 includes a number of factors to be considered through the Site Plan Control Process.

Design Response: The various considerations included in Policy 11.C.1.30 have been addressed through the proposed design of the site. This includes: improvements to the aesthetic quality of the site from the public realm; the provision of safe, comfortable and function site circulation; and the incorporation of mitigating techniques to minimize adverse impacts onto adjacent properties.

11.C.1.31 - 11.C.1.33 Building Design, Massing and Scale Design: The Official Plan contains three policies related to Building Design, Massing and Scale Design. These policies encourage redevelopment projects to create attractive streetscapes and to contribute to rich and vibrant urban places. These policies encourage attractive building forms, facades and roof designs which are compatible with surrounding buildings. For infill development, the policies encourage development which complement existing buildings and contribute to neighbourhood character, particularity if located within close proximity of a recognized cultural heritage resource. Architectural innovation and expression is also encouraged.

Design Response: The proposed development will provide a unique built form in the neighbourhood. The buildings are proposed to be contemporary in style using traditional materials and will be a positive addition to an area that has a wide range of building forms and architectural styles. The proposed development will improve the streetscape and will also enhance the surrounding public realm. The proposed development has been designed to complement existing buildings while still providing an intensification of the site.

CITY OF KITCHENER URBAN DESIGN MANUAL

In September 2019 Council for the City of Kitchener approved a new Urban Design Manual which contains City-wide design guidelines as well as more specific guidelines that apply to various types of development and/or various locations within the City. These guidelines are to be reviewed and evaluated with all planning processes and approvals. The purpose of the Guidelines is to ensure that new development is consistent with the City's Vision for urban design. For the purpose of this Brief we have reviewed the most relevant sections of the Design Manual: City-wide Design; Major Transit Station Areas; Nodes & Corridors; Design for Tall Buildings; and Structured Parking.

Section 9: Design for Tall Buildings is most applicable to the proposed development and the guidelines are reviewed in their entirety below. Section 1: City-wide Guidelines, Section 2: Major Transit Station Areas, Section 6: Nodes & Corridors, and Section 13: Structured Parking are also applicable, however, there are a number of overlapping directives and guidelines from Section 9: Design for Tall Buildings.

City-Wide Design Guidelines

The purpose of the City-Wide Design section of the Urban Design Manual is to set forth the universal design expectations which apply to all of Kitchener. This Section includes urban design objectives that are relevant to all geographies and building typologies and is divided into two sections: Community Design and Site Design. For the purpose of this brief we have focused on the Site Design guidelines which includes guidelines related to Built Form, Shared Spaces and Site Function with sub-categories within each of these two sections.

The proposed development has appropriately considered the **<u>City-Wide</u>** guidelines as follows:

- The proposed development focuses height and mass where it provides the best public realm opportunities while minimizing impacts on surrounding lands.
- Massing techniques are incorporated into the building design including projections, recesses, variation in colour, materials and texture, all of which help to reduce and diversify the massing of the building.
- The building is designed with a defined podium to enhance the public realm along King Street East

- The primary building entrance will be designed to be visible from and directly accessible from the public street.
- All building elevations will be designed to provide transparency, architectural continuity and visual interest. No blank walls will be proposed. As a result of proposed windows and balconies there will be sufficient natural surveillance onto the surrounding public street.
- The proposed buildings will have a contemporary design, meaning the buildings will be designed with a present-day building style, with varied architectural details, materials, colours and textures.
- The design of the building will provide for pedestrian weather protection including covered building entrances.
- Lighting will be designed according to City standards and will be designed to minimize glare and light spilling onto surrounding areas.
- Energy-efficient lamps will be used and over lighting will be avoided.
- The site has been designed with reductions in parking to reduce the demand of private automobiles.
- Driveway access to the proposed development is located off of Sheldon Avenue and Charles Street East. The site entrances provide direct access from the street to the parking area and will be screened from view of the public realm and streetscape.

Other sections of the City-Wide guidelines including Servicing and Utilities, Waste and Recycling and Snow Storage will be considered through the detailed site plan review process and prior to final site plan approval.

Design for Tall Buildings

Kitchener City Council approved the Design for Tall Buildings guidelines on December 11, 2017. The guidelines apply to all development proposals that are nine or more storeys in height. The following is a general assessment of the proposal relative to the various sections within the Tall Building Guidelines.

- The proposed building addresses King Street East, Sheldon Avenue, and Charles Street East in design, massing, and orientation and is a compatible built form for mixed use corridor designated lands, contributing toward a continuous public realm and uninterrupted pedestrian network.
- The proposed development includes one tall building and one mid rise building with a defined building base. The building base has been designed to prioritize pedestrian utility, comfort and safety.
- The base of the proposed building will be designed to engage pedestrians and contribute to an active experience, including large windows along King Street East, Sheldon Avenue and Charles Street East. Active ground floor uses are proposed along the public street frontages, including ground floor commercial area facing King Street East, and two storey townhouse units fronting Charles Street East.
- The ground floor height of the buildings will be designed such that it could support the inclusion of additional non-residential uses in the future.
- Pedestrian and cycling connections on adjacent sidewalks will be strengthened through streetscape improvements along the King Street East, Sheldon Avenue and Charles Street East street frontages.
- Enhanced landscaping that contributes positively to the public realm and promotes sustainability is proposed, and will be

implemented through the detailed landscape design process.

- Based on the criteria established in the Tall Building Guidelines– the proposed 24 storey building would be classified as a compact point tower.
- Visual variety will be provided through well-articulated massing and high quality materials.
- Building mass will be broken up through vertical and horizontal articulation, changes in materials, and architectural features.
- Appropriate setbacks and step backs will be provided in the building mass to achieve the City's physical separation guidelines.
- Balconies will be provided for residential units along street-facing elevations allowing for natural surveillance.
- Parking will be provided underground and in structured parking incorporated in the design of the proposed building. Access to the parking areas is located away from the Kind Street East frontage and is to be delineated using hard and soft landscaping from the public realm and pedestrian circulation routes.
- The structured parking incorporated into the design of the building is proposed to be screened behind active commercial uses fronting King Street East and townhouse units fronting Charles Street East.
- A single vehicle access from Sheldon Avenue is proposed. The number of vehicular access points has been limited to only those required for site function.
- Where structured parking is exposed or otherwise visible, it will be designed as a fully integrated component of the building design, including massing, materials, and articulation. No blank walls are proposed.
- Pedestrian access points, garage entrances, and openings to the structured parking are proposed to be visually permeable through the use of glazing and/or open-air screening to promote safety and natural surveillance for both users of the garage and the public. These areas will be well lit and prioritize pedestrian safety through the use of paving treatments and/or physical separation to delineate pedestrian routes, and provide memorable wayfinding and signage internally and externally.
- Design for adaptability has been considered by creating flat surfaces for parking levels with discreet ramps rather than continuously sloped 'spiral' parking structures.
- The garage driveway and entrances have been located where they interfere least with pedestrians and cyclists, the streetscape and the public realm.
- Identification signage is to be incorporated into the detailed design of the parking structure.

PHYSICAL SEPARATION

The City's guidelines include formulas for calculating physical separation between towers. Physical Separation is the measured setback in metres from a tall building tower's faces to its side and rear property lines. For the proposed development physical separation for the proposal (based on the City's formula) is calculated to be 14.02 metres.

The physical separation guidelines are, in part, intended to ensure that one tall building does not restrict the ability for an abutting property owner to also construct a tall building on their property. Rather than prescribe a fixed number for physical separation, the City recognizes that tall buildings come in all shapes and sizes, and that a dynamic, scalable approach to separation is key to providing towers that are

responsive to their specific contexts.

The tower is proposed to be setback 3.0 metres from the King Street East right of way, 6.60 metres from the Sheldon Avenue right-of-way, 39 metres from the Charles Street East right-of-way, and 14.33 metres from the western property line. The King Street East right of way has a planned right of way width of 26.213 meters in accordance with the City's Official Plan adjacent the property frontage. The Sheldon Avenue and Charles Street East right of ways have a width of 20 metres adjacent the property line. Charles Street East is also subject to an additional

RECOMMENDED PHYSICAL SEPARATION (BASED ON GUIDELINE CALCULATIONS)					
			Recommended Physical Seperation / Proportion	Provid	ed S eperation
H eight	76.60	<u>HxL</u>	14.02	16.1	North - King Street E
L ength	36.60	200	14.02	16.60	East - Sheldon Ave S
W idth	22.90	L/W	1.598	49.00	South - Charles Street E
A rea	838. <mark>1</mark> 4			14.33	West - Auto Repair Use

3.0 metre road widening conveyance. The recommended physical separation of 14.02 metres is exceeded from the proposed compact point tower.

The orientation and placement of the proposed tower represents the most logical placement for the tower within the block. The placement ensures the building mass is focused towards the Regional Transit Corridor. By orienting the tower as proposed the maximum redevelopment potential is maintained for the block on a whole.

OVERLOOK

One of the techniques to relate appropriate building height and consider compatibility with adjacent lands is through the use of physical separation calculations and overlook analysis. With respect to an overlook analysis, overlook is referred to as the overlap that exists between two neighbouring towers. It is measured as a percentage of tower Width or Length. It is determined by a perpendicular projection of one tower facade onto its neighbouring tower facade. The urban design manual provides acceptable maximum overlook percentages as a function of physical separation. As the proposed building has a recommended physical separation distance greater than 14 metres, the maximum recommended overlook between the towers is 30%.

As no existing tall buildings are located adjacent the subject lands anticipated overlook is limited. The building has been oriented on site so that the majority of the views are onto the public right of ways or internal to the subject lands. Where views overlook onto adjacent properties the tower of the building has been setback from the side lot line to provide distance between the adjacent lot where future development may occur. Window and balcony placement will be designed to provide privacy from overlook. The proposed development will additionally mitigate the impacts of overlook through privacy screening where appropriate.

4.2 **COMPATIBILITY ANALYSIS**

The subject lands are located within a Mixed Use Corridor, which are linear in form and recognize the evolution of uses along the major corridors in the inner city. Mixed Use Corridors are planned to provide residential redevelopment opportunities together with appropriate commercial and institutional uses that primarily serve adjacent residential neighbourhoods.

The subject lands are located within a block identified as Mixed Use Corridor, bound by King Street East, Sheldon Avenue, Charles Street East, and Sydney Street South. Properties within this block are generally underutilized and planned for a mix of uses which include High Intensity Mixed Use Development and Medium Intensity Mixed Use Development.

The subject lands location in the above described block provides for redevelopment that will have minimal impacts in terms of height, shadow and traffic on neighbouring land uses (such as the low density residential neighbourhood to the north — approximately 60 metres away). This low density neighbourhood is setback from King Street East and separate from the Mixed Use Corridor Block.

The subject lands are permitted to develop with a maximum Floor Space Ratio (FSR) of 4.0. There is no maximum height specified in the Secondary Plan or Zoning By-law. Notwithstanding, additional analysis has been completed to ensure minimal impacts on adjacent and nearby land uses, in particular areas designated Low Rise Residential and consideration for redevelopment of adjacent properties.

The proposed development has been designed with consideration of the following:

- The proposal is for a mixed use multiple residential building, which is a use currently permitted by the Secondary Plan and Zoning Bylaw;
- The proposed development is located on a site with no maximum height restriction;
- Shadow studies have been completed (Appendix A) which demonstrate that the proposed building height will not result in unacceptable shadow impacts on properties within the Low Rise Residential areas; and
- Pedestrian level wind studies have been completed (Appendix B) to demonstrate the proposed development will not result in undesirable pedestrian environments and provides mitigation strategies for the same.

The 2014 City of Kitchener Official Plan contains general policies related to compatible development. Where a special zoning regulation or minor variance is requested, proposed or required to facilitate residential intensification or a redevelopment of lands, Policy 4.C.1.8 of the 2014 City of Kitchener Official Plan directs that the overall impact of the special zoning regulation or minor variance will be reviewed, to ensure a number of compatibility criteria are satisfied. It is noted that Policy 4.C.1.8 applies in large part to development within established neighbourhoods. The subject lands are located along a Regional Road, are located outside of the Low Rise Residential area that forms the established neighbourhood, and are designated for high density development. Notwithstanding, the following is a response to the applicable criteria set forth in 4.C.1.8:

a) Any new buildings and any additions and/or modifications to existing buildings are appropriate in massing and scale and are compatible with the built form and the community character of the established neighbourhood.

<u>Design Response</u>: The proposed development provides for an appropriate massing and scale with respect to the Official Plan Designation (Urban Corridor and Mixed Use Corridor). The Official Plan provides policy for the future development for the subject lands and surrounding sites with respect to uses as densities. The subject lands and immediately adjacent land uses are planned for intensification that provides for a mix of residential and commercial units with increased densities which differs from what currently exists today. Currently, the subject lands and adjacent land uses are all low rise commercial/service uses. The proposed development and site specific requests align with the Urban Corridor and Mixed Use Corridor policy which provides direction for future intensification on the subject lands and adjacent properties. Given the location of the subject lands the increase in the Floor Space Ratio is appropriate as it is located within a priority area for intensification and not located near sensitive uses.

One of the techniques to relate appropriate building height to consider redevelopment of adjacent lands is through the use of physical separation calculations and overlook analysis. With respect to physical separation, the design of the building incorporates the minimum required separation distance into the building base such that adjacent lands are not precluded from re-developing as a tall building.

d) New buildings, additions, modifications and conversions are sensitive to the exterior areas of adjacent properties and that the appropriate screening and/or buffering is provided to mitigate any adverse impacts, particularly with respect to privacy.

<u>Design Response:</u> The buildings have been oriented on site so that the majority of the views are onto the public right of way or internal to the site. Where views overlook onto adjacent properties the tower of the building has been setback from the side lot line to provide distance between the adjacent lot where future mixed use development may occur.

e) The lands can function appropriately and not create unacceptable adverse impacts for adjacent properties by providing both an appropriate number of parking spaces and an appropriate landscaped/amenity area on the site.

<u>Design Response</u>: The proposed development provides adequate parking to serve the commercial and residential uses proposed on site. The development plans to implement Transportation Demand Management measures to educate the occupants on alternative forms of transportation and active transportation, unbundling parking, providing bicycle storage facilities in excess of the minimum requirements, subsidized transit passes, and car share facilities. In addition, direct connection to Grand River Transit services are available on both King Street East and Charles Street East.

Private and shared amenity spaces are also provided within the building. The majority of the units will have a private patio off of their units, in addition to a large shared outdoor amenity space on top of the podium level.

f) The impact of each special zoning regulation or variance will be reviewed prior to formulating a recommendation to ensure that a deficiency in the one zoning requirement does not compromise the site in achieving objectives of compatible and appropriate site and neighbourhood design and does not create further zoning deficiencies.

<u>Design Response</u>: The proposed zone change application will be reviewed by Planning staff prior to approval. It is our opinion that the proposed zoning will result in a development that achieves appropriate site design.

When considering compatibility, it must be weighted against other planning objectives. The subject lands are located within a Major Transit Station Area, and designated Urban Corridor which are key intensification areas within the Region and City. The planned function for Mixed Use Corridors is to provide residential redevelopment opportunities together with appropriate commercial and institutional uses that primarily serve adjacent residential neighbourhoods. The subject lands are an underutilized parcel within the King Street East Neighbourhood representing a unique development opportunity. The lands immediately surrounding the site are also designated either High Intensity Mixed Use Development or Medium Intensity Mixed Use Development.

When reviewing the land use plan for the King Street East Neighbourhood it is clear that King Street East and Charles Street East are intended to be developed at a higher intensity than the areas internal to the established residential neighbourhood of the secondary plan. The proposed development represents an opportunity to develop the site in a manner which is compatible with the area. A shadow analysis has been completed for the proposed development (**Appendix A**) to analyze the potential impact of the proposed development on surrounding properties. As confirmed in Section 4.3 of this Brief, the shadow analysis demonstrates that the height and location of the buildings will not generate unacceptable amounts of shadows over low rise residential uses in proximity to the subject lands.

4.3 MICROCLIMATE IMPACT ANALYSIS

SHADOW STUDY

A shadow impact analysis was requested to allow staff to better understand the net impact the proposed massing will have on adjacent properties or the public realm. The shadow study diagrams are included as **Appendix A**. The following is a short summary of the shadow study findings:

March/September 21: During the Spring /Fall time periods shadows fall, for the most part, within the subject lands and within non -low-rise residential properties. The adjacent mixed use corridor lands and King Street East public sidewalk will experience shadows in the morning time periods. Existing low-rise residential lands to the north and east will experience partial shadows in the early afternoon. No adjacent properties, public sidewalks, open space areas, parks or nearby low-rise residential lands will experience shadows for more than two consecutive daylight time periods during the spring/fall.

June 21: During the summer time period the shadows are generally contained within the subject lands, on adjacent public sidewalks and non-residential use lands. The adjacent mixed use corridor lands west of the subject lands will experience shadows during the morning time period. Shadow impacts are not anticipated to impact any adjacent lands or the public realm for more than four consecutive hours. Existing low-rise residential lands in the area will not be impacted by shadows from the proposed development during any time period during the summer.

December 21: Residential properties and public realm lands north and northeast of the subject lands will experience partial shadows from the proposed development throughout the day on December 21. Shadow impacts are not anticipated to impact any adjacent low-rise residential lands or public realm lands for more than two consecutive periods. Generally winter shadows are considered more acceptable as people are less likely to use their backyards during this time of year.

The shadow study diagrams demonstrate that the height and location of the building will not generate unacceptable amounts of shadows on adjacent lands, and on lands designated Low-Rise Residential.

PEDESTRIAN WIND STUDY

A pedestrian wind study has been completed by The Boundary Layer Wind Tunnel Laboratory (BLWTL)). The purpose of this study was to conduct a qualitative street-level, wind environment assessment for the proposed development. The study, attached as **Appendix B**, concludes that the proposed project is not expected to have significant impacts on the existing wind conditions off-site. No exceedances of the wind safety criterion are anticipated. Further detailed analysis and mitigation measures will be evaluated during the detailed site plan approval stage.

4.4 **CPTED CONSIDERATIONS**

The proposed development has been designed with consideration of the basic concepts of Crime Prevention Through Environmental Design (CPTED).

ACCESS CONTROL

Access Control
The principle of access control is directed at decreasing crime opportunity. The overall goal with this
CPTED principle is not necessarily to keep intruders out, but to direct the flow of people while
decreasing the opportunity for crime. The proposed development achieves access control by:

- Providing clearly identifiable, point(s) of entry into each building.
- Defining public, semi-public, and private amenity areas through the use of hardscape and landscape planting design.
- Creating well-defined site entrances for vehicular access from both Charles Street East and Sheldon Avenue.
- Consideration will be given to providing passcode protected garage entry doors.

NATURAL SURVEILLANCE

Natural surveillance occurs through the design and placement of physical features, activities and people in such a way as to maximize visibility and foster positive social interaction among legitimate users of private and public space. It is directed at keeping intruders under observation based on the theory that a person inclined to engage in criminality will be less likely to act on their impulse if he or she can be seen. The proposed development achieves natural surveillance by:

- Maximizing the number of "eyes" watching the site by creating a visual connection and maintaining unobstructed views from within the buildings to the exterior, as well as, between the streets, sidewalks, and the buildings.
- Proposing spaces and uses that are capable of generating activity (at-grade lobby/amenity areas, commercial uses).
- Placing windows along all facades adjacent to and overlooking public sidewalks, public and semi-public amenity areas, and parking areas.
- Designing lighting plans that avoid creating blind spots and ensuring potential problem areas are well lit (pedestrian walkways, stairs, entrances/exits, parking areas, recycling areas, etc.).

Natural Surveillance

3 Territorial Reinforcement

TERRITORIAL REINFORCEMENT

Territorial Reinforcement is the intentional design of the site to create a "border" between private and public property. These measures are not meant to prevent anyone from physically entering, but to create a feeling of territoriality and send a message to offenders that the property belongs to someone. The proposed development achieves the principle of territorial reinforcement by:

- Clearly delineating private from public property via: pavement treatments, entry treatments, landscaping, fencing, signage, etc.
- Delineating desired pedestrian and vehicular circulation.

MAINTENANCE

The other key aspect of CPTED is property maintenance; on the premise that good maintenance practices and upkeep send the message that the property is cared for on a regular basis.

Following construction of the development, property management and/or management by a condominium corporation will ensure that the buildings interiors and exteriors are well maintained.

The proposed development is subject to site plan approval, it is contemplated as a condition of site plan approval the owner will enter into an agreement to secure maintenance of the property for the life of the development.

4.5 **CONCLUSION**

The proposed development presented in this Urban Design Brief conforms with the policies of the City of Kitchener's Official Plan and meets the urban design objectives as well as the site specific goals and objectives identified herein. Overall, the proposed redevelopment represents a significant investment in Kitchener and will create new residential units in a high-quality development, all of which contribute positively to the surrounding neighbourhood. In summary, the proposed development will:

- Capitalize on the existing location of the subject lands in the King Street East Transit Corridor, and designated Urban Corridor and Mixed Use Corridor;
- Provide for intensification that is sensitive to the existing and planned surrounding context;
- Result in a pedestrian friendly development that supports active transportation while supporting existing and planned transit services, thereby minimizing future occupants' reliance on the automobile;
- Create strong visually appealing street edges and a defined pedestrian realm;
- Result in a more efficient and sustainable use of the property;
- Celebrate the views of the Rockway Golf Course and Stanley Park Conservation Area;
- Increase the variety of unit types within the area by offering smaller multiple residential units at an attainable price point; and
- Define the King Street East, Sheldon Avenue and Charles Street East street edges by incorporating high quality architectural detailing.

The proposed redevelopment is appropriate for this location and will contribute positively to the character and built form of the King Street East corridor. The proposal additionally supports the vision to provide a variety of high density residential uses through redevelopment on lands adjacent the King Street East Transit Corridor and transit focused neighbourhood.

APPENDIX A Shadow study

2022-03-17

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KSC 1251 & 1253 KING STREET EAST , KITCHENER, ON.

2022-03-17

APPENDIX B PEDESTRIAN WIND STUDY

Boundary Layer Wind Tunnel Laboratory

Pedestrian Level Wind Preliminary Impact Assessment King-Sheldon-Charles (KSC), Kitchener, Ontario

February 24, 2022 BLWT-K053-IR1-2022

BLWTL Project No. 21K053

Submitted To:

Vive Development Corporation 1020 King Street East Kitchener, Ontario, N2G 2M9 Canada

Submitted By:

The Boundary Layer Wind Tunnel Laboratory The University of Western Ontario Faculty of Engineering London, Ontario N6A 5B9

Peter Case, Director (Operations)

1 REPORT OVERVIEW

The Boundary Layer Wind Tunnel Laboratory (BLWTL) was retained by Vive Development Corporation to perform a preliminary wind assessment for the King/Sheldon/Charles development located at 1253 King Street E in Kitchener, ON. The site is bordered by King Street E to the north, Sheldon Avenue S to the east, and Charles Street E to the south.

Specifically, the BLWTL was engaged to carry out an initial high-level assessment of the expected pedestrian winds around the 1253 King Street E site in Kitchener, and the impact of the proposed development to comfort conditions. This qualitative approach provides a description of potential wind conditions related to pedestrian comfort, identifies areas of accelerated flows, and presents conceptual mitigation strategies. This assessment is based on drawings renderings received by BLWTL on February 22, 2022.

The proposed development consists of a 24-storey residential building (Bldg A) and an 8-storey residential building (Bldg B) with a shared 1-storey podium containing retail along the King Street side (see Figure 1). The proposed development has an overall building footprint of about 60m x 70m, with building A about 55m x 24m, and Bldg B about 58m x 17m; a roof plan is shown in the Figure 2.

Figure 1: North-South Section of Development

This report provides a qualitative streetlevel, wind environment assessment with a focus on pedestrian comfort. Discussion of the 2nd level amenity terrace space is also included. For this qualitative assessment, the local wind climate is examined in relation to the building's location, and draws upon experience obtained from related microclimate analyses. Together, this provides the basis to carry out this desktop analysis that is intended to provide a summary of the pedestrian level comfort conditions anticipated around the proposed development.

The introduction of a high-rise building development in a relatively suburban environment will invariably create local wind speed-ups for some wind directions. With that expectation, the focus is to identify and develop strategies to make wind conditions suitable for the intended usage for the affected area. For example, entry areas should have a comfort category consistent with standing activities, while sidewalks should meet the condition of being comfortable for walking.

2 Site Specific Information

The site is readily accessed by continuing about 1 km west after exiting the Conestoga Parkway (Highway 7) onto King Street or by continuing west along the Highway 8 for 1 km past the Conestoga Parkway. The site is located on the south side of King Street East and bordered by Charles Street E to the south and Sheldon Avenue S to the east. The current site consists of a 1-2 storey concrete block building with several retail stores and associated parking.

The site is generally situated in suburban environment for all approach wind directions. Locally, open field areas include the Rockway Golf Club to the south of the site. Directly west of the site are low industrial type buildings. Otherwise, out to 4 to 6 km in all directions is largely comprised of 1 and 2 storey homes. Figure 3 shows aerial views looking over the site location. Beyond the suburban areas, some 5-7 km away in many directions, the terrain opens up to a more expansive open country exposure.

Figure 3: Aerial views looking northeast over site (top) and southwest over site (bottom) (images courtesy of GoogleEarthTM)

3 Assessment of Wind Conditions

3.1 General

The criteria used at the BLWTL for the assessment of pedestrian comfort are categorized by typical types of activity (walking, standing, sitting). In general, wind conditions suitable for walking are appropriate for sidewalks and parking areas. At entrances, lower wind speeds that are comfortable for standing are preferred. For amenity spaces, including public terraces, it is often desirable to have lesser winds suitable for sitting or long-term standing, depending on the intended use. If the criterion for walking is not satisfied, then a sidewalk area would be classified as uncomfortable for the intended usage. These criteria are more fully described in Appendix A, along with some other general details relevant to a pedestrian wind speed assessment, including a description of directional winds by season for the Kitchener-Waterloo area.

The adjacent insert shows the predicted wind speeds exceeded 5% of the time on an annual basis for typical suburban and open country locations in K-W. These are compared to the different comfort categories (further described in Appendix A). In terms of comfort, winds expected in a typical suburban (S) environment are expected to be suitable for long sitting and therefore suitable for most activities regardless of duration. In a typical open country (O) environment, the winds can be expected to be somewhat more intense and suited for standing or leisurely walking. In summer, predicted winds can be expected to be lower than the annual winds shown, while in winter months higher winds speeds can be expected.

Note that local winds will be influenced by their immediate surroundings. For example, a broad building will undoubtedly cause downwash winds, creating local wind speed-ups at ground level particularly at building corners. Appendix B shows images of some typical wind patterns around midrise and tall buildings.

3.2 Existing Wind Conditions

The site for the proposed development at 1253 King Street E is currently the location of a 1-2 storey concrete block building containing several retail shops facing King Street E and associated parking space at the rear. Apart from the Rockway Golf Club, which is located about 200m to the south, the site is surrounded by some industrial style buildings to the west, and residential areas in other directions. This makes the site predominantly situated in a typical suburban environment, and therefore it would be expected to experience winds consistent with a suburban environment. For wind from the southern quadrant, coming over the golf course, marginally stronger winds can be expected, approaching those typical of an open country environment.

Based on these surroundings, existing wind conditions on the site property and at adjacent properties are expected to be comfortable for standing in the summer, and for walking or standing in the winter.

3.3 Predicted Wind Conditions – 1253 King Street E Development 3.3.1 General

Entries/exits to the development are indicated in Figure 4. The main entry is located near the northwest corner at King Street E Level. Note that the King Street level is 1 floor above the Charles Street E level. Also along the north face are retail spaces with anticipated access directly from the King Street E sidewalk area. Secondary resident entries can be found at the southwest and southeast corners at the Charles Street E level. At the Charles Street level along the south are townhouse (TH) units with private access from Charles Street E level. The 2nd Level outdoor amenity terrace has both locations for private (TH) access and general access.

Specific landscape plans have not been provided at the time of this reporting. Strategic landscaping is expected to be instrumental in achieving desired comfort levels at many locations. Trees, and planters, can disrupt the effects of downwash winds at street level, as well as the wind pattens around building corners. For some phenomena, windscreens, canopies, or overhead trellises can be effective.

KING STREET EAST

Figure 4: Plan indicating ground level and outdoor amenity locations of entries/exits.

Throughout the site of a high-rise development flow patterns can be complex. Appendix B demonstrates some typical wind patterns around a tall structure. Appendix C further demonstrates some flow patterns and describes some of the associated problems including downwash effect, venturi effect (funnelling), and confined horseshoe vortex; these can lead to locally accelerated wind flow at ground and terrace levels. Figure 5 demonstrates some typical horizontal wind patterns expected around the King-Sheldon-Charles development site that can be relevant to the current assessment; many of these patterns are affected by the more common westerly wind directions.

KING STREET EAST

CHARLES STREET EAST

Figure 5: Illustration of select flow patterns that can develop around site.

Downwash effects will be most intense across the broader faces of the building. Downwash effects can be expected for common southwesterly wind directions and affect areas south of the development (along Charles Street E) as well as through the terrace area. Downwash effects along King Street East can also occur for northerly winds, but as these wind directions are less frequent they are not expected to be significant to meeting the desired comfort category along the sidewalks.

3.3.2 Discussion of Expected Comfort Conditions

The general zoning to the west is industrial area with scattered parking lots. To the south is typical exposure golf course. To the north and east is residential.

No landscape plan has been reviewed at the time of this report; landscaping is often beneficial to the local wind environment. The wind conditions at adjacent properties is not expected to be greatly influenced by the introduction of the proposed King-Sheldon-Charles (KSC) development, and sidewalk areas around neighbouring properties are expected to be appropriate for the intended usage (walking) year round. Some areas directly adjacent to the KSC development, as well as on-site locations are expected to require some strategies to improve upon the comfort levels. Specifically, the outdoor amenity space between the two towers is expected to be susceptible to high localized winds due to funnelling, confined vortex formations, and downwash. Furthermore, sidewalks and entries on the Charles Street E side of the development will experience downwash across the broad face of the south building (BLDG B). Suggestions are provided for improving the usability in these localized areas.

The following is an overview of some specific areas of interest and detail some mitigation strategies:

 <u>Charles/King/Sheldon sidewalks</u>: While downflow off the north face of the north building (BLDG A) is expected for northerly to north-easterly wind directions, the occurrence of these winds is infrequent. During the summer season, the sidewalk along King St. East is expected to experience wind suitable for standing year-round.

Downflow off the broader south face of the south building (BLDG B), particularly for frequent westerly to southwesterly wind directions, can have an impact at street levels and corners adjacent to Charles Street E. Flow off these faces will reach ground level where speed-up along the street and around the tower corner will occur on the Charles St. E side. During the summer season, the sidewalk along Charles St. E is expected to experience wind suitable for standing or walking. During the windier winter months, conditions along sidewalks are expected to be suitable for walking or brisk walking. To improve the wind conditions in these areas, the installation of coniferous planters or trees along the street in suggested. Also extending the privacy windscreens or fences between townhouse units can disrupt flow. See Figure 6 for illustration.

Figure 6: Street line trees (preferably coniferous) and extension of privacy wind screens/fences is beneficial to winds along Charles Street.

The Sheldon Avenue S sidewalk is expected to be generally suited for standing or walking activities year-round.

2. <u>Main entries and secondary entries at Street levels:</u> The primary ground level entry and secondary entries are identified in Figure 4. Some of these are located near building corners and can be susceptible to locally accelerated flow.

At the main northwest building corner entry, winds are expected to be comfortable for the intended usage (standing or better) during the summer season, but may be suited for walking during winter and spring seasons. Inclusion of landscaping or windscreens at this corner, as per Figure 7, will further provide assurance of comfort levels throughout the year and improve wind conditions to standing year-round, appropriate for entry areas.

Figure 7: Coniferous trees or windscreens at the northeast corner will help protect entry from westerly winds.

Retail entry areas along the King St. East side will largely be protected from common westerly winds and suited for standing or better year-round.

The private townhouse entries along the south side of the building adjacent to Charles St. will benefit from extended privacy fencing as illustrated in Figure 6.

The secondary entry on the east face of the development, and just north of the southeast corner, is expected to be suited for standing activities year-round; this is suitable for entries and sidewalks.

At the secondary entry at the southeast corner downwash effects are expected to be most pronounced. Localized mitigation in the form of windscreens and/or coniferous plantings is suggested to make this area comfortable for standing - see Figure 8.

Figure 8: Protection in the form of windscreens and/or coniferous trees at corner recommended

3. <u>Amenity Terrace</u>: The outdoor amenity terrace is susceptible to several wind phenomena, including downwash from the south face of the north building (BLDG A), confined horseshoe vortex formation from southerly winds, and funneling between the buildings. As is typical, many effects can be more pronounced near building corners.

These phenomena can be problematic at entry areas to the amenity space. Flanking these entry/exit doors by windscreens or shrubbery can be effective. An extended overhead canopy over can lessen the effect of confined vortex formation, as well as lessen the impact of downwash winds from the north building (BLDG A). General mitigation over the terrace includes an increased height perimeter railing (5-6ft), staggered landscaping and hardscaping (windscreens, planters), and evergreen landscaping near perimeter rails, would also improve overall wind conditions through the terrace areas, including near entryways to the amenity terrace.

Introduction of combinations of the proposed mitigation strategies (see Figure 9) would improve the terrace comfort to standing/sitting during the summer months, and suitable for standing/walking during the winter months. The terrace entry areas are expected to be suited for standing or better year-round with proposed mitigation.

Figure 10 illustrates some of these landscape/hardscape features that can be adopted to mitigate local winds through the terrace level, as well as at ground level locations. Overhead trellises through the terrace area can also add a degree of benefit to winds in that area.

Figure 9 Suggested mitigation for amenity space can include shrubbery, windscreens, increased railing, and canopy(s).

Figure 10: Sample landscape/hardscape features to mitigate local winds a) 3-5' planters with evergreen shrubbery, *b*) 6-10' evergreens in rows, *c*) and *d*) 6' (min) windscreens staggered or continuous.

4. <u>Building Corners:</u> In general, all building corners can be expected to experience increased winds. Placement of evergreen shrubbery and planters can be effective at softening these effects, as well as act to keep pedestrian traffic away from high wind areas. Figures 6 and 7 have illustrated proposed planting for some ground level corners. Additional greenery near the northeast corner (see inset to right) would also be beneficial, particularly if retail entries are proposed for this area.

5. <u>Adjacent Properties:</u> The development is not expected to have a significant influence on winds at neighbouring properties, i.e. the comfort categorization of adjacent properties is expected to remain similar to that for the existing configuration. Modestly increased winds can be expected to the north and south of the site for westerly wind directions. This is not expected to impact comfort levels at adjacent buildings or entries.

4 SUMMARY

The BLWTL was engaged to carry out an initial high-level assessment of the expected pedestrian winds around the King-Sheldon-Charles development at 1253 King Street East site in Kitchener, and the impact of the proposed development to comfort conditions. This qualitative approach provides a high-level description of potential wind conditions related to pedestrian comfort, identifies areas of accelerated flows, and presents conceptual mitigation strategies.

The development is not expected to have a significant influence on winds at neighbouring properties, i.e. the comfort categorization of adjacent properties is expected to remain similar to that for the existing configuration and/or suited for the intended usage.

The main public street level areas along King Street E and Sheldon Avenue S are expected to experience wind conditions consistent with the intended usage year round, this includes the entrances and sidewalks. Along Charles Street E some wind phenomena can lead to accelerated flows at adjacent sidewalks and mitigation is expected to improve winter and spring winds to recommended comfort levels.

The northwest entry (main) and southeast (secondary) entry door are anticipated to require local mitigation to make those areas suitable for entries (i.e. standing category or better).

Conceptual mitigation has been provided to further improve upon expected wind conditions in specific areas. Evergreen trees at all corners of the development would be beneficial to mitigate downwash effects and local speed-ups.

For the amenity space it is often desirable to meet more stringent comfort classification. Strategies have been identified to improve upon comfort, with focus on extending summer usage of the area.

5 Applicability of Results

The assessments and recommendations in this report are based on the understanding of the proposed development as per site plans provided to the BLWTL on February 22, 2022. The qualitative assessment is made in context of the proposed building configuration in relationship with existing surroundings and the proposed site building. This information cannot and should not be used for analysing building façade pressures, door pressures, exhaust re-entrainment, etc.

In the event of changes to the proposed development or proposed buildings around the development, the assessment made herein may be influenced. In the event of such changes, the BLWTL should be contacted to make an appropriate reassessment.

These qualitative results are not to replace a detailed quantitative study(s) required for future planning stages of the development. Given the expected wind conditions, the proposed mitigation should be developed and evaluated using quantifiable wind tunnel testing.

APPENDIX A GENERAL DETAILS PERTAINING TO THE ASSESSMENT OF PEDESTRIAN LEVEL WINDS AND COMFORT

A.1 Meteorological Data

Wind climate data are based upon wind records taken at the Region of Waterloo International Airport (ISD Station 713680) between 1976 - 2017. Figure A-1 shows the distributions of wind speed frequency by direction for the four seasons. For the spring and summer seasons westerly to north-westerly winds are predominant. During the autumn season and especially the winter season the winds from the south-westerly to westerly directions become relatively more predominant. The winds presented in the windrose data are measured at 10m. Representative ground level winds might then be expected to be somewhat lower than those indicated on the windrose in a uniform terrain. The wind climate at the site is dependent on wind direction and will be influenced by and dependent upon the terrain type over which it travels.

Figure A-1 shows the wind directionality for ranges of wind speeds. Stronger winds are indicated in the outermost contours. Winds over 40 km/hr are shown as the outermost colour zone in the contour plots. During the autumn, spring, and winter months winds over 40 km/hr are expected to occur about 3%, 4%, and 5% of the time, respectively. During summer months, a wind speed of 40 km/hr is expected to occur less than 1% of the time.

A.2 Criteria for Comfort Assessment

The criteria used at BLWTL for the assessment of pedestrian comfort are categorized by the following types of activity.

- Standing, Sitting for long exposure (< 14 km/hr): Wind felt on faces, leaves rustle slightly. Suitable for promenades, outdoor restaurants, or park benches where people may linger for long periods to eat, relax, or read a newspaper.
- Standing, Sitting for short exposure (< 22 km/hr): Leaves and small twigs in constant motion; wind extends light flags. These winds are comfortable for building entrances or bus stops where people are likely to linger for a short time.
- Leisurely Walking (< 29 km/hr): Raises dust and loose paper; small branches are moved. Wind speeds experienced are appropriate for activities which involve slow walking such as a leisurely stroll or window shopping.
- Fast Walking (< 36 km/hr): Small trees in leaf begin to sway; can cause movement to hair and loose clothing. Areas experiencing these winds would be appropriate for sidewalks, parks, or playing fields where people are active with little notice of moderate wind activity and unlikely to be in one location very long.

Wind conditions are considered suitable for the corresponding activity if the wind speeds are expected to last 95% of the time. A designation as uncomfortable would exist for winds that fall outside these criteria.

Safety is also considered on the basis that winds, if sufficiently large, will affect a person's balance. If such wind events occur more frequently than suggested then the wind conditions would be considered unsafe. Where such conditions exist, mitigating or remedial measures would typically be required to improve conditions to acceptable levels.

A.3 Pedestrian Wind Speed Assessment - General Comments

In the assessment of winds particular to a site there are many variables that must be considered in predicting the wind speed and occurrence rates. These include, but are not limited to: the aforementioned wind climate; the surrounding upstream terrain conditions; the juxtaposition and orientation of neighbouring buildings; and the geometry of the proposed buildings themselves. For a qualitative analysis, past analyses carried out for a number of buildings in various locations have afforded a good experience base which allows a knowledgeable assessment of wind conditions at and around the proposed development.

In general, suburban settings provide surface roughness that can moderate wind conditions downstream, while more open expanses allow the oncoming wind to travel unobstructed. Winds also have a tendency to accelerate up sloped or hilly terrain, the magnitude of which also depends on the level of vegetation on and around the embankment.

On a more local level, flow around an individual building is influenced by the building's orientation to the wind as well as the building height. Winds tend to accelerate locally around building corners as the wind tries to finds a way around the obstruction. Buildings in close proximity and oriented at 90° to each other can 'funnel' local approach winds, thus accelerating the flow between the buildings. For mid-rise buildings, some wind can be redirected downward over the face of the building, accelerating around corners as it reaches the ground levels. However, strategically located canopies or podiums can be beneficial in deflecting these 'downwash' winds before reaching ground level, thereby improving pedestrian comfort.

With respect to wind, it can be expected that conditions will be calm directly in the lee of a building. It should be realized that in areas that may be exposed to the direct sun, particularly in the summer months, some breeze can be favourable to the overall area comfort. Furthermore, some gentle breezes in any area do afford an exchange of air, preventing heavy stale air to accumulate as might be the case in wind-quiet or dead zones.

The inclusion of any new development can be expected to ultimately alter the wind conditions at a site for specific wind directions and wind speeds as compared to the pre-development conditions. However, it is not practical to attempt to quantify the winds speeds in an area, given the number of variables involved, without an appropriate quantitative analysis.

Figure A-1: Windroses showing directional distribution of seasonal wind (centered on a 10° sector): Based on data from Waterloo International Airport.

APPENDIX B

EXAMPLES OF WIND EFFECTS AROUND MIDRISE AND TALL BUILDINGS

Boundary Layer Wind Tunnel Laboratory

APPENDIX C

ILLUSTRATION OF SOME PROBLEMS AND SOLUTIONS TO WIND EFFECTS AROUND BUILDINGS

Solutions

Stepped pedestal: downwash is prevented from reaching street level.

Covered walkways: (a) enclosed canopy deflects downwash; (b) open sides provide some breeze under the canopy; (c) canopy open at both ends is only a partial solution: if the wind direction is such that it blows right through, a venturi effect is created.

Recessed plaza: wind passes over lowered area.

Windscreens and landscaping: wind is broken up and pedestrians are introduced gradually to windy areas.

Public indicators: flags provide warning of unavoidable high-wind areas.

