CITY OF KELOWNA

TRAFFIC SAFETY RISK MANAGEMENT

FOR DOWNTOWN OUTDOOR SEATING AREAS

FINAL REPORT

Engineering and
Planning Consultants

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FINAL REPORT

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EXECUTIVE SUMMARY

The City of Kelowna has in recent years approved a number of outdoor seating locations in the Downtown area. All outdoor seating locations are extensions of existing coffee shops, restaurants and pubs. The seating is either separated from the adjacent premises by the sidewalk, or the sidewalk is detoured around the outdoor seating area and separated from vehicular traffic by railing. Generally, the additional sidewalk seating was achieved by the removal of adjacent parking stalls.

As a risk management strategy, the City is interested in establishing a formal process to evaluate from a traffic safety perspective the suitability of candidate outdoor seating locations. The City retained Hamilton Associates to develop such a process to be used by City staff in evaluating future applications.

The objective of this study is to develop an analytical process that the City can adopt to evaluate from a traffic safety perspective the suitability of candidate outdoor seating locations. The analytical process consists of an objective evaluation matrix that can easily be applied to any candidate location, with calibrated threshold values suitable for Kelowna.

Further to a review of current practice in Kelowna and other jurisdictions, the following basic requirements were established for the evaluation matrix:

- Simple – easily understood;
- Objective – easily quantifiable and measurable;
- Repeatable – similar results should be obtained by different analysts; and;
- Transparent – results can be easily explained and justified.

Patrons at a sidewalk seating area, and pedestrians along a sidewalk that is detoured around a seating area, are exposed to risks due to the proximity of adjacent traffic. The risk of crashes is a function of exposure (traffic volume), probability (design features), and consequence (collision severity). On this basis, the following criteria were selected for inclusion in the evaluation matrix:

Exposure Measures:

- Vehicular volumes.

Probability Measures:

- Width of the traffic lane.
- Distance to the nearest intersection.
- Presence of street lighting.
- Presence of parking stalls (angle or parallel) buffering the seating area.
- Complexity of the surrounding roadway and sidewalk environment.

Consequence Measures:

- Operating speed along the roadway.
- Percentage of heavy vehicles along the roadway.

A scoring, weighting, and interpretation system was developed and tested. The final form of the evaluation matrix is presented in FIGURE 3.1. The matrix allows the City to determine whether a candidate outdoor seating area presents minimal, low, moderate, or high traffic safety risks. Mitigation measures (described in Section 4) can be considered to reduce the risk of sites that are deemed to have a relatively high risk. The results produced by the matrix at seven Kelowna locations were found to be reasonable and consistent with the judgment of City staff.

The evaluation matrix developed in this study meets the basic requirements of being simple, objective, repeatable and transparent. It is suggested that the City actively use this evaluation matrix for the next 12 months. After gaining one year of practical experience, the matrix details may be fine-tuned to ensure that it fully meets the requirements of the City.

1.0 INTRODUCTION

1.1 Background

The City of Kelowna has in recent years approved a number of outdoor seating locations in the Downtown area. All outdoor seating locations are extensions of existing coffee shops, restaurants and pubs. The seating is either separated from the adjacent premises by the sidewalk, or the sidewalk is detoured around the outdoor seating area and separated from vehicular traffic by railing. Generally, the additional sidewalk seating was achieved by the removal of adjacent parking stalls.

As a risk management strategy, the City is interested in establishing a formal process to evaluate from a traffic safety perspective the suitability of candidate outdoor seating locations. The City retained Hamilton Associates to develop such a process to be used by City staff in evaluating future applications.

1.2 Study Objectives

The objective of this study is to develop an analytical process that the City can adopt to evaluate from a traffic safety perspective the suitability of candidate outdoor seating locations. The analytical process consists of an objective evaluation matrix that can easily be applied to any candidate location, with calibrated threshold values suitable for Kelowna.

1.3 Study Methodology

The following tasks were undertaken to complete this study:

- A review, evaluation, and summary of existing policies, practices and guidelines related to outdoor seating at the City of Kelowna and other jurisdictions;

- The identification of relevant measurable criteria and factors that could affect the safety of outdoor seating;

- Discussions with City staff and site visits to determine the potential safety issues and how these can be quantified;

- The development of a draft evaluation matrix for reviewing the safety implications of outdoor seating sites;

- Field testing of the draft evaluation matrix at sample locations by Hamilton Associates and City of Kelowna staff;

- Revision to the evaluation matrix to reflect the findings of the field test; and,

- Preparation of draft and final reports to document the study process and findings.

2.0 STATE-OF-THE-ART REVIEW

2.1 Scope

This study addresses outdoor seating permitted for businesses engaged in the food and beverage services in the City of Kelowna. The seating occupies the public sidewalk or roadway and generally occupies a space as wide as the business frontage. The business establishment requires a permit from the City and must meet the permit requirements.

2.2 Current City of Kelowna Policy and Procedure

The City of Kelowna has developed a program and policy for sidewalk seating and café extensions to make the business district more attractive to visitors and residents. The Kelowna program may permit two main types of configurations that allows a food and beverage business to occupy a public sidewalk and roadway as an extension of their adjacent establishment.

Temporary Sidewalk Seating

A food and beverage business may be allowed to utilize space on the public sidewalk directly in front of the place of business, with the stipulation that a minimum of two metres clear sidewalk width must be maintained for pedestrian movement. The permit area is marked on the sidewalk by the City. Fencing can be provided by the permit holder to coincide with the area marked by the City.

Seasonal Extension for Sidewalk Cafés

A food and beverage business may be allowed to occupy the entire width of the sidewalk and a portion of the roadway to a maximum depth of 2.5 metres from the face of the curb in areas of on-street parallel parking or to a maximum depth of 4.0 metres from the face of the curb in areas of on-street angle parking.

The pedestrians are diverted around the seating extension by a two-metre wide walkway. The walkway must be separated from traffic and the seating area by a one-metre high fence. A permit may be issued to occupy a minimum of one and a maximum of two parallel parking stalls or a minimum of two and a maximum of three angle parking stalls.

The City of Kelowna's Terms of Reference for sidewalk cafes describe the permitted uses, fees, design considerations, insurance requirements and other operating requirements. A drawing of a typical layout of a sidewalk extension, extracted from the Terms of Reference, is shown in FIGURE 2.1.

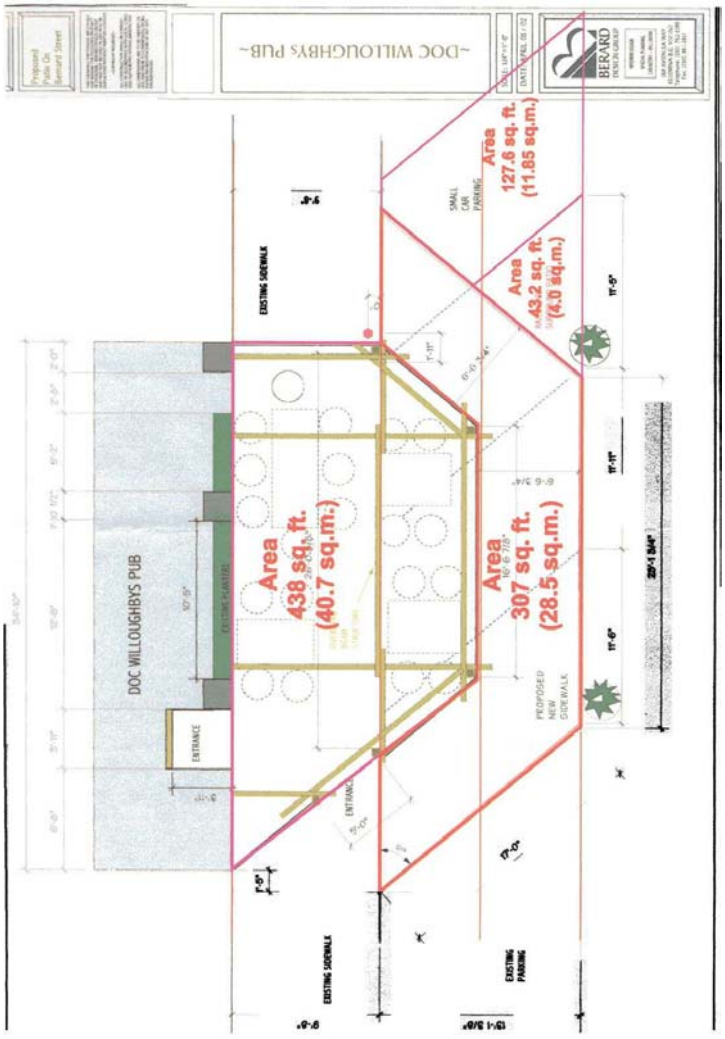

FIGURE 2.1 TYPICAL OUTDOOR SEATING LAYOUT

2.3 Safety Related Issues in the City Policy

The City of Kelowna Policy addresses the following pedestrian and vehicle safety related issues:

- The permit area must conform to the sight lines established in Section 2.2 of the City of Kelowna Traffic Bylaw;
- All aspects of the facility must meet the provisions of the Traffic Bylaw No. 8120;
- Construction to conform to the BC Building Code;
- Seating area to be a non-slip, all weather surface;
- Cupping or flexing of wood should not create a tripping hazard;
- Walkway to have a minimum of two metres width that can't be reduced by overhanging vehicles or any other elements;
- Where the walkways includes ramps they shall meet the BC Building Code, including the provision of handrails;
- A continuous one metre vertical fence must separate the seating area from the roadway and adjoining parking stalls;
- A high degree of contrast is encouraged to increase the visibility of fences;
- If the short depth of an angle parking stall creates a safety hazard the City reserves the right to remove the stall;
- No signage is permitted in the permit area of a sidewalk seating area;
- Concrete planters, with object markers, shall be placed to protect patrons from vehicular traffic on the road right-of-way, including vehicles entering and exiting adjacent parking stalls;
- Permit holders to keep all surfaces free of ice and snow and provide secure footing in all weather conditions;
- Permit holder to keep roadway and parking areas clear of ice and snow in areas that cannot be accessed by City crews;
- Lighting of the outdoor seating facility shall be located so as not to be directed onto the roadway that would impede the visibility of motorists or would in any way interfere with the effectiveness of any traffic control device; and,
- There can be no change in elevation between the walkway and the adjoining sidewalk surface.

Some features of existing outdoor seating areas in downtown Kelowna are shown in FIGURE 2.2.

(a) Concrete barrier are placed to reduce the probability of an errant vehicle entering the pedestrian walkway and seating area. Object markers are installed to make the planter more visible. A short parking stall is reserved for motorcycles.

(b) A typical sidewalk seating area that occupies the entire sidewalk in front of the food and beverage business. The pedestrian walkway is detoured onto the street in the area occupied by parallel parking. Fences are provided to separate the walkway from the roadway and seating area.

(c) A typical sidewalk seating area that occupies the angle parking stalls and a portion of the existing sidewalk. A two-metre wide sidewalk is provided to bypass the area.

(d) A typical sidewalk seating area that occupies a portion of the existing sidewalk. A two-metre wide clear area is provided for pedestrians to pass by the seating area.

FIGURE 2.2 FEATURES OF SIDEWALK SEATING AREAS

2.4 Practices from Other Cities

The policies and practices from some other cities were reviewed, including the Cities of Ashland and Redwood in United States and the Cities of Sidney and Shellharbour in Australia. This task was not intended as a thorough review of practice, but rather a quick scan of documents generally available on-line.

Although all the guidelines that were reviewed refer to safety as an objective, none of them includes an explicit evaluation of traffic safety issues as part of a risk management strategy for outdoor seating areas. Some highlights of the policies are summarized below.

City of Ashland, Oregon, United States

An ordinance (no. 2811) was added as Chapter 6.44 of the Ashland Municipal Code (www.ashland.or.us/Page.asp?NavID=819) to regulate sidewalk cafes in April 2002. The purpose of the Chapter is to permit and encourage sidewalk dining that is compatible with other uses of the public sidewalk. The policy states that sidewalk cafes encourage a pedestrian-oriented environment help to create a visually attractive atmosphere and streetscape, and promote overall commerce.

A clear and unobstructed passageway at least six feet (1.8 metres) wide must be provided for pedestrian movements. The sidewalk café shall be located five feet (1.5 metres) from driveways and alleys and ten feet (3.0 metres) from intersections. Requirements for liability and insurance, application procedures and penalties are also included in the Ordinance.

City of Redwood, California, United States

The Downtown Sidewalk Café Design Guidelines policy was adopted by City Council (www.ci.redwood-city.ca.us/cds/planning/policies.html) in September 2001.

The purpose of these guidelines is to provide standards for sidewalk café uses in order to enhance the quality and safety of the pedestrian experience in the Downtown, and reinforce its sense of place and economic vitality. Sidewalk café areas are subdivided into five zones, including the Adjacent Zone, Café Zone, Pedestrian Zone, Buffer Zone, and Vehicular Zone.

According to the typical clearance requirements, a clear pedestrian path with a minimum width of five feet (1.5 metres) should be provided at all times, and all crosswalks must intersect with the Pedestrian Zone maintaining a five feet (1.5 metres) width. Photographs and diagrams showing all sidewalk patterns and activity zones are included. Café furniture guidelines, operation and maintenance issues, and a standard permit application form are also provided in the Guidelines.

City of Sydney, New South Wales, Australia

The City Council adopted the Outdoor Café Policy in November 2001 (www.cityofsydney.nsw.gov.au/catz_council_policies.asp) to provide simple procedures and urban design guidelines to encourage the establishment of outdoor cafes wherever feasible and appropriate throughout the City. The policy indicates that the important assessment criteria include pedestrian and vehicular circulation, convenience and safety of patrons and the general public, existing streetscape elements and, in residential areas, residential amenity.

In general, a clear distance of at least two metres must be maintained adjacent to the seating area for pedestrian circulation, and the café must be located at least 0.8 metres from the curb edge to provide a safety buffer from vehicles. Diagrams showing different opportunities for locating and aligning the outdoor café are provided. Furniture guidelines, management issues and application procedures are also included in the Policy.

City of Shellharbour, New South Wales, Australia

The Sidewalk Eating Development Control Plan was adopted by City Council (www.shellharbour.nsw.gov.au/index.pl?page=85) in June 1999, and amended in October 2003. The plan provides a simple set of guidelines to assist in the establishment of sidewalk eating opportunities in the City. One of the major objectives is to ensure that sidewalk eating areas are safe and accessible for all people, including those with disabilities.

The plan indicates that the preferred location for sidewalk eating areas is away from the building edge to allow for undisrupted pedestrian movement along the front of adjacent proprieties.

A minimum width of two metres must be provided at all time adjacent to the licensed area, and a 0.8 metre buffer zone is required adjacent to the curb to allow the opening of doors and unloading of vehicles. To maintain clear vision and sight distances near driveways and intersections, furniture must be set back at least two metres from building corners at any intersection. The plan also indicates that the sidewalk seating area is to be clearly defined by the use of fencing and/or paving using materials approved by City Council.

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3.0 EVALUATION MATRIX

3.1 Basic Requirements

The process of evaluating a candidate site for suitability as an outdoor seating area involves applying an evaluation matrix that accounts for all relevant factors that may affect traffic safety risks. The following basic requirements were established for the evaluation matrix:

- Simple – easily understood;
- Objective – easily quantifiable and measurable;
- Repeatable – similar results should be obtained by different analysts; and;
- Transparent – results can be easily explained and justified.

3.2 Traffic Safety Criteria

Patrons at a sidewalk seating area, and pedestrians along a sidewalk that is detoured around a seating area, are exposed to risks due to the proximity of adjacent traffic. The risk of crashes is a function of exposure (traffic volume), probability (design features), and consequence (collision severity). On this basis, the following criteria were selected for inclusion in the evaluation matrix:

Exposure Measures:

- Vehicular volumes in the traffic lane adjacent to the outdoor seating.

Probability Measures:

- Width of the traffic lane adjacent to the outdoor seating.
- Distance to the nearest intersection, excluding driveways and lanes.
- Presence of street lighting.
- Presence of parking stalls (angle or parallel) buffering the seating area from approaching traffic.

- Complexity of the surrounding roadway and sidewalk environment, including visual clutter, distractions or road network / traffic control elements that increase the driver work load. This qualitative criterion aims to capture the likelihood of drivers committing errors due to external circumstances. Specifically, the presence or absence of the following elements may be considered in measuring complexity:
    - Proximity of driveways and back lanes;
    - Curvature of the roadway;
    - Road Grade;
    - Pedestrian volumes, and,
    - Road signs.

Consequence Measures:

- Operating speed along the roadway adjacent to the outdoor seating area, during the hours of outdoor seating operation.
- Percentage of heavy vehicles, including buses, along the roadway adjacent to the outdoor seating.

It is noted that the evaluation matrix is independent of the current or expected sidewalk pedestrian volumes, since this dynamic variable may be influenced by the seating area itself. As well, road grade was included in the complexity criterion, since downtown Kelowna is generally flat. If this evaluation matrix is to be applied in other areas where vertical alignments vary, it should be revised to include road grade as a separate criterion.

3.3 Scoring, Thresholds, Weighting and Interpretation

Scoring

Each criterion was assigned a three point scoring system (1, 2, or 3), with higher scores representing a higher risk. The total score for each site is the sum of the points assigned for each criterion, after adjusting for weighting.

Thresholds

The thresholds that determine the score for each criterion (1, 2, or 3) were initially determined using the judgement of Hamilton Associates and City of Kelowna staff. The thresholds were then validated and adjusted further to office and field tests of the matrix.

Weighting

Further to the testing of the evaluation matrix, two criteria were judged to be of higher importance when assessing the traffic risks:

- The distance to the nearest intersection; and,
- The complexity of the roadway and sidewalk environment.

These two criteria were therefore given a weighting of "x2", such that the assigned scores are 2, 4, or 6 rather than 1, 2, or 3.

Criteria Combinations

The combination of narrow travel lanes with high truck volumes was judged to increase the risk of collisions, so additional points are assigned if relatively narrow travel lanes and relatively high truck proportions are present.

Score Interpretation

The highest score than can be achieved with the evaluation matrix is 32, while the lowest score is 10. Further to the office and field tests conducted on actual sites, the total score interpretation was established and are summarized in TABLE 3.1.

TABLE 3.1 SUMMARY OF SCORE INTERPRETATION

SCORE	EXPECTED RISK	NOTES
15 or less points	Minimal	Locations receiving this score are suitable for outdoor seating areas without further review
16 to 19 points	Low	Locations receiving this score are likely suitable for outdoor seating areas, subject to a brief review and possibly a few simple mitigation measures.
20 to 23 points	Moderate	Locations receiving this score may be suitable for outdoor seating areas, but a review should be conducted and several mitigation measures may be needed prior to implementing the outdoor seating area.
24 or more points	High	Locations receiving this score are unlikely to be suitable for outdoor seating areas. A thorough review and possibly significant mitigation measures may be required.

Sample mitigation measures are discussed in Section 4.

3.4 Evaluation Matrix

The evaluation matrix proposed for the assessment of outdoor seating area location suitability is shown in FIGURE 3.1. The criteria, units of measurements, threshold values, and scoring are all clearly defined on the matrix. The issues that contribute to the complexity of the road and sidewalk environment are also noted on the matrix.

KELOWNA DOWNTOWN OUTDOOR SEATING

Outdoor Seating Location Assessment Form

Name of Establishment : _____

Location : _____ Date : _____

Reviewer : _____ Time : _____

Circle the appropriate score

Criteria	Measures (Unit)	Value	Score (Scale)			Score
Traffic Volumes	Daily Traffic Volume (vehicles per day)		1 - Low (< 5,000)	2 - Medium (5,000 to 10,000)	3 - High (> 10,000)	
Operating Speed	Operation Speed (kilometres per hour)		1 - Low (< 30)	2 - Medium (30 to 50)	3 - High (> 50)	
Lane Width	Adjacent Vehicular Lane Width (metres)		1 - Wide (> 3.5)	2 - Medium (3.1 to 3.5)	3 - Narrow (< 3.1)	
Proportion of Trucks	Percentage of Heavy Vehicles		1 - Low (< 1%)	2 - Medium (1% to 2%) +1 if lane width is narrow	3 - High (> 2%) +1 if lane width is medium +2 if lane width is narrow	
Street Lighting	With or Without Illumination	-	1 - Yes	2 - Limited	3 - None	
Provision of On-street Parking	Angle or Parallel Parking	-	1 - Yes	N/A	3 - None	
Proximity of Intersections	Distance to the Nearest Intersection (metres)		2 - Midblock (> 30)	4 - Medium (20 to 30)	6 - Close (< 20)	
Complexity*	Likelihood of Distraction	-	2 - Simple	4 - Medium	6 - Complex	
TOTAL SCORE						
Recommendations for next step:						

Total Score equal to or below 15 - Risk is minimal. Site is suitable for outdoor seating.

Total Score between 16 and 19 - Risk is low. Brief review of safety elements is needed.

Total Score between 20 and 23 - Risk is moderate. Detailed review of safety elements is needed.

Total Score equal to or over 23 - Risk is high. Site is likely unsuitable and significant review required.

Notes : _____

_____

_____

_____

*Complexity includes :	check if an issue
Driveways	
Curvature	
Road grade	
Pedestrian Volumes	
Road signs	
Other:	

Version: March 30, 2005

FIGURE 3.1 EVALUATION MATRIX FOR OUTDOOR SEATING AREAS

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4.0 APPLICATION

4.1 Application Locations

Two City of Kelowna staff members and two Hamilton Associates engineers independently applied the evaluation matrix at five existing sidewalk seating areas and at two potential locations. The application locations were in the central business district as shown in FIGURE 4.1.

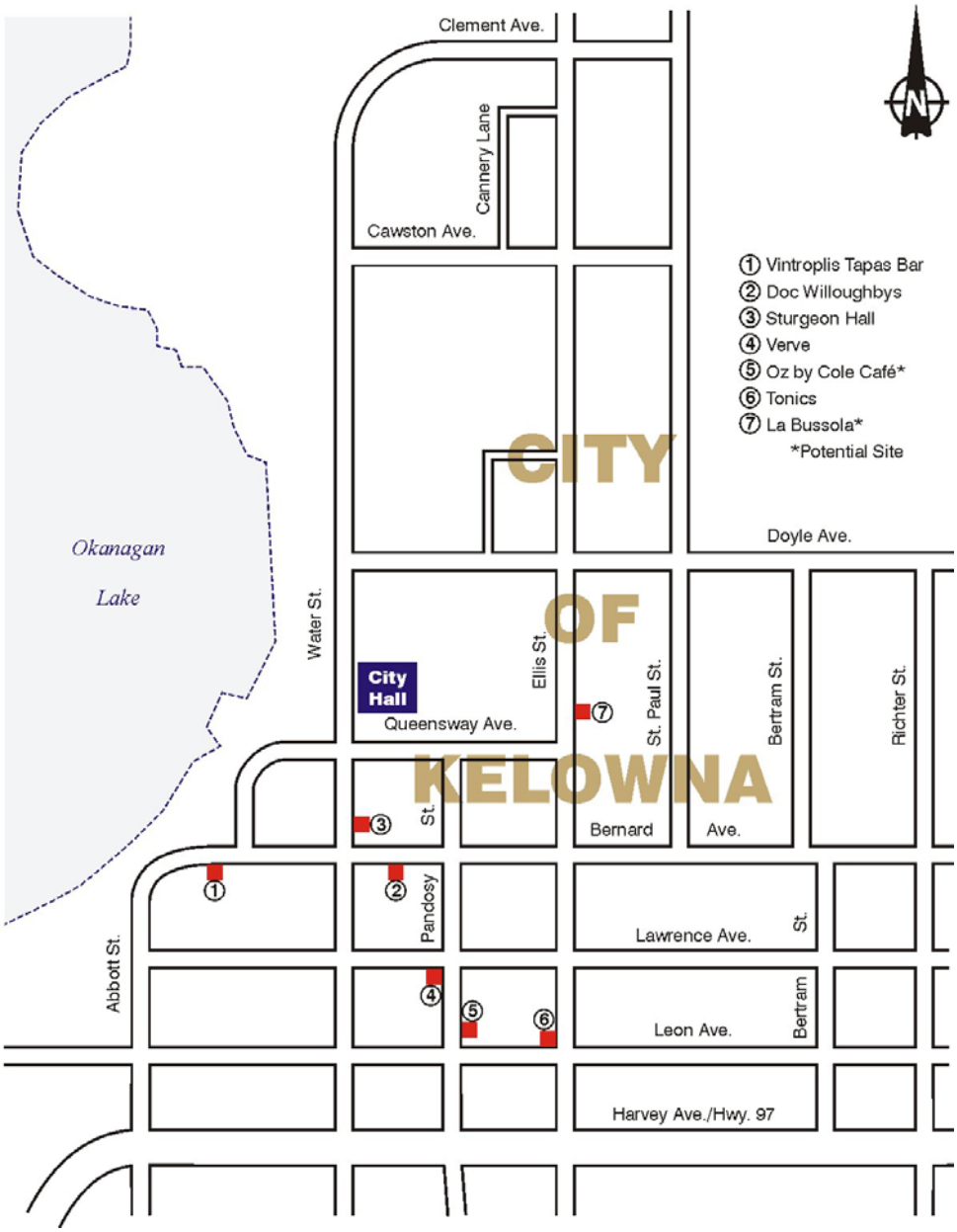

FIGURE 4.1 APPLICATION SITE LOCATIONS

The City provided the traffic volume counts, estimates of operating speeds, and the percentage of trucks at each location. The remainder of the criteria were independently scored by each analyst.

4.2 Location Results

The average total score obtained at each site is shown in TABLE 4.1. The variance between the four reviewers for each site never exceeded three points, indicating that the evaluation matrix achieves the objectives of being simple, objective, and repeatable. The results produced by the evaluation matrix were found to be logical reflections of site conditions. The additional notes recorded by the reviewers at each site are summarized in TABLE 4.2.

TABLE 4.1 TOTAL SCORES FOR APPLICATION SITES

SAMPLE SITE		TOTAL SCORE	NOTES
1	Vintopolis Tapas Bar	16 points	Low Risk. Consider a brief review.
2	Doc Willoughby's	14 points	Minimal Risk. No review needed.
3	Sturgeon Hall	16 points	Low Risk. Consider a brief review.
4	Verve	20 points	Moderate Risk. Conduct a review.
5	Oz by Cole Café	18 points	Low Risk. Consider a brief review.
6	Tonics	20 points	Moderate Risk. Conduct a review.
7	La Bussola	20 points	Moderate Risk. Conduct a review.

4.3 Possible Mitigation Measures

Locations that receive high scores indicating an elevated risk should be reviewed, to determine if mitigation measures can be implemented to reduce the risk. The site review should be conducted (or supervised) by Engineering Department staff members, and the results and recommendations should be documented. Mitigation measures that can be considered to reduce the risk could include:

- Widening of the lane adjacent the seating area;
- Narrowing the seating area and introducing a wider buffer zone between the seating area and the road / intersection;
- Installation of additional street lighting;
- Increasing the intensity of existing street lights;
- Widening the pedestrian walkway;
- Installation of hazard markers and retro reflective markers ;
- Providing additional barriers to act as a buffer, such as concrete litter containers or large planters;
- Relocating or modifying traffic signs;
- Improving sight distances by removing obstacles.
- Measures to reduce operating speeds along the adjacent street.

The specific mitigation measures that can be considered will vary according to the characteristics of each site.

4.4 Conclusion

The evaluation matrix prepared in this study will assist the City in managing the risks associated with outdoor seating areas. The matrix meets the basic requirements of being simple, objective, repeatable and transparent. It has been tested on seven application sites and has produced logical and useful results.

It is suggested that the City actively use this evaluation matrix for the next 12 months. After gaining one year of practical experience, the matrix details may be fine-tuned to ensure that it fully meets the requirements of the City.

TABLE 4.2 LOCATION NOTES

1. Vintopolis Tapas Bar at Benard Avenue	*16 points*	*Low Risk*
• Close to road curve and driveway.		
2. Doc Willoughby's at Bernard Avenue	*14 points*	*Minimal Risk*
• Presence of angle parking stalls can provide a buffer for any lost-control vehicles. • Object marker signs on the planters.		
3. Sturgeon Hall at Water Street	*16 points*	*Low Risk*
• Site is close to the intersection of Water Street and Bernard Avenue • Westbound right-turn vehicle may not see the site if the parallel parking is vacant.		
4. Verve at the Pandosy Street and Lawrence Avenue Intersection	*20 points*	*Moderate Risk*
• Close to intersection. • Drivers may not see the site when travelling through an unsignalized intersection with crosswalks, one-way and STOP-controlled.		

TABLE 4.2 LOCATION NOTES (continued)

5. Oz by Cole Café at Pandosy Street (Potential site)	*18 points*	*Low Risk*
• Close to back lane. • May need to use one parallel parking stall as extension of sidewalk. • Buses travel on Pandosy Street. • Street lighting may be an issue.		
6. Tonics at the Ellis Street and Leon Avenue Intersection	*20 points*	*Moderate Risk*
• Leon Avenue with relatively low traffic volumes was considered as adjacent street, not high traffic volume Ellis Street. • Narrow adjacent lane width of 2.9 metres. • Planters are provided to protect the sidewalk but object marker signs are absent.		
7. La Bussola at Ellis Street (Potential Site)	*20 points*	*Moderate Risk*
• May need to use one parallel parking stall as extension of sidewalk. • Close to pedestrian-actuated signal and bus exit. • High traffic volumes and high percentage of trucks were recorded along Ellis Street.		

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