





Main Campus Master Plan

5

Main Campus' historic buildings, open spaces, and gathering spots are fundamental to the image of Queen's and highly valued by students, staff, faculty, and alumni alike. Even though the campus is much loved, changes on Main Campus will be necessary to ensure the University continues to provide the appropriate facilities and social spaces for a contemporary and sustainable campus. Change will occur mostly in the form of renewal to existing facilities, with the objectives of bringing older buildings into contemporary conditions, all while protecting and enhancing the existing image, experience and historic fabric of the campus. Modest amounts of new development will also occur in the Campus' few remaining underutilized spaces. Where this occurs, it is important that new buildings respond to the existing context through sensitive and respectful design.

This chapter provides direction regarding all the change that will occur on Main Campus. It is divided into the different systems that make up the overall physical structure, including land use patterns, heritage, development sites, and movement.

► Figure 5-1
Main Campus Perspective





5.1 Land Use and Social Infrastructure

Historically, the pattern of uses and activities on a University campus reflect the administrative and academic organization of the institution. Queen's was consistent with this approach with faculties that were relatively closed communities - each occupying their own quadrangle or buildings. Remnants of this organization remain today. However, relationships and communities at universities today are much more dynamic, diverse and multi-disciplinary. Combining uses and sharing facilities on campus reflects this move towards multi-disciplinary learning and the integration of Indigenous knowledge into curricula, and also contributes to a mixed-use campus where different functions and services are integrated and in close proximity to one another.

Social Infrastructure

Rather than provide a prescriptive land use structure on Main Campus, this section provides recommendations to locate uses and facilities on campus that support an interdisciplinary learning environment. The objective is to identify the pattern of "social infrastructure", the key places of gathering and learning at Queen's. This approach is similar to the Library and Archives Master Plan's recommendation for new library communities, Library Information Network at Queen's (LINQ). Evenly distributed across campus, LINQs will be spaces for learning, research, and socializing consisting of study commons with access to library support. While technological advancement have made it possible to access information and resources everywhere, there is a desire and necessity to create a number of environments that foster the environment of learning and social interaction, to form relationships that spawn innovation.

In the same spirit as the LINQ, this section addresses two priorities. The first is to identify those places on campus that are currently lacking social infrastructure, and recommend



▲ Figure5-2

Main Campus Social Infrastructure

such spaces be located here. The second is to identify the places where these concentrations exist and align them with broader public realm improvements, providing formal spaces for social life to occur, this includes enhancing the visibility of Indigenous communities at Queen's and promoting inclusive learning spaces on campus. This approach to "place-making" will provide a framework of communal places and landscapes which can be occupied by a number of groups as the University evolves.

Places with Deficit of Social Infrastructure

Figure 5-2 identifies the general location of social infrastructure, referred to as "student life" spaces, as well as other campus uses such as academic, administration offices, and residences. For the most part, these spaces (in yellow) are well distributed across campus, with a primary focus on the area north of Union Street from the Queen's Centre to Stauffer Library. However, there are a number of areas on campus that lack social infrastructure. Those areas devoid of yellow dots (mostly the areas around Queen's

Quad and the northwest corner of campus near Albert and Union) are priority areas in need of more social infrastructure.

Aligning Social Infrastructure with Public Realm Improvements

Areas with a concentration of social infrastructure (the clusters of yellow), such as the Queen's Centre and Student Residences should be considered places for public realm enhancements such as landscape improvements or the installation of street furniture, with a focus on extending these internal places to the public realm.

Residences

Residences on Main Campus are generally concentrated in its southwest corner. Development sites in this vicinity may continue to be considered as new residence locations, however, due to the minimal development opportunities without constraints on Main Campus, other areas for residences should be explored. A suitable and recommended area is land north of Union where the Social Life uses that exist can support such uses. The University

will also explore opportunities for student housing off-campus, in compliance with the directions provided in Section 4.4 of this plan.

Academic Uses

Academic Uses will continue to be distributed across campus, however, West Campus should increasingly be considered for new or relocated faculties and departments.

Recommendations

1. Areas illustrated in this chapter's diagrams as lacking Student Life Spaces should be considered priority areas for additional social infrastructure. Social infrastructure includes all space and informal environments that facilitate student and faculty interaction, sustaining or enhancing programming that supports a more holistic Queen's out-of-classroom learning experience. These include group study spaces, Indigenous teaching and ceremony spaces, cafés, LINQ locations, student government offices, club spaces, and student-run services.
2. Buildings and facilities around the Queen's Quadrangle should be considered priority areas for social infrastructure. This includes the School of Medicine, Biosciences Complex, and Theological Hall. Additionally, temporary opportunities for social infrastructure within Queen's Quadrangle, such as food trucks, convenience kiosks, and student organization tables should be considered in this area.
3. The emphasis on distributing Student Life Spaces across campus should not detract from investments in improving existing Student Life Spaces in need of repair.
4. In order to preserve the nature of the essential community building features of student life on campus, any relocation or displacement of current student life space should respect the original purpose and character of the space. New space should be at least equal in quality and quantity to the original space and be designed to be flexible and adaptive for changing uses.
5. Areas with a high concentration of social infrastructure should be considered priority areas for public realm improvements that incorporate infrastructure for gathering and socializing, such as outdoor patios, public seating (including Indigenous seating circles), and attractive landscaping.
6. The University will work with University food services to identify locations for small-format markets or cafés across campus. Areas lacking Student Life Spaces should be considered priority areas for locating this amenity.
7. The Campus Master Plan does not prescribe detailed use patterns. Notwithstanding, certain uses that are space-intensive are not considered appropriate for development sites on Main Campus including:
 - new administrative and back-office uses
 - space-intensive, large-scale industrial spaces
 - new or expanded athletic facilities

5.2 Heritage

The historic nature of Main Campus is one of its most defining qualities. Its limestone buildings and picturesque landscapes have become synonymous with the institution's image and experience. The historic neighbourhoods that Main Campus sits within provide a distinct setting, rich in Canadian History.

Over the past decades, Queen's has been committed to preserving its historic assets. The Main Campus vision continues this commitment, recognizing the important role historic buildings and landscapes play in creating a sense of place and fostering a spirit of a collective history.

Patterns of Queen's Built Heritage

There are two significant patterns that characterize Queen's historic character. First, there is an evolution towards a general

use of stone for institutional buildings and brick for residential buildings, which is indicative of Upper Canada more generally and "Limestone City" in particular. The earliest 19th Century developments preceded the easy availability of brick, so substantial estate residences such as Summerhill House, as well as the major institutional buildings, were constructed of stone. However, once manufactured brick became easily available in the second half of the 19th Century, there was a general acceptance of stone for institutional construction - not only University buildings, but also the Court House to the east and the prisons and psychiatric hospital to the west, reserving brick for residential buildings.

The other pattern that emerges is the contrasting siting of individual stone buildings as relatively independent pavilions within the landscape, and the construction of brick residential buildings as ordered components of more uniform residential streetscapes. The brick buildings are individually smaller, but they create relatively continuous street facades with shared setbacks and similar proportions.

These patterns become significant when examining the edge conditions between Queen's and surrounding Kingston neighbourhoods. Generally, the academic campus is associated with larger-scale stone buildings that are relatively independent in their siting. They may have several important facades, and create internal courtyards as well as street frontages.

Residential areas, by contrast, have a strong focus on the street as the organizing element. They have a distinction between more public street frontages, minimal side yards, and private back yards. This typology is relatively consistent across Kingston's various periods of residential development.



The Goodes Hall addition responds to the historic school house's scale in a contemporary manner.



▲ Figure5-3

Main Campus Heritage

Determining Heritage Value

The approach to determining which buildings are of historic significance takes into account a broader notion than the historic value of just individual buildings. Each building within the campus has been considered within a context of overall relationships between various physical, function and cultural identities. The following observations and principles have been utilized to assign heritage value to individual buildings as they contribute to the overall historic landscape:

- It is important to recognize both the heritage value of individual buildings and the heritage value of the context within which they exist. For example, while the 19th century residential buildings on Barrie Street may not individually be of historic value, their contribution to the historic character of City Park renders them valuable to the Old Sydenham Ward's historic landscape.
- Stone-clad buildings define the primary character of the main Queen's campus, and constitute the most important character-defining element of this campus. Besides their material and style - various interpretations of what can generally be called collegiate Gothic - they are also notable for their position as pavilions within a relatively continuous landscape.
- Brick-clad buildings define the primary character of the surrounding residential neighbourhoods. These smaller-scaled residential buildings exist not just as independent structures but as contributing elements to two-sided residential landscapes that exhibit a relatively uniform pattern of setbacks and proximity.
- There remains to be defined a transitional architecture that defines the boundary conditions between institutional and residential districts. The scale, material, texture and street relationship of the two identities - institutional and residential - are so different that they do not always co-exist comfortably.

Historically significant buildings and areas where housing form must be considered

Figure 5-3 categorizes Main Campus' buildings into three categories. The first category, "Historic," illustrates buildings with either an individual historic significance, or that strongly contribute to a historic landscape, such as the houses on Barrie Street opposite City Park. These buildings should be retained, but under appropriate circumstances, may be incorporated into new development.

The second category, "Redevelopment Permitted," illustrates older buildings that may be either retained or demolished, but where replacement development must respect the existing housing form of the street. Development here should contribute to low-rise, continuous street facades with shared setbacks and character, which importantly define Queen's historic adjacent neighbourhoods.

The final category is all other buildings that are not considered historically significant (based on the rationale described in this section).

Recommendations

Marrying Historical Value with Renewal

The indication of a building as historically significant does not preclude renewal. As an historic campus with many historically significant buildings, there will be a need to renovate interiors to bring buildings into a contemporary standard, or to utilize developable space between or behind buildings. Contemporary heritage preservation principles recognize that sensitive and carefully considered architecture additions or renovations can actually prolong an historically significant building's life by providing it with a current use (while simultaneously addressing deferred maintenance issues). Queen's has already utilized this approach to preservation through a number of new developments, including Goodes Hall and the School of Medicine Building. A fuller discussion of design principles to consider when altering or providing an addition to historic buildings can be found in the Building Design Guidelines in Part 2 of this document.

1. The heritage value of individual buildings should consider both the individual historic significance of the structure in addition to how the building (or buildings) contributes to Queen's and Kingston's historic landscape.
2. Buildings coloured in blue on Figure 5-3 are considered historically significant and will be retained. Internal alteration of these buildings is permitted, however, a facility-specific historic assessment will be required in advance.
3. Buildings coloured in blue on Figure 5-3, specifically smaller buildings, such as those on Albert Street and University Avenue, are permitted for incorporation into new development, provided their prominence to the street is not compromised.
4. Where an historically significant building is incorporated into new development, the massing and design of the building should give prominence to the historic structure. While any addition should complement the historic structure, new components of these buildings should not imitate the historic style, and should be contemporary in design.
5. Buildings coloured in purple on Figure 5-3 are permitted for new development, however new development should retain the existing character and scale of the street. Redevelopment of these buildings must demonstrate a sensitive transition to adjacent neighbourhoods.

5.3 Renewal and Development Sites

With few vacant parcels remaining on Main Campus, there are limited major development opportunities.

As a result, the focus for change on Main Campus in the near term will be the renewal of existing facilities to better align existing spaces to meet the needs of current and future users. Figure 5-4 identifies sites on campus appropriate for change either in the form of new construction or redevelopment sites. Discussed in fuller detail in Chapter 2, these include:

- Vacant or undeveloped sites;
- Surface parking lots;
- Existing sites facing a backlog of deferred maintenance that are not historically significant;
- Sites that are underutilized (in terms of use or intensity) that are not historically significant.

Together, these sites indicate there are a number of locations on campus that provide opportunity for renewed or new facilities, however only those on vacant or undeveloped sites and surface parking lots provide relatively cost effective and more immediate opportunities.

Development Sites

- A Albert Street Site
- B Tindall Field Site
- C Queen's Crescent Site
- D Rideau Building Site
- E Alfred Street Site
- F Jeffery Hall Site
- G LaSalle Building Site
- H PEC Building Site
- I Fleming and Clark Site
- J Kathleen Ryan Hall Building Site
- K Clergy Street North Building
- L Clergy Street South Building Site
- M Louise D Acton Site
- N Cataraqui Building Site
- O Harrison-Lecain Hall Site
- P Aberdeen Street Site

► Figure 5-4
Main Campus Renewal
and Development



The near-term plan, contained in Chapter 8, identifies a potential development prioritization plan.

With some development sites in high profile locations, and because many redevelopment sites will be incorporated with historic buildings, there are a number of considerations and - in some case - conditions that are required as part of any development project proposed for these sites. Figure 5-4 overlays a number of symbols indicating these considerations. These are:

- The identification of **key building frontages** which buildings should be built to, in order to reinforce the spatial continuation and hierarchy of campus open spaces. Primary entrances should also be oriented toward the key frontages and should feature a high degree of glazing (the incorporation of windows or other design features that

provide interaction between the public realm and building interiors) located at the ground floor level.

- **Historic buildings** (or portions of a building) to be protected, either through incorporation into new development or facility renewal. In some cases, redevelopment may be permitted for underutilized areas to the rear of historic buildings. In this instance, the historic building is required to be prominently incorporated into the building's design. The design should seek to include as much of the buildings exterior, and should avoid façadism (the retention of only the historic buildings front façade). For a broader discussion about Heritage on Main Campus, see Section 5.2 of this chapter.
- **Required courtyard spaces** to be included in a buildings design. These have been

indicated to contribute to Main Campus' traditional campus open space network and provide open space relief in larger development sites.

- Servicing access routes and building service zones, to ensure the functionality of new development. These systems are described further in Section 5.5.5 of this chapter.

For a fuller discussion of these considerations, see the Precinct Plans in Part 2 of this document, which consolidate the opportunities and requirements for campus evolution for each renewal and development site on a place-by-place basis.

Recommendations

1. The development sites indicated in Figure 5-4 should guide the selection of sites for new development on Main Campus. The considerations provided in this section should be applied to the placement and design of all new development.
2. The most cost effective development sites exist on what is, currently, surface parking lots. Displaced parking will be accommodated on West Campus, in conjunction with the parking strategy detailed in Section 4.2.

5.4 Open Space Network

Queen's open space network – consisting of the formal and informal spaces between buildings – is one of the key components of what the Queen's community and alumni value about the campus. These places support the image of Queen's and are also an important place to gather and form community.

This section provides direction for the evolution of Main Campus' open space structure, which consists of existing places, as well as a number of proposed landscaped projects that are meant to enrich the existing network. These initiatives will be realized in concert with new development and infrastructure renewal projects.

Main Campus' open space network can be divided into four landscape types that reflect the particular role, function and hierarchy of these places within the larger open space network. These four landscape types include picturesque landscapes; formal linear landscapes; plazas, courtyards and small greens; and gateways.

► Figure 5-5
Main Campus Open
Space Network



Picturesque
Landscapes



Formal Linear
Landscapes



New Plazas,
Courtyards and
Small Greens



Gateways

Recommendations

1. A Landscape Master Plan for Main Campus should be developed as a comprehensive guide to landscape investment based on the landscape projects identified in this document. Landscape projects will be implemented according to University objectives and funding opportunities.
2. New landscape projects will reinforce the established character, image and the spatial structure of the campus. Individual landscape projects should be planned and designed to contribute to the sense of a whole campus as well as meeting particular site and program requirements.
3. New plantings should consist of a variety of native or non-invasive species to promote biodiversity. Planting selections should consider species that provide visual variety at different times of year.
4. Leverage traditional knowledge with respect to integrating traditional Indigenous plants across the campus gardens.
5. Plantings should generally be arranged to frame pathways and provide visual interest to those walking through components of the open space network.
6. To animate components of the open space network and to promote natural surveillance, the location and design of building entrances, active uses at ground level and visual connection between interior and exterior of buildings should promote appropriate movement patterns through, and the animation of, the open space network.



Native plantings, such as those in the Native Garden located in front of the Biosciences Complex, promote biodiversity and provide a place-specific characteristic to the University's Open spaces.



This corridor leading to the entrance of the School of Medicine is a Formal Linear Landscape that demonstrates how the design of open spaces contribute to a legible and enjoyable movement network.

7. The design of landscapes should take into account the kind and extent of the maintenance they will receive. Some landscapes may justify intense maintenance by virtue of their special purpose or value, but these should be the exception. In general, landscape design should underpin Queen's life-cycle landscape maintenance program and be both economical and sustainable to implement and maintain.
8. Opportunities to incorporate plantings into the design of buildings, such as green roofs or living walls, should be encouraged in all new development.
9. A design standard should be developed for Queen's open spaces requiring hard surfaces, such as walks or plazas. These will guide the design of new open space projects or improvements to existing spaces.
10. Consider naming opportunities, or other methods to acknowledge donors, as a way to raise funds for landscape projects.
11. Consider the creation of open spaces that reflect, celebrate, and honour the culture and the territory of the Anishinaabe and Haudenosaunee Peoples.
12. The design and retrofit of all landscapes, existing and proposed, should comply with Queen's Accessibility Guidelines.



SUNNYSIDE

SYDENHAM
WARD

EARL STREET

UNION STREET

UNIVERSITY AVENUE

BARRIE STREET

WEST STREET

CITY PARK

COLLINGWOOD STREET

KING STREET

STUART STREET

LAKE ONTARIO

B

A

C

D

5.4.1 Picturesque Landscapes

Picturesque landscapes are expansive open spaces, designed to convey an idyllic natural setting. They are typically characterized by lush, informally placed plantings interspersed with meandering pathways that form a variety of landscape geometries.

These landscapes are the setting for some of the first buildings at Queen's. These buildings were designed in relationship to their picturesque setting, and in turn they provide panoramic views of their setting.

Picturesque landscape are a quintessential component of the traditional campus and are some of Queen's most recognizable open spaces such as the fields around Summerhill that include Queen's Quadrangle and Nixon Field (referred to in this document simply as Queen's Quadrangle). They are places to gather and celebrate, take a stroll through, and admire. Given their importance and

visibility, picturesque landscapes deserve enhanced maintenance, care and ongoing improvements. These landscapes will continue to be preserved, with certain modifications proposed to enhance the functionality and overall image of these iconic places.

As illustrated in Figure 5-6 the Picturesque Landscapes on Main Campus consist of the following:

Projects for Consideration:

- A Queen's Quadrangle Enhancements
- B Tindall Woods
- C Victoria Green
- D Chown Hall Green



Cornell University

Recommendations

1. The traditional character of Main Campus' picturesque landscapes should be protected, maintained and enhanced through continued investment and maintenance.
2. Landscape plans should be developed for each picturesque landscape, including provisions for pathway re-treating or re-alignments, new plantings, and guidelines for adjacent buildings.
3. In order to provide an animated public realm, active uses, such as playing fields or tracks, should be encouraged in picturesque landscapes where appropriate. The placement and design of these facilities will consider the context of its setting.

◀ Figure 5-6
Picturesque
Landscapes

Queen's Quadrangle Enhancements

The Queen's Quadrangle is one of the most memorable and treasured open spaces on campus, providing the backdrop to some of the University's most iconic buildings and landmarks. It is also a gathering space for a variety of purposes including large scale events, recreational activities, as well as day-to-day moments such as relaxing between classes, studying, and a meeting place.

As with most picturesque settings, the Queen's Quadrangle has evolved over many years. A number of further enhancements are recommended to improve the pedestrian experience and image of the space, as well as animate it all times of day.

By some re-aligning of existing service lanes, the Queen's Quadrangle will extend to incorporate Agnes Benidickson Field. Existing walks will be modified to better signal hierarchy, legibility, and co-ordination. As well, additional landscaping will be incorporated to further enrich this iconic setting.

Recommendations

1. To better incorporate Agnes Benidickson Field as part of Queen's Quadrangle, remove the current servicing road that connects Summerhill House to Kingston and Theological Halls.
2. Re-pave and widen Professor's Walk to reinforce this route as the predominant east-west connection through the Queen's Quadrangle.
3. All other walking paths should be narrower than Professor's walk and be of a consistent paving treatment.
4. To improve pedestrian safety and buffer Queen's Quadrangle from vehicular traffic, work with the City to design and install a sidewalk and street trees along the north side of Stuart Street.
5. Re-surface the existing tennis courts to improve usability and appearance.
6. Improve stewardship of the Arboretum through enhanced maintenance and new plantings.
7. Consistent with the recommendations in Section 5.1 to locate Student Life uses around the Queen's Quadrangle, consider temporary uses within the space including amenities such as refreshment kiosks, food trucks, seating areas and public art.
8. Integrate permanent infrastructure such as power outlets to support small and large gatherings.

► Figure 5-7
**Queen's Quadrangle
Enhancements
Perspective**

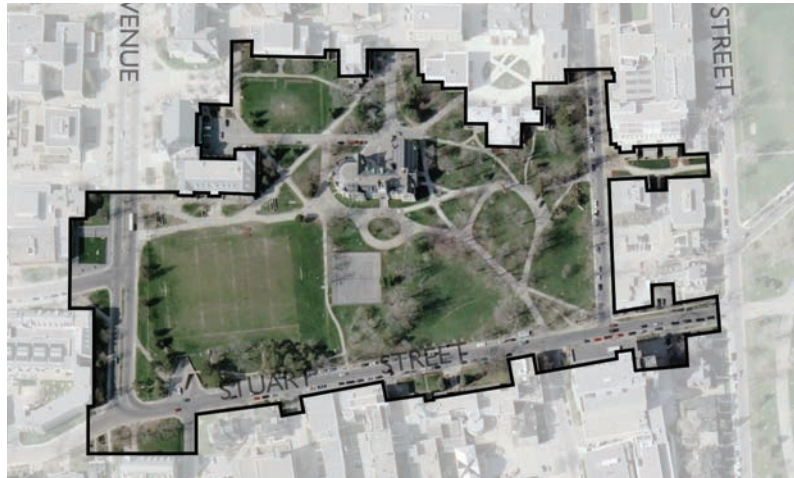


Figure 5-8
Queen's Quadrangle Existing Condition

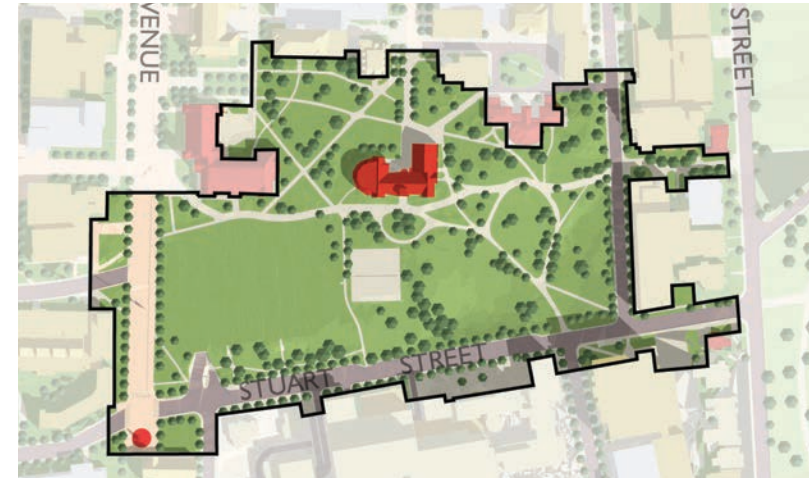


Figure 5-9
Proposed Queen's Quadrangle



Tindall Woods

Tindall Woods is the enhanced re-imagining of the open space surrounding and including Tindall Field. Currently defined by diagonal linear pathways, re-alignments of pathways and design enhancements will improve the image of the space and extend Queen's picturesque landscapes to edges of campus.

As one of the prominent views to those entering the University along Union Street, this open space has the potential to be a defining feature of Queen's, as well as an attractive setting to travel through.

Recommendations

1. As new development occurs at the surface parking lot at the corner of Union Street and Albert Street, install a new path connecting from the southern tip of Tindall Field to Stuart Street. Consider this as an opportunity to re-align existing pathways as a more meandering design.
2. Plant additional trees and shrubs, and other landscaping to beautify the space. New trees should frame the pathways and be located in key view termini.
3. Consider public art in visual terminus points, such as the south end of the pathway along the eastern edge of Tindall Field.

► Figure 5-10
Tindall Woods
Perspective



Figure 5-11
Tindall Woods Existing Condition

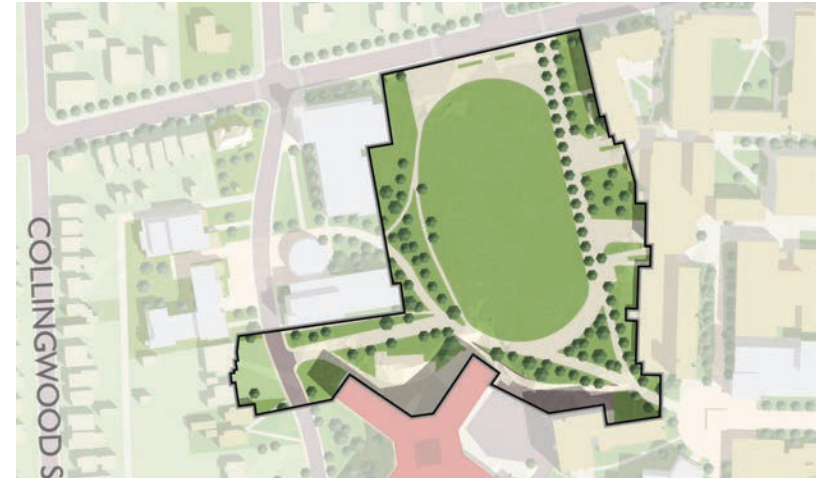


Figure 5-12
Proposed Tindall Woods



Victoria Green

Victoria Green is the open space surrounding Victoria Hall. Defined by its centerpiece's dynamic modern architecture and deep setbacks from the road, this landscape will be enhanced through new plantings that provide visual variety, keeping with the area's and University's tradition, and new pathways to facilitate movement and create visual variety.

Recommendations

1. To beautify the setting, install new plantings throughout the space.
2. Extend the pedestrian path leading from the Victoria Hall Albert Street entrance to the new development and align with a new pathway on the west side of Albert Street.
3. Consider re-surfacing the pedestrian island located at the confluence of Albert Street, Bader Lane, and Queen's Crescent with soil to allow for plantings, or with planters. Co-ordinate new plantings and grasses that respond to the landscaping on either sides of Albert Street.

► Figure 5-13
Victoria Green
Perspective

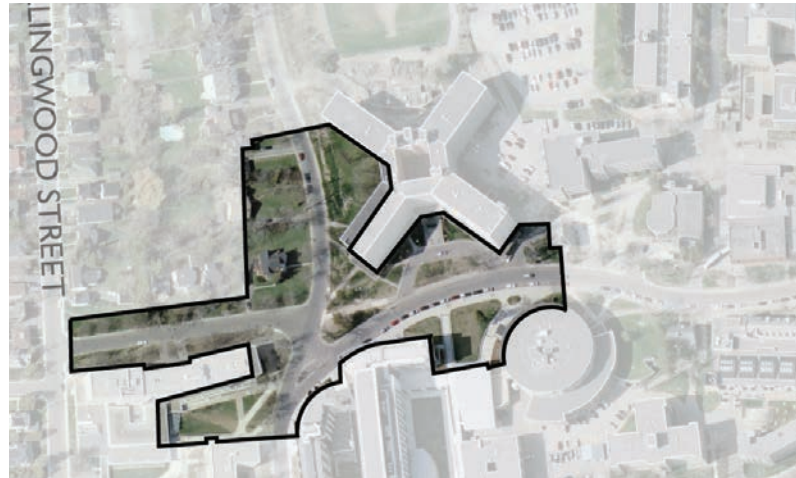


Figure 5-14
Victoria Green Existing Condition

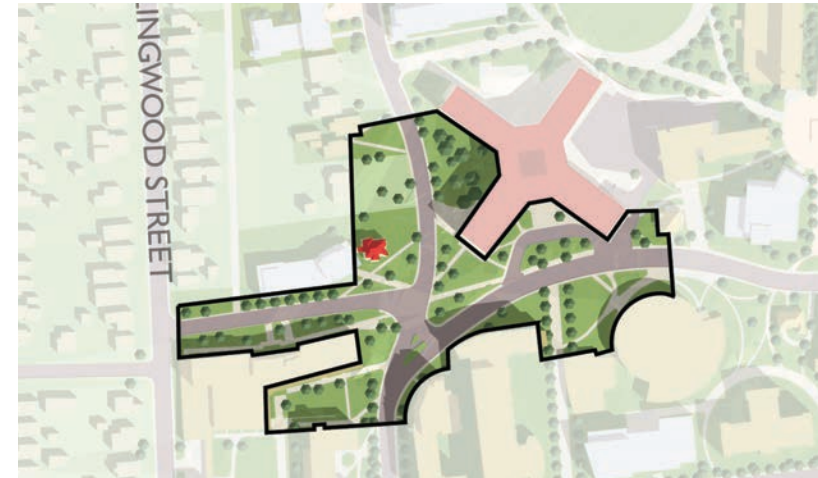


Figure 5-15
Proposed Victoria Green



Chown Hall Green

Chown Hall Green is the landscape that includes the space north of Chown Hall and east of Stirling Hall. The space is framed by these two buildings and is defined by the geometries of this architecture.

Recommendations

1. Chown Hall Green is in close proximity to the potential development site to the west of Chown Hall. The enhancement of this open space should be considered in conjunction with the development of this site.
2. Install curvilinear pathways framing the northern building face of Chown Hall and Stirling Hall.
3. Extend the green currently only in front of Chown Hall to reach Stuart Street.

► Figure 5-16
Chown Hall
Green Perspective

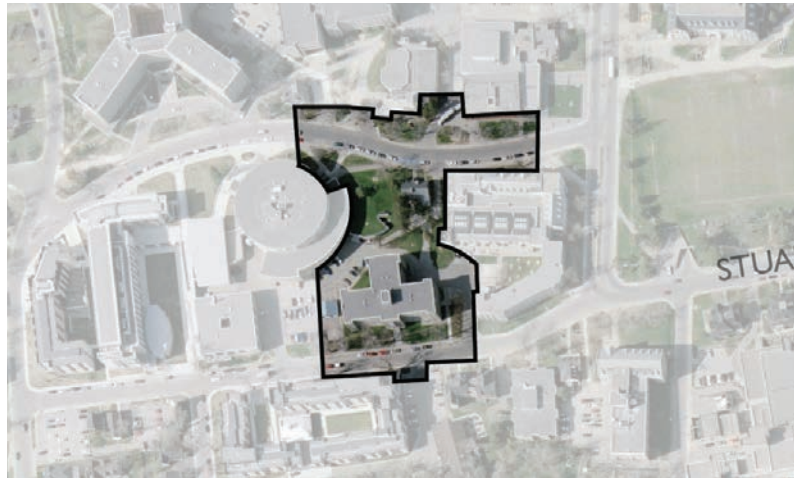


Figure 5-17
Chown Hall Green Existing Condition

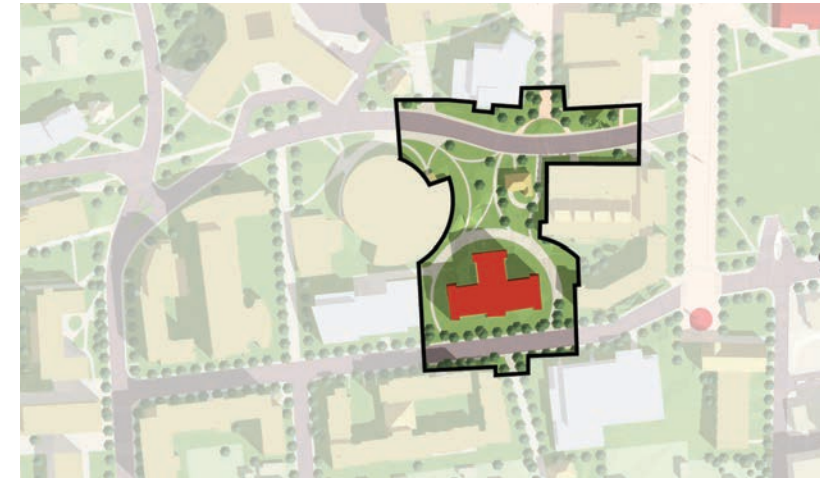
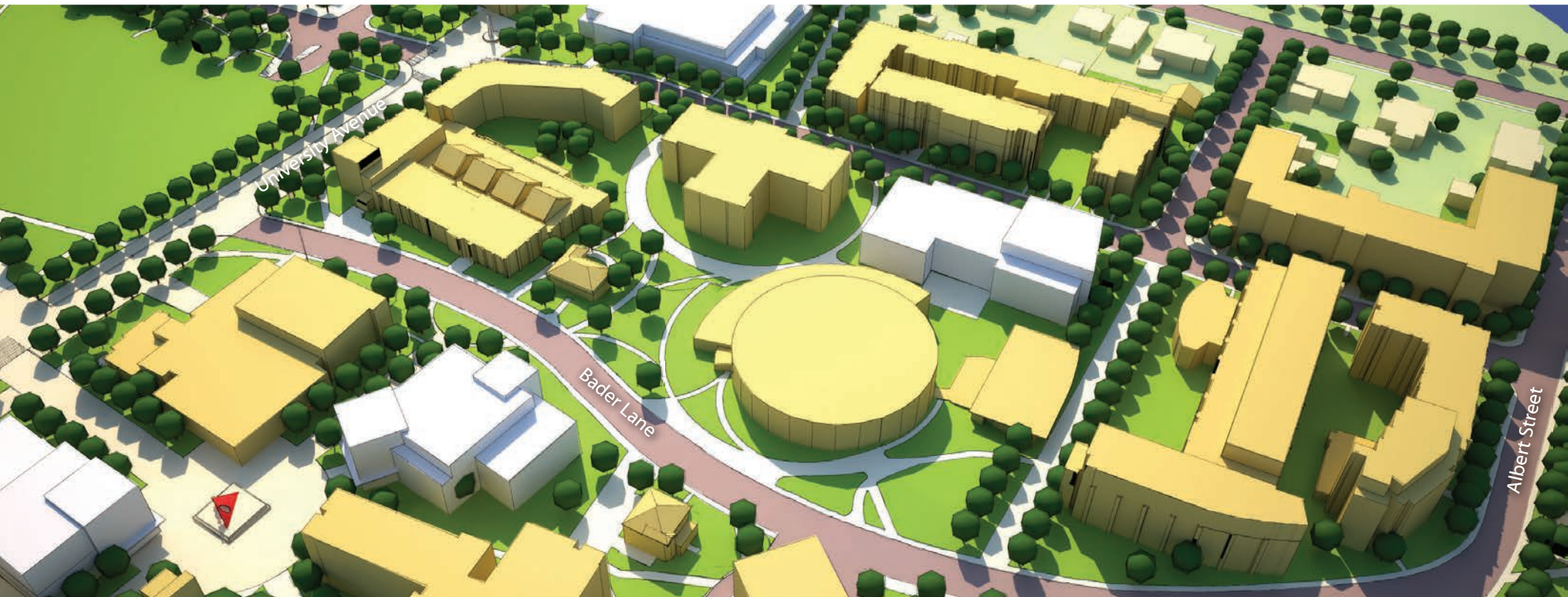


Figure 5-18
Proposed Chown Hall Green





◀ Figure 5-19
Formal Linear
Landscapes

5.4.2 Formal Linear Landscapes

Formal linear landscapes – containing streets and walks – are linear open spaces designed to move people through the campus and provide views to landmarks and other campus-defining elements. Formal linear landscapes are recognizable by the repetition of similar design elements such as trees, paving materials and street furniture.

Formal linear landscapes are also defined by the design and placement of buildings and landscapes adjacent to them, and therefore adjacent uses must be considered in conjunction with the design of these spaces.

As a pedestrian-oriented campus, formal linear landscapes hold an important role as a way to make moving through campus intuitive, enjoyable, and memorable. The design and maintenance of these spaces must equally balance pedestrian movement and as well as aesthetics.

This section contains recommendations to enhance existing linear landscapes as well as a number of new spaces that would enhance the pedestrian and open space network.

As illustrated in Figure 5-19 the Formal Linear Landscapes on Main Campus consist of the following:

Landscape Projects:

- A Chown Hall Walk (L1)
- B Fleming Walk (L2)
- C University Avenue Streetscape (L3)
- D Union Street Streetscape (L4)
- E Fifth Field Company Lane Streetscape (L5)

Additional Projects for Consideration:

- F St. Lawrence Walk
- G Clergy Street Streetscape
- H George Street Streetscape
- I Divison Street Streetscape
- J Albert Street Streetscape



Cornell University



Princeton University

Recommendations

1. The design and treatment of paving should be consistent throughout all pathways to provide legibility.
2. All pathways should be aligned with other components of the pedestrian network. Where a path does not connect with another route, align the path to lead to a visual terminus.
3. To provide safe, well-lit routes, install pedestrian-scaled lighting either as stand-alone structures or as part of adjacent buildings.
4. Street furniture, such as benches, planters, and waste bins, provide functional purpose and also visual interest to linear landscapes. The installation of street furniture should be visually consistent, and placed in a manner that does not obstruct the pedestrian right-of-way.
5. Tree plantings should be continuous on either side of all pathways, to provide visual interest and to define linear landscapes.

Chown Hall Walk

The Chown Hall Walk will be an exceptional gateway to Lake Ontario connecting Stuart Street to the waterfront. The attractive promenade will consist of an enhanced version of the path that currently exists south of the University Club as well as a new extension through what is currently the surface parking lot in front of the University Club as part of the potential LaSalle Site Redevelopment.

Situated between King Streets' waterfront homes and the University Club, this pathway will be generously wide and attractive, lined by trees and terminating with a new green south of the University Club.

Recommendations

1. With the redevelopment of the Film and Media Centre, re-design and install a continuous path that links Stuart Street with the waterfront promenade.
2. To ensure privacy with non-University neighbours as well as define the pathway, substantially-sized trees and plantings should be planted on either side of the walkway.
3. The design of this walk should be designed and integrated with an enhanced lawn south of the University Club. There should be a clear entryway to these areas and the two spaces should be designed to address and complement one another.



University of Toronto

► Figure 5-20
Chown Hall
Walk Perspective

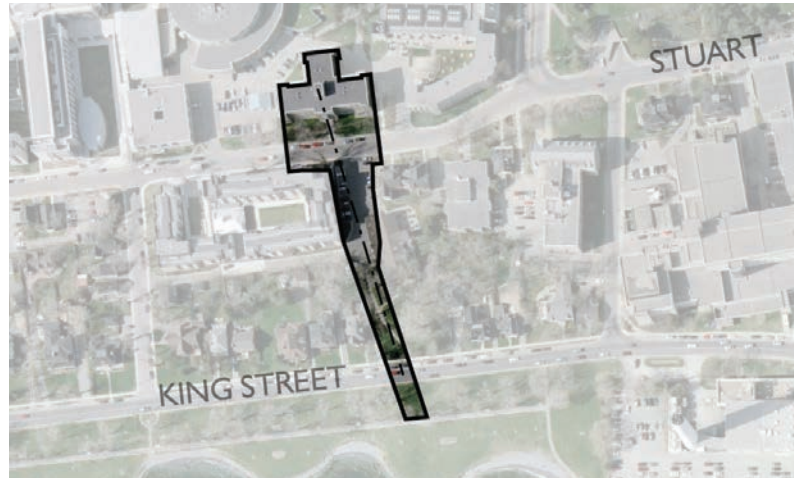


Figure 5-21
Chown Hall Walk Existing Condition



Figure 5-22
Proposed Chown Hall Walk



Landscape Project L2

Fleming Walk

Fleming Walk will be a new linear green extending from Fleming Hall to University Avenue, framed by pedestrian pathways and a number of historic buildings including Douglas Library, Gordon Hall, and Ontario Hall. Located near Library Square, the Fleming Walk lawns could be used for festivities on special occasions, or as “collision spaces” for passive everyday recreational use such as eating lunch and meeting with friends.

The proposed realignment provides more movement options by creating double pathways located closer to adjacent buildings. These changes also consolidate the open space to create a more functional lawn for those to sit on and enjoy.

Recommendations

1. Extend the two parallel pathways that end at the Western loop of Fifth Field Company Lane westward to University Avenue. This will require the relocation of the current utility box at the south end of Douglas Hall as well as regrading .
2. The area between pathways should consist of high quality landscaping with large expanses of grass to provide an environment for sitting and gathering.
3. Fleming Walk should be integrated into the site plan and potential redevelopment of Clark Hall. A landmark element of the building should be incorporated into its design, providing a visual terminus at the eastern end and a special character for this landscape.



Princeton University

► Figure 5-23
Fleming Walk
Perspective

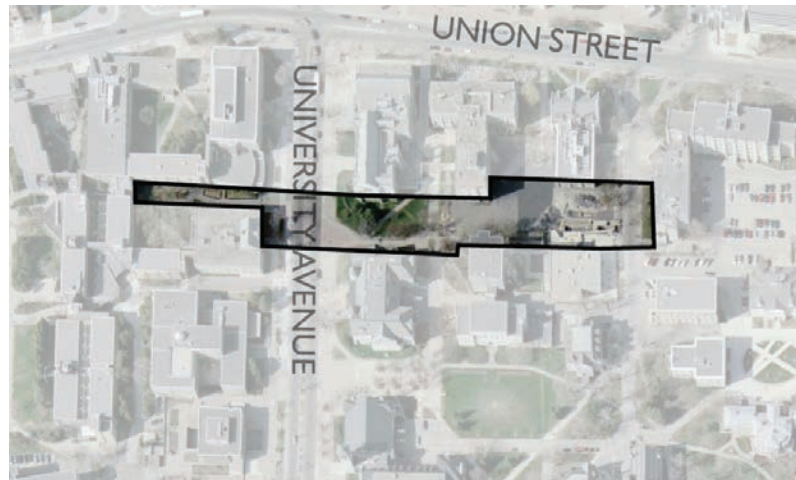


Figure 5-24
Fleming Walk Existing Condition

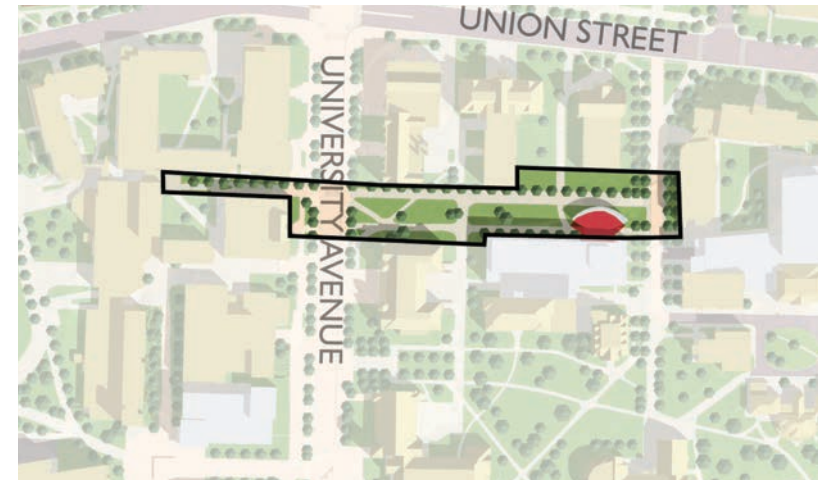
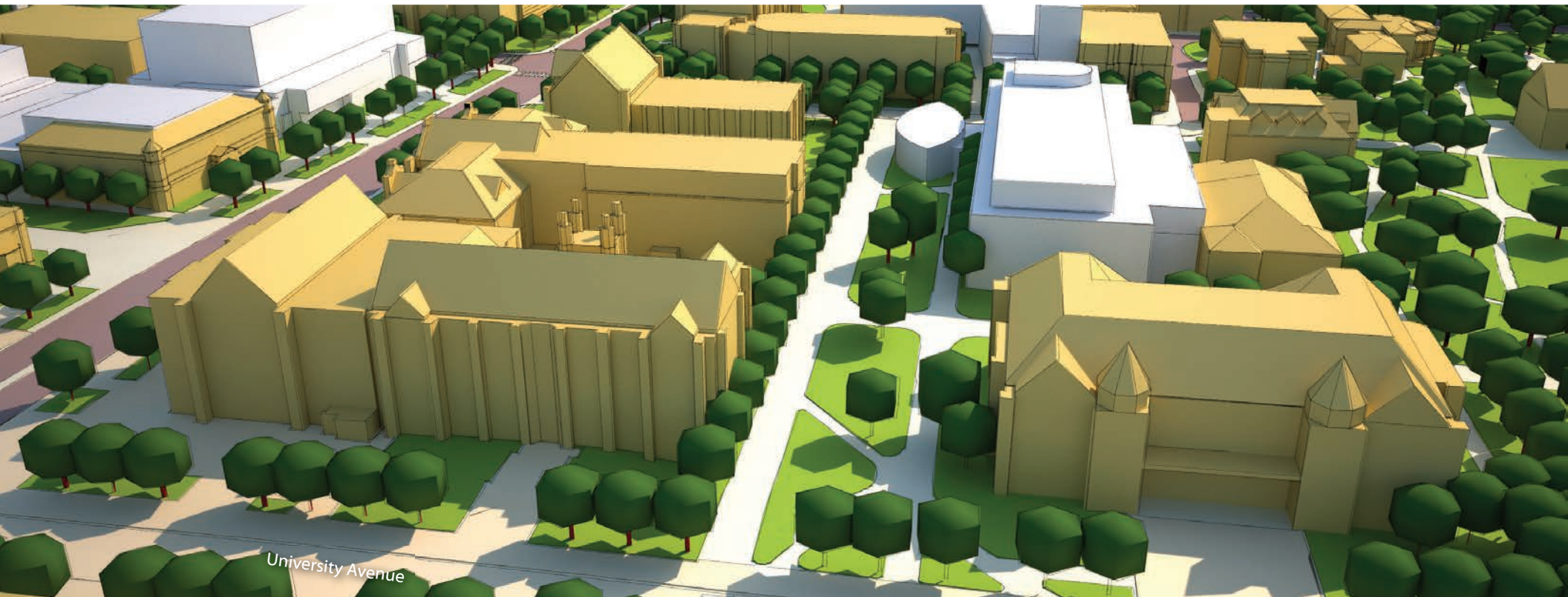


Figure 5-25
Proposed Fleming Walk



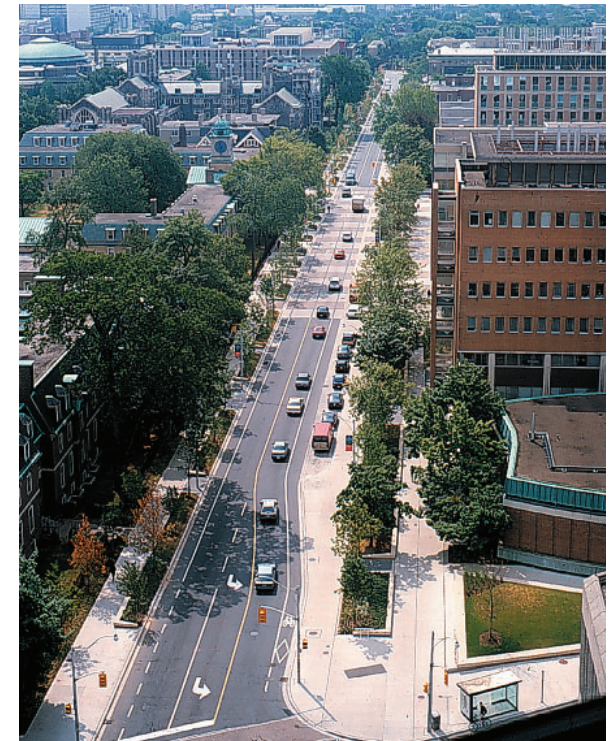
University Avenue Improvements

University Avenue is a front door to Main Campus as well as its central artery. It is also an important connector to a number of walks, landscapes, and other components of the open space network. With some enhancements, it will provide a memorable setting to complement the iconic buildings that face it, while promoting safety and comfort for all through a street design that prioritizes all modes of traffic equally.

While there has been much important investment already completed to enhance University Avenue's image and reduce traffic speed, there are some simple interventions that can be made to better buffer the sidewalks from moving traffic, make the streets image more lush and beautiful, and create a truly great street. With a unified streetscape design, dedicated bike lanes will delineate the space used for vehicle and cyclists, and formalized pedestrian crossings at key intersections will prioritize pedestrians.

Recommendations

1. To better define the road, reinstall University Avenue's street furniture, including lamp posts, benches and planters, to the edge of the roads. In the future, additional trees should be planted in line with existing tree plantings.
2. At highly trafficked pedestrian crossings, install traffic tables, one or two metre wide raised pathways at key pedestrian crossings that prioritize the pedestrian over the vehicle.
3. To emphasize its role as the gateway from the north, extend University Avenue's special street design north of University to Earl Street.
4. Emphasize entries to other components of the open space and pedestrian network through paving treatment and landscaping.



University of Toronto, St. George Street

► Figure 5-26
University Avenue
Perspective



Figure 5-27
University Avenue Existing Condition



Figure 5-28
Proposed University Avenue



The streetscaping that currently exists on portions of Union Street should be extended along the entirety of the Main Campus segment on both sides of the street. The introduction of planters or other street furniture elements would better define the street's edge, create connectivity and provide visual interest.

1. In coordination with the design recommendations proposed for Library Square (and the recommendation in the LAMP), design and implement a consistent streetscape for Union Street that includes both sides of the street and extends from Alfred Street to Barrie Street.
2. Consider the continuous installation of planters, benches, and other street furniture to provide visual interest to the streetscape, and provide places to rest.



► Figure 5-29
Union Street
Perspective



Figure 5-30
Union Street Existing Condition

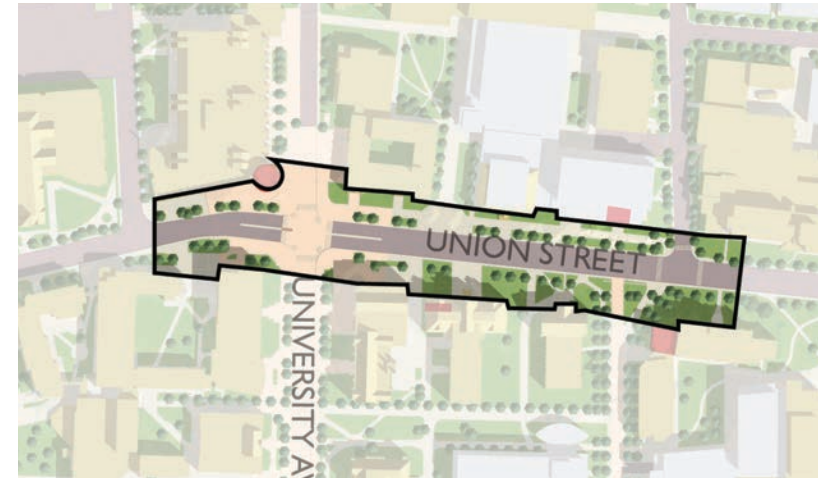


Figure 5-31
Proposed Union Street



Fifth Field Company Lane Improvements

Design enhancements to Fifth Field Company Lane will transform what is today a service lane with a fragmented system of sidewalks to a beautiful and inviting pedestrian connection. With enhancements, it will become a route that prioritizes the pedestrian, while recognizing the need to carry service vehicles. It will connect Theological Hall to Union Street, and align with Division Street, ultimately forming part of a larger north-south route.



University of Toronto

Recommendations

1. Re-design Fifth Field Company Lane to signify it as a pedestrian-priority street. This may include special paving or rolled curbs.
2. To define the lane and provide shade, plant a double row of street trees on either side of Fifth Field Company Lane.
3. Improve pedestrian connections to ensure the north end of Fifth Field Company Lane orients in a diagonal to the northeast to align with Division Street.



Figure 5-32

Fifth Field Company Lane Existing Condition

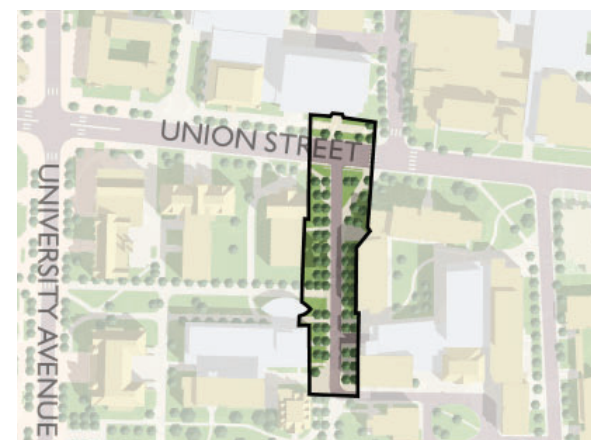


Figure 5-33

Proposed Fifth Field Company Lane



▲ Figure 5-34
Fifth Field Company Lane Perspective

► Figure 5-35

**Fifth Field Company Lane
Existing Perspective**

▼ Figure 5-36

**Fifth Field Company Lane
Proposed Perspective**



Other Projects for Consideration

St Lawrence Walk

St. Lawrence Walk is the pedestrian connection that runs as a northern continuation of St. Lawrence Avenue between Chernoff Hall and Chernoff Auditorium and the Rideau Building. The potential redevelopment of the Rideau Building will provide an opportunity to enhance this path, and align new development to allow an important view to Lake Ontario from Chown Hall. This is one of many enhanced apertures to the water proposed in this Plan including Chown Hall Walk.

Streetscape Improvements

Other Main Campus streets, including Clergy Street, George Street, Division Street, and Albert Street should also be considered for streetscape improvements. Such improvements include continuous street trees or plantings which define the streets edge, as well as surfacing improvements, and the addition of street furniture or public art.



Cornell University



Princeton University



Cornell University



EARL STREET

SYDENHAM
WARD

SUNNYSIDE

A

UNION STREET

UNIVERSITY AVENUE

BARRIE STREET

WEST STREET

CITY PARK

B

STUART STREET

C

KING STREET

LAKE ONTARIO

5.4.3 Plazas, Courtyards and Small Greens

Whereas the picturesque landscapes of Queen's Quadrangle and Tindall Field provide settings capable for holding celebrations, large gatherings and activities, the plazas, courtyards, and small greens of the campus provide casual settings for day-to-day campus activity. They are the place for more passive uses such as meeting friends, studying, or taking a break between classes.

A number of new plazas, courtyards, and greens are proposed to create more opportunities around campus to sit, rest, and socialize.

As illustrated in Figure 5-37 the Plazas, Courtyards and Small Greens on Main Campus consist of the following:

Landscape Projects:

- A Library Square (L6)
- B Arts Square (L7)
- C McLaughlin Square (L8)

◀ Figure 5-37

**Plazas, Courtyards
and Small Greens**

Recommendations

1. Plazas, courtyards, and small greens should be distributed evenly throughout the campus.
2. Where a new plaza, courtyard or small green is incorporated with the design of a new development, ensure adjacent development addresses the open space with windows, entrances, and considers “spill-out” uses such as cafe patios to animate the space.
3. Plazas, courtyards, and small greens should provide a variety of places to sit and rest. This may include benches, tables and chairs, or landscaping features (large, raised planters) with inherent sitting features.
4. Street furniture, such as benches, bike parking facilities, and waste bins shall generally be arranged at the periphery of these spaces so as not to obstruct views or pedestrian movement through these spaces.



Princeton University



Macquarie University

Landscape Project L6 Library Square

Library Square will be a new identity for the intersection of Union Street and University Avenue, transforming this highly-trafficked intersection into an exceptional and dynamic public realm. It will be a place of social and intellectual engagement, where the essential functions of Stauffer and Douglas Libraries more fully engage with the campus outside their doors, and with the community beyond.

Through a unified streetscape, enhanced landscaping and the installation of outdoor seating and patios, Library Square will become a social space to meet, study, collaborate with others, and make meaningful connections. The re-envisioning of this intersection will be coupled with the appropriate traffic calming measures discussed in the mobility section of this Plan.

Recommendations

1. A landscape streetscape plan for Library Square should be developed to address the recommendations described herein and should allow for incremental improvements.
2. A unified paving treatment – distinctive from standard asphalt paving – should expand across the entire square. This treatment will unify Library Square and signal to vehicles that they are entering a pedestrian priority zone.
3. Unified streetscape elements, such as distinct lighting, banners, and street furniture should be designed and implemented in this area.
4. Street furniture should be located adjacent to buildings along Union Street and located closer to the street's edge along University Avenue, in order to comply with the streetscape enhancements for University Avenue identified in Sections 4.5 and 5.4.2.
5. In consultation with the City, a high priority pedestrian crossing, such as a “scramble,” should be installed at the University Avenue and Union Street Intersection.

► Figure 5-38
Library Square
Perspective

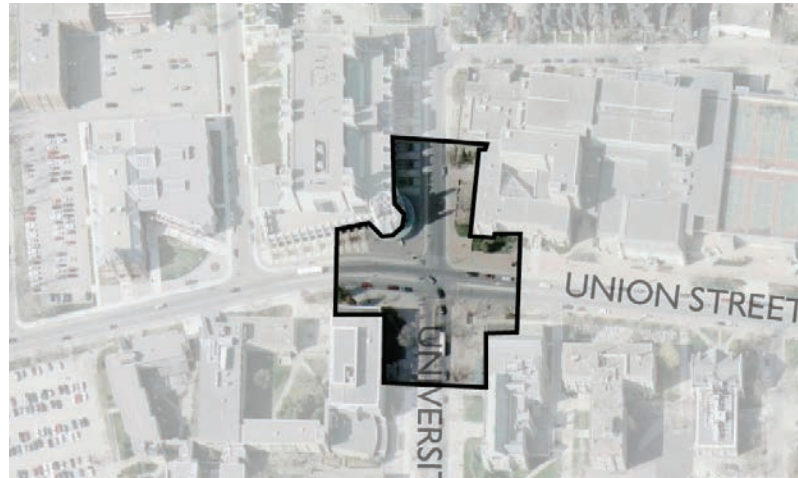


Figure 5-39
Library Square Existing Condition

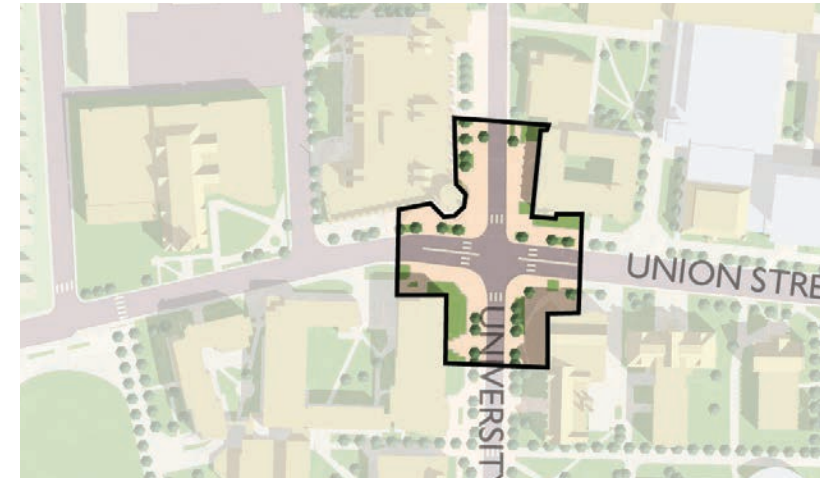


Figure 5-40
Proposed Library Square



Image prepared by CS&P Architects

Landscape Project L7
Arts Square

The Arts Square will be a dynamic new plaza with a bold design reflective of the Arts Faculty and Agnes Etherington Art Centre it sits adjacent to.

The project will be brought forward with the redevelopment of Jeffery Hall, replacing what is currently a series of asphalt walkways. The design of this area will be unified and formalized as a plaza for gathering or solitary activities. The Arts Square will consist of interesting plantings and public art, and offer an intimate setting with a memorable view of the Grant Hall clock tower.

Recommendations

1. Consider the centre of the Arts Square as a priority location for public art.
2. Consider design features, such as special paving, that distinguishes the Arts Square from connecting pathways.
3. In its redesign, incorporate ample seating and tables for everyday use. Ensure the placement of these and other street furniture does not obstruct pedestrian traffic patterns.

► Figure 5-41
**Arts Square
Perspective**

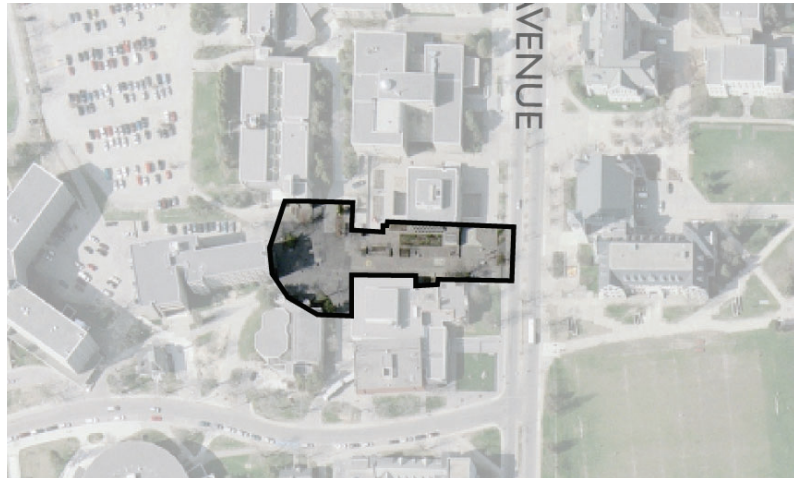


Figure 5-42
Arts Square Existing Condition

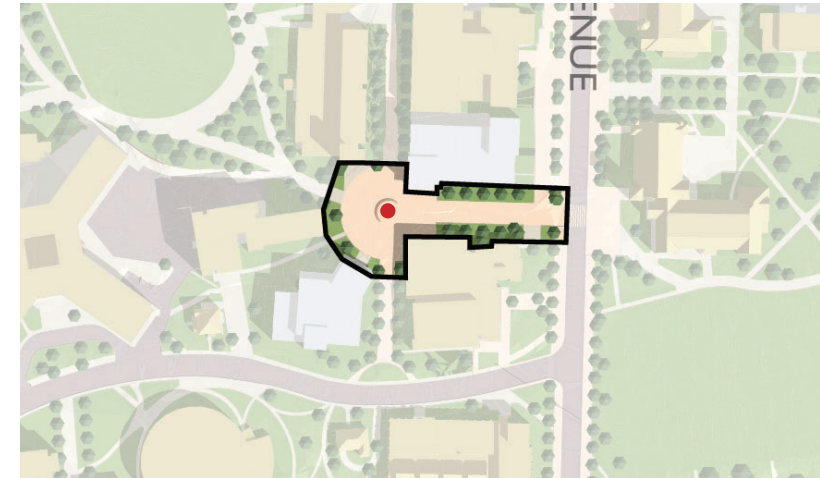


Figure 5-43
Proposed Arts Square





◀ Figure 5-44
Arts Square Existing Perspective

▶ Figure 5-45
Arts Square Proposed Perspective





McLaughlin Square

McLaughlin Square will be a new addition to the University's open space network, providing views to the Queen's Quad and, potentially, Lake Ontario. The square itself will be a defining visual terminus to those traveling south on University Avenue.

It will be a hardscaped square consisting of public art and dynamic design features. Large enough in size to hold small-scale special events and in close proximity to Lake Ontario, it may be considered an area to celebrate the narratives of Queen's and Kingston's First Nations Communities. This may be achieved through temporary programming, or more permanent public art and design elements.

Recommendations

1. The redevelopment of McLaughlin Square should be designed and installed as part of the potential redevelopment of the La Salle Building.
2. With the redevelopment of the La Salle Building, explore opportunities to re-arrange plantings and regrade the site to allow for views to Lake Ontario.
3. In designing McLaughlin Square, consider the placement of public art in relation to its role as a view terminus from University Avenue.
4. The placement of public art, seating and landscaping should have regard to the entry of McLaughlin Hall, and should not obstruct pedestrian movement patterns.

► Figure 5-46
McLaughlin Square
Perspective

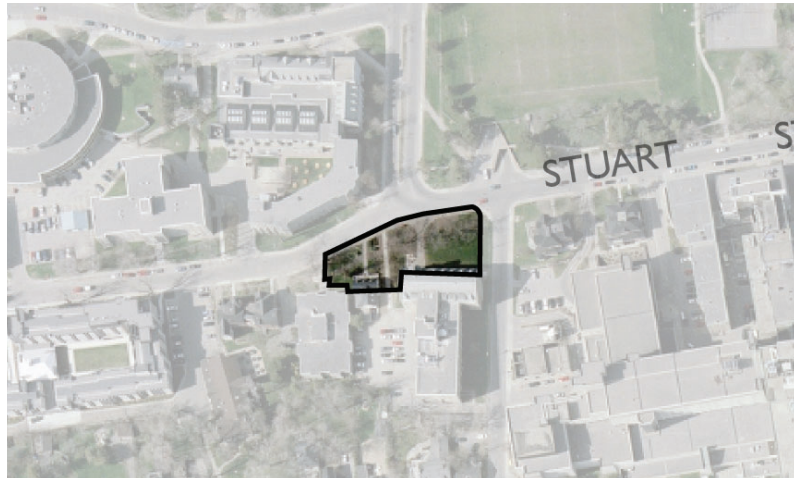


Figure 5-47
McLaughlin Square Existing Condition



Figure 5-48
Proposed McLaughlin Square





SUNNYSIDE

SYDENHAM
WARD

CITY PARK

LAKE ONTARIO

G1

G2

G3

G5

G4

EARL STREET

UNION STREET

UNIVERSITY AVENUE

STUART STREET

KING STREET

COLLINGWOOD STREET

BARRIE STREET

WEST STREET

5.4.4 Gateways

Gateways are the places within the larger open space network that mark the transition from the City to the campus. The design of buildings, streetscapes and public spaces can enhance the sense of arrival (or departure) from these key locations. Together, these measures enhance the experience of place as well as assist wayfinding for the University community and visitors. Gateways vary in prominence and environment, and the design of these should respond accordingly.

Unlike many other campuses, there is no single predominant gateway to the Queen's Campus. Identifying and prioritizing gateways can help distinguish Queen's place in Kingston. Illustrated on the plan to the left are five major gateway opportunities (which are also University Projects) as well as a number of secondary gateways which should receive enhanced landscaping attention, but will not provide the same grand sense of arrival. The following describes the importance and role of each of these gateways.

University Avenue / Earl Street Gateway (G1)

The intersection of Earl Street and University Avenue is the entryway from the north of campus. While not as predominant a street in the City as Division Street, University Avenue carries large amounts of foot and car traffic from those entering from the Williamsville neighbourhood.

Division Street / Earl Street Gateway (G2)

As one of the City's major arterials and a key connector between the University and Williamsville, Division Street and Earl is a prominent gateway from the north of campus.

Union Street / Barrie Street Gateway (G3)

The intersection of Union Street and Barrie Street is the eastern terminus of Queen's busiest street and a predominant entryway from the Old Sydenham Ward.

King Street / Albert Street Gateway (G4)

The intersection of King Street and Albert Street is where you first enter the University from the waterfront, Portsmouth, and the Isabel Bader Centre for the Performing Arts.

Union Street / Albert Street Gateway (G5)

This is where you first enter the Main Campus if traveling from West Campus, Portsmouth, or the Sir John A. Macdonald Boulevard exit. This gateway will be reinforced by a new building at the southeastern corner, which should include an architectural element. The redevelopment of this site should incorporate clear wayfinding signage directing visitors to major points on campus.

The following are additional gateway intersections that are suitable for minor landscape enhancements as well as improved arrival and wayfinding signage:

- Barrie Street and Clergy Street
- Albert Street and Bader Lane/Queen's Crescent
- King Street and Barrie Street
- Barrie Street and Professor's Walk
- Barrie Street and Stuart Street
- Earl Street and Aberdeen Street

5.4.5 Summary of Main Campus Landscape Projects

The plan on the opposite page highlights the array of landscape projects described in this section. Their integration with new development, as well as other design and implementation considerations, are described in Part 2 of this Plan.

Formal Linear Landscapes:

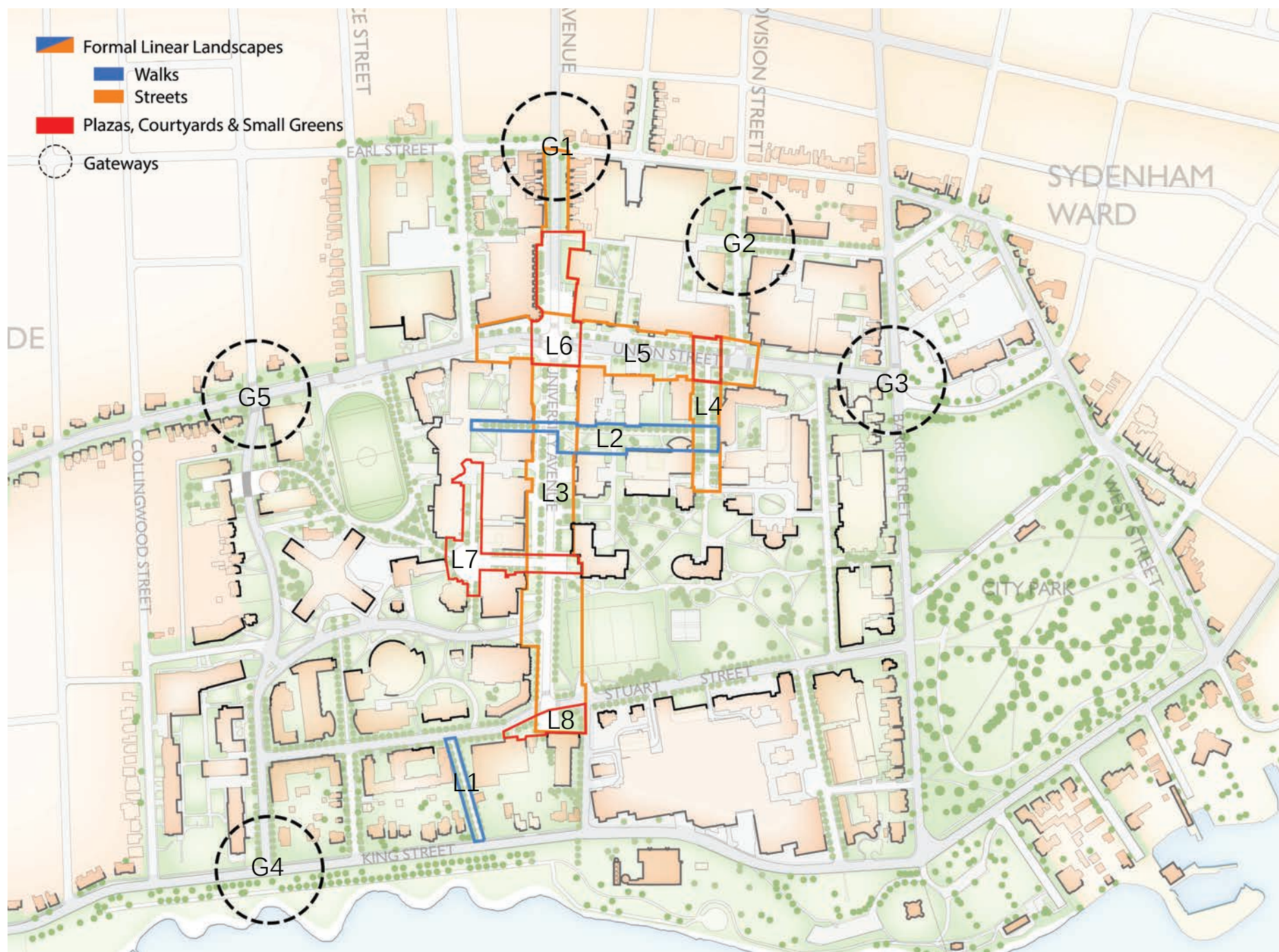
- L1 Chown Hall Walk
- L2 Fleming Walk
- L3 University Avenue Improvements
- L4 Fifth Field Company Lane Improvements
- L5 Union Street Improvements

Plazas, Courtyards and Small Greens

- L6 Library Square
- L7 Arts Square
- L8 McLaughlin Square

Gateways:

- G1 University Avenue / Earl Street Gateway
- G2 Divison Street / Earl Street Gateway
- G3 Union Street / Barrie Street Gateway
- G4 King Street / Albert Street Gateway
- G5 Union Street / Albert Street Gateway



▲ Figure 5-50

Main Campus Landscape Projects Summary

5.5 Movement

A comprehensive and well-considered movement network is an integral component of an attractive and functioning campus. The streets and walks that make up the movement system are also key parts of the campus' open space network. They are the some of the most highly frequented common spaces where people meet and build relationships with other members of the Queen's community. With campuses designed as pedestrian environments, and to ensure Queen's promotes sustainable, active transportation choices, it is important that the Queens' movement network maintains its functionality while prioritizing pedestrian safety and comfort.

Main Campus' existing compact layout and extensive pathway system already provides the Queen's community with a comfortable and extensive movement network that could be viewed as a model for other campuses. However, there are improvements to be made to better integrate different modes of travel – pedestrians, cars, and cyclists – to ensure a more connected, safer, and inviting environment for all. This section provides direction regarding all components of the Main Campus movement network, including the pedestrian, vehicular, cycling, parking and servicing networks.

5.5.1 Pedestrian Network

At Queen's, the pedestrian experience is the campus experience. While people get to campus using a variety of transportation modes, once they have arrived, the majority of students, staff and faculty use the campus' extensive pedestrian network to get from class to class, meeting to meeting, or simply to take a stroll to get some fresh air and give their mind a break. For these reasons, a pedestrian network must be both extensive, providing many direct routes to get to different points on campus, as well as an enjoyable experience in order to encourage people to walk.

The pedestrian network consists of a number of different components. It includes the sidewalks of the campus' streets, the extensive pedestrian outdoor pathway system, as well as the internal hallways of larger complexes such as Mackintosh-Corry Hall and Queen's Centre. Together these generally create an extensive, fine-grained system. Much of this system is a result of Main Campus' historic nature. The original campus layout was determined at a time before the rise of the private automobile,

and also at a time where the size of institutional buildings were smaller. As a result much of Main Campus' historic core is characterized by the siting of institutional buildings as relatively independent pavilions, usually situated within an extensive pathway network.

Prioritizing sustainable transportation

Designing Main Campus for pedestrians, cyclists and those with mobility-related disabilities is a priority. Main Campus will continue to be defined as pedestrian-oriented, where pedestrian activity is the most important mode of travel. Where the pedestrian priority zone interfaces with vehicle routes, mediation is required to ensure safety and to maintain pedestrian priority. Mediation would include more frequent and safer street crossings as well as enhanced landscape treatment that define pedestrian rights-of-way. The vehicular network section provides recommendations for interventions to make Main Campus' streets more friendly to the pedestrian network.

Extending a fine-grained pedestrian network to the campus edges

As teaching, learning, and research have evolved, there has been a need to construct larger complexes that are often twice or even three times the size of the campus' historic buildings. These complexes, such as Queen's Centre and the Biosciences Complex are often located at the periphery of campus. The few remaining major development sites (see Section 5.3) are also located on the periphery of campus. With an outdoor pedestrian network defined by the size and shapes of buildings and blocks, this shift in facility need has resulted in a pattern of buildings and pedestrian network at two different scales. To ensure that the need for larger complexes does not compromise Main Campus' extensive fine-grained and historic pedestrian network, it is fundamental that the design and placement of these buildings consider how their internal hallways align with the outdoor network, and internally provide a similar offering of multiple route options, breaking the larger building into smaller parts. In addition to ensuring consistent alignment, the design of

Recommendations

entrances – by using transparent materials and utilizing clear, direct sight lines – will contribute to a successful integration of internal and external pedestrian networks.

Priority Areas for Pedestrian Connection Improvement

In addition to the general objective of designing new buildings to integrate with the pedestrian network, there are two areas on campus where the fine-grained pedestrian network have been disrupted. These should be considered priority areas for improvement and are illustrated in the Figure 5-51 to the right.

The first priority area is the north-south connection connecting the foot of Aberdeen Street to Union Street. Currently the block bounded by Union Street, University Avenue, Earl Street, and Division Street has a longer block length than the blocks to the east and west. As a highly frequented district with the highest concentration of student services, better north-south connections are needed. With the potential redevelopment of the Physical Education Centre, an indoor or outdoor connection linking Aberdeen Street to Union Street should be incorporated into the design of the new facility.

The second priority area is the northern edge of Stuart Street at Queen's Quadrangle which does not currently contain a sidewalk. One principle to a comprehensive and safe pedestrian network is to ensure all streets contain sidewalks on both sides of the street. The installation of sidewalks on this portion of Stuart Street should be coordinated with the City and incorporated with any enhancements to Queen's Quadrangle (described in detail in Section 5.4.1 of this Plan).

Enhancing Walks and Paths

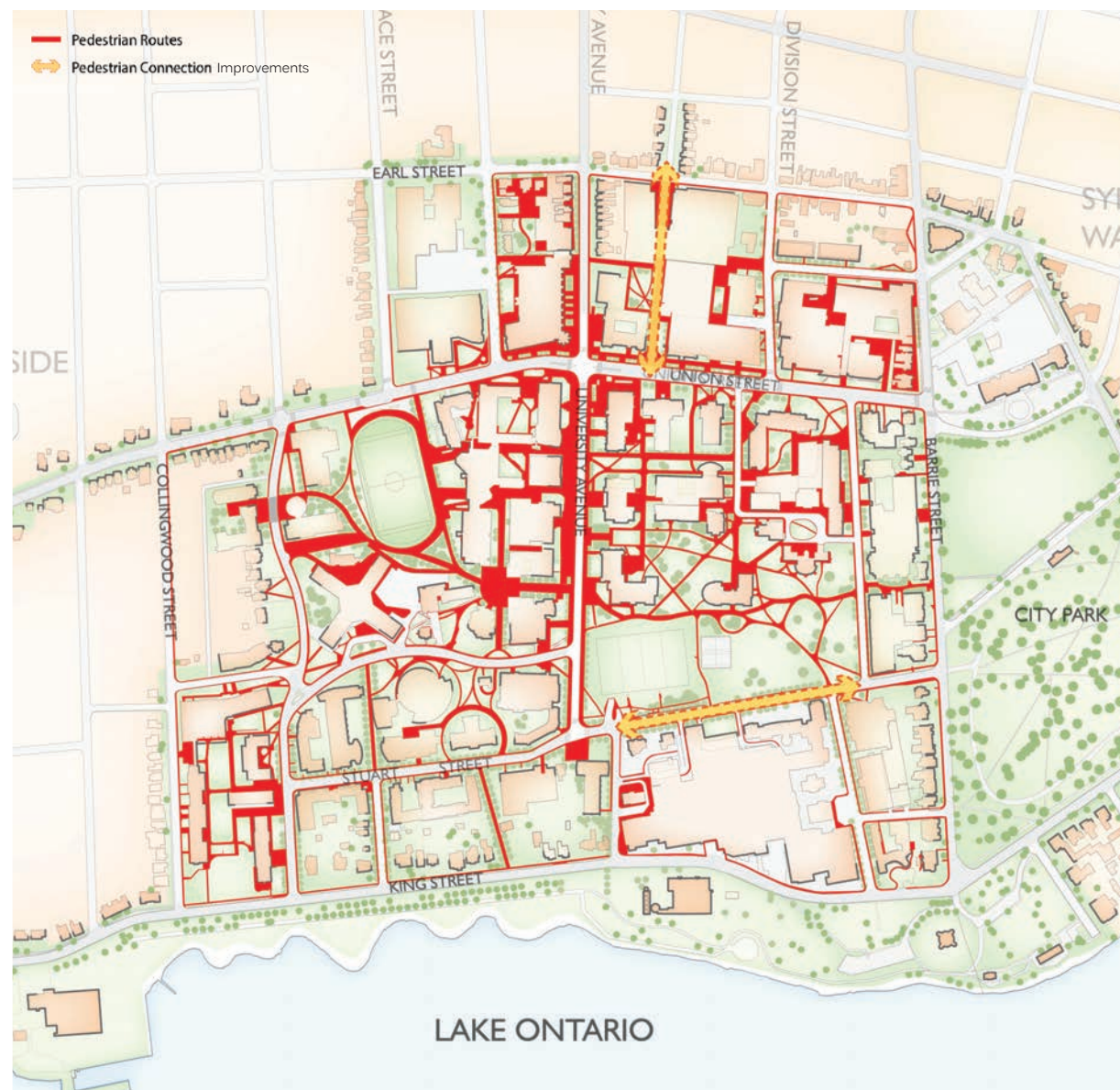
Essential to a well-used Pedestrian Network is that its routes are comfortable and enjoyable. The walks and pedestrian paths of Main Campus are also part of the Open Space Network. The Open Space Network Section of this document provides a number of recommendations to enhance existing walks, the creation of new ones, and the re-balancing of existing service lanes to prioritize pedestrian movement. These recommendations can be found in Section 5.4.2, "Formal Linear Walks."

Accessibility

As part of this Plan's commitment to ensure the campus is accessible to all, new additions or improvements to the pedestrian network should incorporate universal design elements such as curb cuts, narrow inclines, and even grading.

1. The continued maintenance and enhancement to the pedestrian network should be considered a priority in order to ensure a continued safe, walkable, and accessible Main Campus. Enhancements should aim to create protected and inviting routes. Design considerations should include:
 - Continuous, identifiable paving
 - Framing and protective elements such as trees or planting
 - The incorporation of street furniture such as benches to provide places to rest. These should be located on either side of the path but should not obstruct the pedestrian right-of-way
 - Regard for Design for Crime Prevention through Environmental Design (CPTED) principles
2. Pedestrian activity should remain at grade and be designed in accordance with Queen's Accessibility Guidelines to accommodate those with mobility-related disabilities.

3. Walks and pedestrian pathways should be aligned with one another to ensure a continuous and co-ordinated network. Any new walk or re-alignment of an existing walk should be designed to join with other components of the pedestrian network.
4. When designing new buildings, ensure the placements of entries and exits align with existing pedestrian routes as illustrated on Figure 5-51. Entry ways should utilize transparent materials to provide a sense of porosity to the new building, indicating a pedestrian through-way.
5. For infill development sites that incorporate an historic building, ensure the existing circulation pattern is maintained by providing entries and entrances in alignment with existing pedestrian routes.
6. The University will work with the City to accelerate the installation of sidewalks on the south side of King Street to provide safer pedestrian movement options between Main Campus and the Isabel Bader Centre for Performing Arts.



▲ Figure 5-51

Main Campus Pedestrian Network

5.5.2 Street Network

As carriers of cars, people, cyclists and public transit, streets are an integral component of Main Campus' movement network. Consistent with the principle to prioritize sustainable transportation choices at Queen's, enhancements to streets on Main Campus can be considered at two dimensions. First is the re-balancing of streets themselves. This is achieved through reconsideration of a street's cross-section (the width and design of sidewalks, bike lanes, and travel lanes). The second consideration is to view the street and pedestrian network holistically and addressing points where the street network disrupts the continuity of the pedestrian network and poses safety issues to pedestrians. The design of streets on both Main and West Campus are discussed at the City scale in Chapter 4 and in further detail as they relate to the Open Space network in Section 5.4.2. This section focuses on the second consideration, regarding the disruption streets make to a continued and safe pedestrian network.

Figure 5-52 provides a number of locations on Main Campus where pedestrian crossings of different types can be installed or enhanced to

shift priority to pedestrians over the vehicle. The majority of the recommendations in this section regard prioritizing pedestrian movement and promoting safe crossings within the Student Life Cluster (as illustrated on Figure 5-2). Both Union Street and University Avenue are important streets in the City of Kingston's broader road network with a role in moving vehicles, cyclists, and pedestrians. But with Main Campus as one of the areas in Kingston with the most pedestrian activity, both of these streets must be subject to better traffic calming in their portions that carry through Main Campus.

Priority Intersections for Improvement

The intersections of Union Street and University Avenue, Union Street and Division Street, and King Street and Albert Street are all highly-trafficked, significant crossings that require enhancements to increase pedestrian safety.

While the intersection of Union Street and University Avenue currently hosts a signalized intersection, it is considered by many as the "heart" of campus and is the location of the proposed Library Square (see Section 5.4.3).

Accordingly, this intersection should receive further enhancements to prioritize the pedestrian and slow traffic. This can be accommodated through street design, but should also be an intersection considered for a traffic crossing that is re-programmed to allow for longer crossing times. Another option is the installation of a "pedestrian scramble". A pedestrian scramble stops both north-south and east-west traffic, and allows pedestrians to cross an intersection all ways for a period of time. A pedestrian scramble increases the duration and frequency for pedestrian crossing.

The intersections of Union Street and Division Street and King Street and Albert Street are highly-frequented pedestrian crossings that do not currently contain signalized intersections. With the near completion of the Isabel Bader Centre for Performing Arts and the introduction of a Kingston Transit Express Bus Route along King Street, this intersection will see increased pedestrian movement. To facilitate safer crossing at this intersection, either a signalized crossing or a pedestrian-activated crosswalk are recommended here.

Crosswalk Improvements

Figure 5-52 also indicates locations for crosswalk improvements. These are existing pedestrian crossings on University Avenue. Even with recent attempts to slow traffic on University Avenue, further interventions are required to create a safer pedestrian environment. Speed tables, a raised crossing for pedestrians, are proposed here that would give pedestrians priority over private vehicles while simultaneously calming traffic.



► Figure 5-52
Main Campus Street Network

Recommendations

1. Prioritize pedestrian, bicycle and transit activity to all campus streets and advocate for these modes of transportation in any projects involving city streets.
2. Advocate for the installation of new or enhanced traffic crossings at key intersections for improvement, as indicated on Figure 5-52. The following specific directions will guide enhancements to these crossings:
 - To reinforce its role as the heart of campus, and to support significant pedestrian volume, the intersection of Union Street and University Avenue should receive an enhanced signalized intersection with longer pedestrian crossing times. The installation of a “Pedestrian Scramble” should be considered.
 - As a key intersection for movement between Main Campus and the Isabel Bader Centre for Performing Arts as well as a prominent cycling and transit route, the intersection of King Street and Albert Street should be the location of a new signalized traffic crossing or pedestrian-activated crosswalk.
 - To enforce reduced traffic speeds and safer conditions on Union Street, the intersection of Union Street and Division Street should be the location of a new traffic crossing or pedestrian-activated crosswalk.
3. To prioritize pedestrians and reduce traffic speed, advocate for the installation of speed tables at existing intersections on University Avenue as indicated on Figure 5-52.
4. To enhance pedestrian safety, advocate for the installation of new pedestrian crossings at locations indicated on Figure 5-52. The crossings should utilize one of the following techniques: special paving treatments at the pedestrian rights-of-way, highly-visible painted pavement markings, or overhead flashing lights.

5.5.3 Parking

Parking on Main Campus currently consists of surface parking, underground parking, and on-street parking.

Overtime, open space and building investments will displace surface parking to the point where surface parking may be relocated to West Campus, or that more structured or underground parking may be required on Main Campus. Should Queen's decide to develop underground parking, it can be accommodated on any development site whose building footprint is 120 square metres or more.

In the interim, surface lots will see enhanced landscape treatment (e.g. landscaped pedestrian paths, increased tree cover, pedestrian-scale lighting, smaller parking modules) to better reflect the quality of campus and ensure a safe pedestrian experience.



Queen's University



Princeton University

5.5.4 Cycling Network

As described in Section 4.3, a comprehensive, safe, and inviting cycling network promotes cycling as a desirable and primary transportation choice.

On Main Campus, a number of new cycling routes and pedestrian cycling routes are proposed, as indicated on Figure 5-53 on the opposite page. Proposed cycling routes are located on all of Main Campus' streets to promote cycling as a preferred route on campus. New cycling trails are proposed that would connect the University with City Park to the east and King Street to the South. While these pathways may be informally used today as cycling routes, their inclusion in the cycling network formalize this role, and any future enhancements to these trails should consider them part of the cycling network. New design standards will ensure trail rights-of-ways are wide enough to accommodate both cyclist and pedestrians and mitigate conflict.

Bike parking should be installed in the form of bike posts, rings or racks along cycling routes.

The location of these should be out of the pedestrian right of way and should be placed in weather-protected areas where possible.

Enhanced bicycle parking facilities provide safe and secure locations for cyclists to store their bikes and help emphasize cycling as a promoted mobility choice. Enhanced bicycle parking facilities refer to higher-security bicycle parking such as bike lockers or bike cages. These may be in the form of a stand-alone structure outside of buildings, incorporated at grade level near entrances in new projects, or as secure parking in underground parking garages. Additional bicycle amenities would be suitable near the north entrance of the Queen's Centre. With existing shower and locker room facilities available for gym members, this is a location suitable for either dedicated showers for cyclists, or a program for cyclists to access existing facilities.

Recommendations

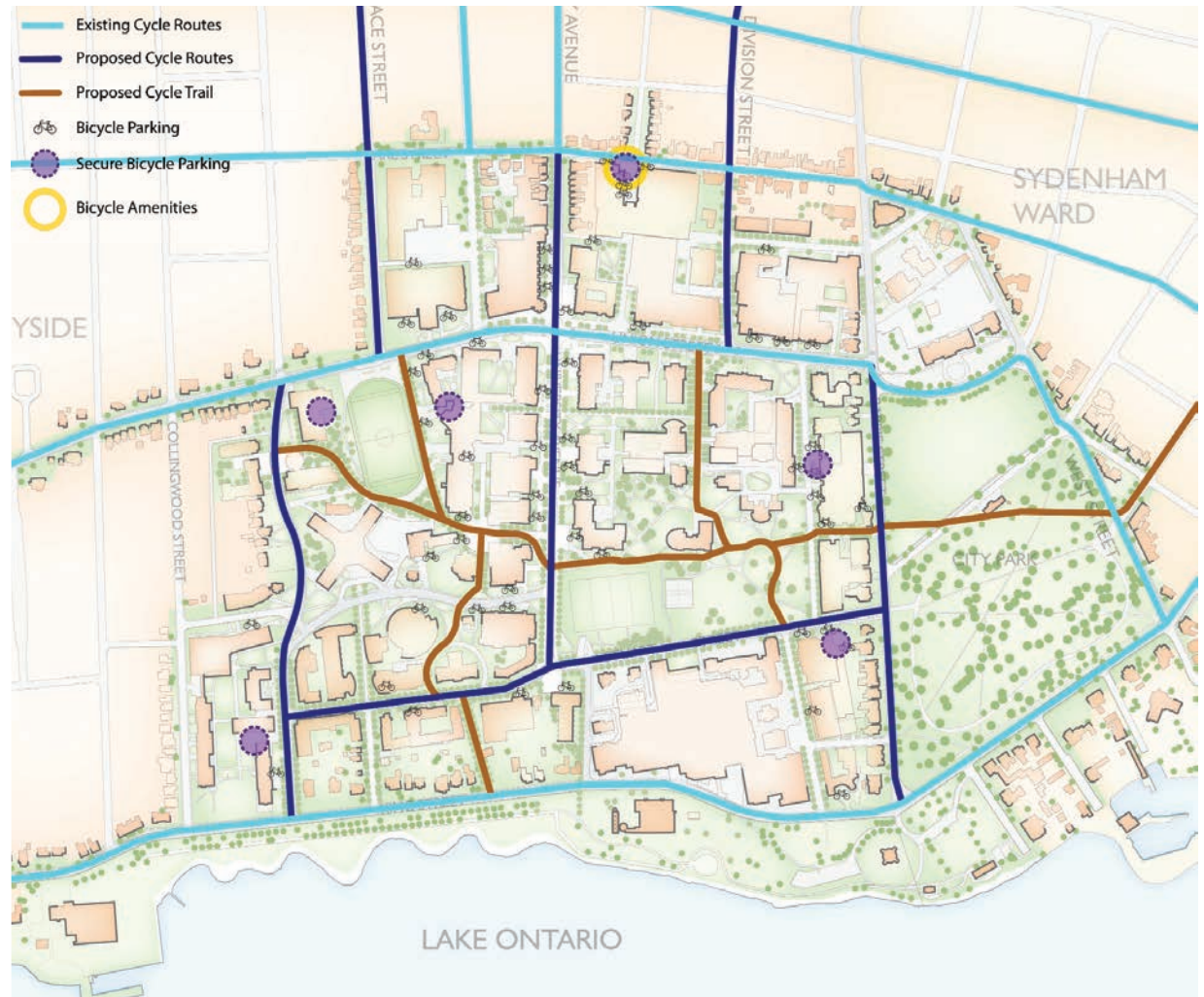
1. Bike Parking in the form of bike posts, rings or racks, should be located within 20 metres of cycling routes.
2. Include bicycle parking considerations in site planning for new developments including secure bike lockers, bike cages, and shower facilities.
3. Guided by Figure 5-53, incorporate installation locations for enhanced bicycle parking facilities as part of the cycling parking strategy, recommended in Section 4.3.
4. Due to its proximity to the Queen's Centre shower and athletic facilities, explore opportunities to provide secure bicycle parking in the existing underground garage beneath the Queen's Centre. Other underground parking facilities may also be considered for secure bicycle parking facilities.



Princeton University



Kingston Transit



► Figure 5-53
Main Campus Cycling Network

5.5.5 Servicing Network

Recommendations

Unlike personal vehicles, servicing vehicles need routes that carry vehicles further into the campus to deliver goods, remove waste, and provide fire and emergency vehicle access. A number of service routes and service locations have been identified in Figure 5-54 on the opposite page.

The servicing strategy recommends retaining most existing service routes, but also proposes the re-alignment of some, including Fifth Field Company Lane (for a discussion of the proposed design changes to this lane, see Section 5.4.2). Also identified are service areas in existing and proposed development sites, as well as service zones that can accommodate more significant loading and “back-of-house” uses.

While the placement of some service routes are intentionally located to minimize disruptions with pedestrians, at many locations they are integrated with the pedestrian network and open spaces. In these places, the design of servicing functions needs to be thoughtfully considered and designed, so as not to disrupt the image and the quality of the campus setting.

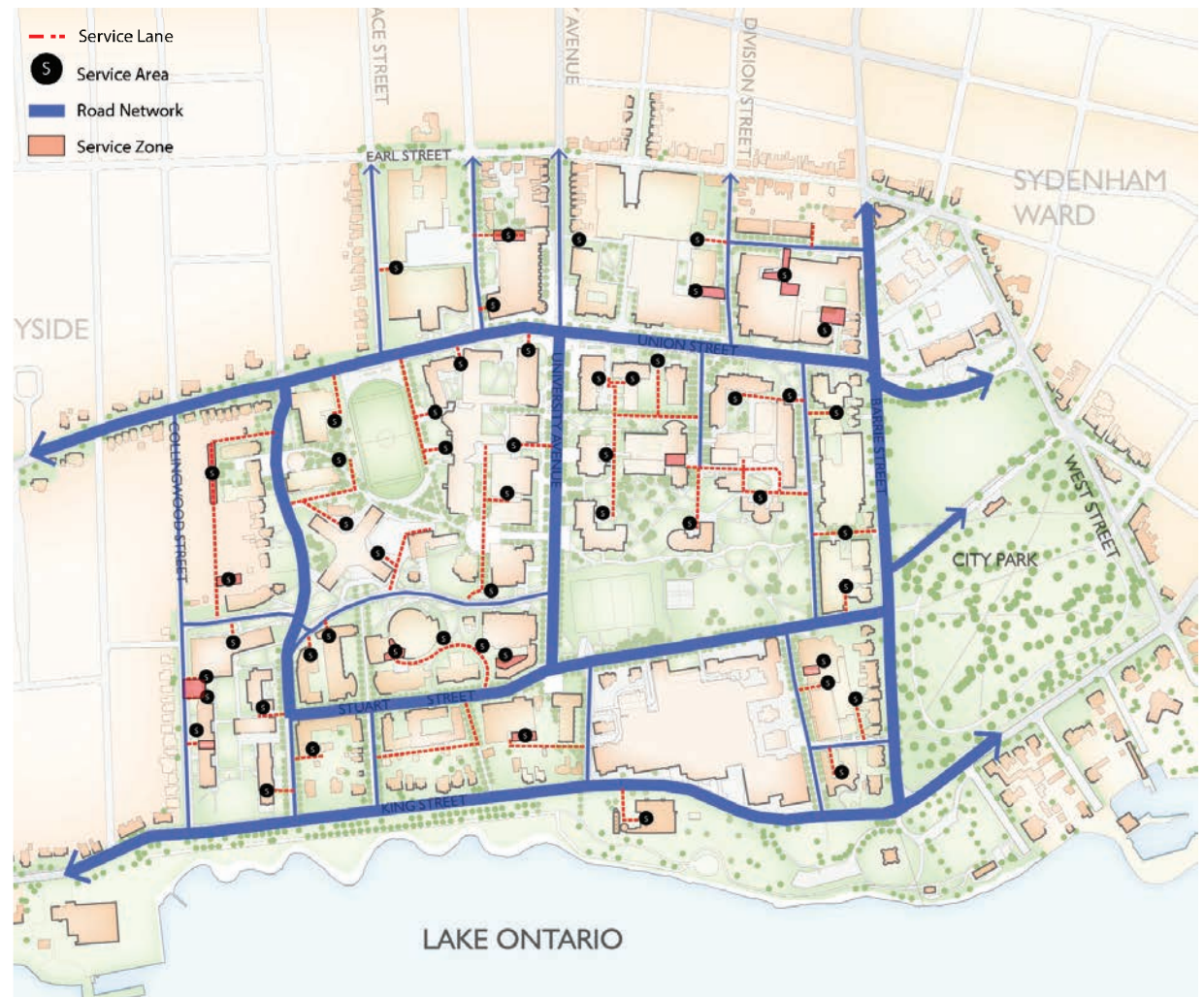
1. Design building service areas to be oriented to service routes, screened from view and, where possible, integrated into buildings.
2. Consolidated service routes should be designed to ensure appropriate service and truck access to campus facilities.
3. Where service routes overlap the pedestrian network, they should be designed as high quality pedestrian spaces to discourage unsafe vehicular behaviour and reinforce the pedestrian nature of campus.
4. Explore opportunities for a central receiving facility on West Campus for larger delivery vehicles, supported by a fleet of smaller trucks to deliver goods to Main Campus facilities.



This servicing entrance at the New School of Medicine illustrates how service routes can be integrated into new development while minimizing disruption to the pedestrian network.



At Princeton University, smaller vehicles are used to minimize the infrastructure needed to support servicing requirements.



► Figure 5-54
Main Campus
Servicing Network

5.5.6 Summary of Main Campus Movement Projects

The plan on the opposite page compiles the array of movement projects described in this section. Their integration with new development, as well as other design and implementation considerations, are described in Part 2 of this Plan.

Movement Projects:

- M2** Union / University Intersection Improvements
- M3** Union / Division Intersection Improvements
- M4** King / Albert Intersection Improvements
- M5** University Avenue Pedestrian Crossings
Improvements



▲ Figure 5-55

Main Campus Movement Projects Summary

5.6 Utilities

5.6.1 Main Utilities (Water, Gas, Sanitary and Storm Sewers)

The redevelopment identified as part of this Plan will impact and require upgrades to the existing utilities which support the Main Campus and West Campus. In addition to the base utilities, and understanding Queen's strong commitment to sustainability, there is also an opportunity to implement further upgrades to increase energy efficiency and develop a more resilient power system that can withstand severe weather events.

The utilities within private University blocks are owned and maintained by Queen's. Within municipal right-of-ways, Utilities Kingston manages the City of Kingston's water and wastewater infrastructure systems, while storm sewers are owned and operated by the City of Kingston.

For the most part, wastewater from Main Campus is drained by gravity to an existing sanitary pump station near the Central Heating Plant south of King Street, which sends flows to the municipal sewage treatment plant. In general, sanitary sewers flow from north to south and collect in large trunk sewers on King Street. Although major blocks of the main campus have been separated in recent years, there are multiple locations where University sanitary sewers currently cross connect into combined municipal sewers. Combined municipal trunk sewers can currently be found on several streets in the northern and eastern portions of the campus such as George Street, Arch Street, Clergy Street, University Avenue, Earl Street, Alfred Street, Barrie Street and Okill Street.

Stormwater flows for the campus also generally drain from north to south with outfalls discharging to Lake Ontario at George Street, University Avenue, St. Lawrence Avenue and Collingwood Street.

A 600 mm diameter water-main on King Street is the major water source for the Main Campus. It supports 400 mm connections on Albert Street and University Avenue as well as a 300 mm connection on George Street to produce the water distribution system for the campus. A major line is also present across the campus on Union Street, which ranges from 400 to 500 mm in diameter.

Based on preliminary discussions with Utilities Kingston, it is understood that the sanitary and combined sewer systems in the vicinity of the Main Campus are at or near capacity. On-going infrastructure maintenance work is currently taking place throughout the City to separate storm and sanitary services, however, it is not known if and when sewers in the vicinity of the University will be separated because a long

Recommendations

term sewer separation program has not been established. Ongoing municipal maintenance work is also focused on increasing the capacity of the sanitary and water networks in critical areas of the City.

Due to the presence of combined sewers, special permission will likely be necessary from Utilities Kingston in order to connect into the surrounding municipal infrastructure, and it must be demonstrated that there is adequate capacity in the system for the proposed loading.

In order to connect to water and sanitary networks, a servicing assessment must be performed to determine if there is adequate capacity in the respective systems for the proposed loading.

1. Continued separation of combined sewers should continue throughout the campus property with the goal of eliminating all combined sewers where reasonably possible. This initiative will provide more flexibility for future development projects and reduce loading to the sewage treatment plant.
2. A pre-consultation meeting with City engineering staff is highly recommended in advance of proposed campus development in order to understand the servicing constraints and opportunities that may be present in the infrastructure surrounding the project area. The municipality may require small Functional Servicing Reports, which take a detailed look at local utility capacity surrounding proposed development, as part of the Site Plan Approval process.
3. Re-development within Main Campus may produce civil design challenges due to the presence of unknown or antiquated infrastructure. A detailed underground utility survey prior to the design stage of all projects will reduce surprises and help produce the most efficient civil design to support the proposed development project.
4. In response to municipal stormwater flow control guidelines, rooftop storage of rainwater should be considered as a means of reducing the size of underground storage units on highly congested project sites.

5.6.2 Electrical Power Distribution

The Queen's electrical distribution grid is managed by Queens' Physical Plant Services department. Main Campus is fed from four 44kV substations. Two are owned by Kingston Hydro (MS6 Centre Street and MS9 Division Street). One is owned by Kingston General Hospital (KGH), which is shared by Queen's. The substation under Tindall Field is owned by Queen's.

Currently electrical supply from these four sources is adequate for the buildings on Main Campus, however if two or three major buildings are added on campus, a fifth substation will be required. Queen's has 'shelled in' a room for a fifth substation in the basement of the New Medical building on the east side of campus.

Queen's owns and operates a 4160 Volt distribution system on Main Campus and West Campus which has been designed to incorporate several levels of redundancy. Buildings are typically fed through a loop

distribution system on 5kV; with each building is fed from two separate sources. A program to replace lead lined, underground high voltage cables on Main Campus has been ongoing for the last several years and considerable progress has been made.

The Existing Co-Generation Plant is configured to back-up research-intensive buildings in the southeast portion of campus. The plant has the ability to provide electrical power to KGH and multiple campus buildings in the event of an extended utility grid power outage.

Recommendations

1. Power supply study for Main Campus should be updated with respect to redevelopment and new buildings included in this plan. Incoming 44kV services need be coordinated with City of Kingston and Kingston Utilities. Co-Generation Plant back-up capacities should be included in overall load calculations and redundant/emergency power sources analyzed.

5.6.3 Heating and Cooling

Heating Plant

The campus has a district heating system which supplies steam to both the Main Campus and West Campus and additionally to the Kingston General, Hotel Dieu and Providence Continuing Care Hospitals.

The existing steam plant is located in the Central heating Plant on King Street and comprises:

- A 150,000lb/hr dual fuel (gas/bunker oil) boiler installed in 1969
- A 150,000lb/hr bunker oil fueled boiler installed in 1974
- A 150,000lb/hr dual fuel (gas/diesel) boiler installed in 2009
- 2 x 7.5MW/75,000lb/hr gas fired cogeneration solar turbines installed in 2006

The current plant has some operational issues with regards to breaching pathways and as a result, restricts the combination of certain equipment. Overall this may affect the feasibility to use the total available capacity of the plant for future growth. The current plan is to replace the 1974 and 1969 boilers. The 2009 boiler and cogeneration turbines are relatively new and there is no plan to replace at this time.

Heating Infrastructure

Steam is distributed throughout the Main Campus and West Campus via piping of various ages ranging from the 1930s through to more recent upgrades in 2012. The majority of facilities are serviced by steam with hot water heat exchangers at each building. Where steam is not available, standalone boilers and gas fired rooftop units provide heat. As illustrated in Figure 5-56 the steam piping is direct buried in tunnel systems and broken into three main lines:

1. West Campus Line

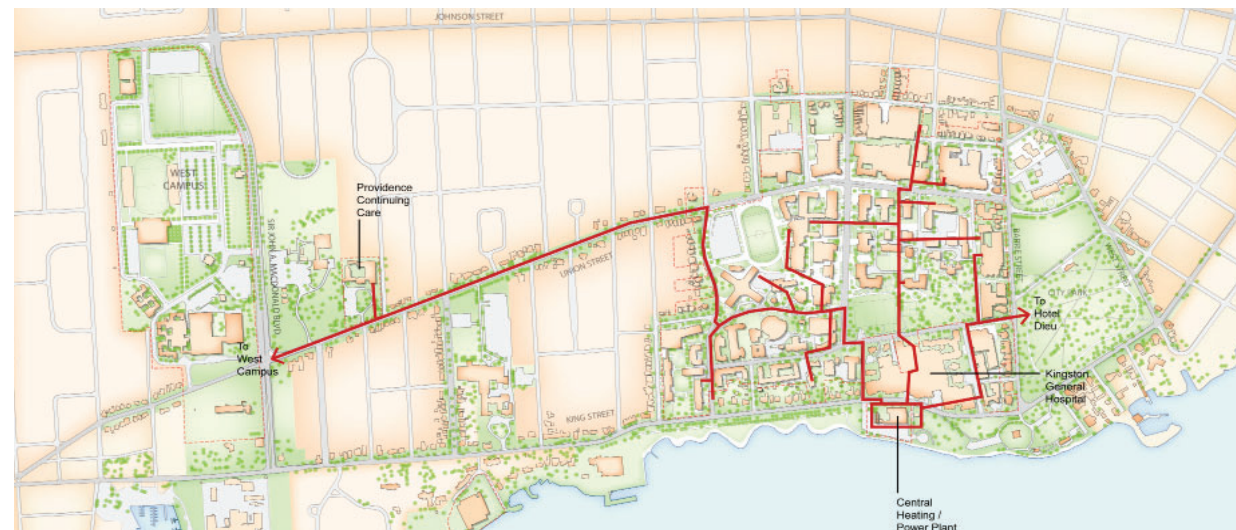
- The line runs west along Union Street and serves the West Campus, Providence Continuing Care and Queen's Donald Gordon Centre.
- The piping is approximately 40 years old and in poor condition. Based on the distance and age, this would be expensive to repair.

2. Central Line

- The line serves the Main Campus and Kingston General Hospital.
- The piping varies in age and condition.

3. East Campus Line

- The line serves parts of Kingston General Hospital, east side of campus buildings and the Hotel Dieu Hospital.
- The piping varies in age/condition and the Hotel Dieu has considered detaching themselves from the steam line and replacing with a standalone heating system.



▲ Figure 5-56
Existing Steam Infrastructure

Cooling Plant/Infrastructure

On the Main Campus, cooling is typically dedicated to each building but there are satellite, chilled water, district cooling systems which serve multiple buildings.

Sustainability and Energy

Queen's has invested into programs and activities in an effort to reduce energy consumption and GHG emissions which include:

- In house and third party bill verification
- Carbon footprint accounting
- Building Automation Systems (BAS), nightly and weekend setbacks
- Precinct Cooling
- 20KW solar PV array
- Building level utility data tracking
- Lighting upgrades and scheduling
- Occupancy sensors
- Low flow fixtures for new construction
- Heat recovery within HVAC systems
- CO2 monitoring and HVAC control

The renewable and sustainable technologies which have merit at Queen's are as follows:

Geothermal

Kingston has desirable ground conditions which provide high thermal conductivities to support geo-exchange. If there is space to support a vertical borehole field, this is an efficient and cost effective way to provide district heating and cooling.

Deep Lake Cooling

This will be dependent on the available depths and temperatures available but based on the proximity to both campuses, this can be re-investigated.

Solar Thermal

In buildings with a high domestic hot water requirement/turnover, sports facilities and as a supporting system to a low temperature hot water heating system, solar thermal can be a viable option.

Waste Gasification

Depending on the available waste volume either from campus or sourced from the local community, waste gasification and alternative technologies to generate bio-fuel are possible. The bio-fuel can be used to feed co-generation turbines, boilers or fuel-cells to create heat and power. The feasibility of this system will be dependent on the available annual waste volume and a cost comparison against the existing TranCanada natural gas supply.

Responding to Queen's strong commitment to sustainability and performance benchmarks, there is an opportunity to implement measures to reduce energy consumption and GHG emissions as part of the master plan.

Recommendations

Building Systems

The current approach Queen's is taking to improve the efficiency of each building (existing and proposed) is a great first step. These low cost measures paired with upgrades to control systems and monitoring are cost effective solutions to reduce energy consumption. As the campus is heavily populated with older buildings and the population varies dramatically throughout the year, some examples to consider:

1. Improve insulation
2. Improve glazing
3. Decrease infiltration of air. This may be around windows, doors and transition between materials. Also consider creating heated/cooled vestibules at entryways.
4. Install energy efficient HVAC systems. In addition to energy efficient Air Handling Units, Heat wheel retrofits and new rooftop units, consider Variable Refrigerant Flow (VRF) systems, multiple Energy Recovery Ventilators (ERV), Lossnay heat/humidity exchanger retrofits as an example.
5. Install modular building systems. Based on the variance of occupancy in some buildings it can be more efficient to run multiple, smaller pieces of equipment than to turn down larger.
6. Heat recovery from larger building sources such as lecture theatres, sports facilities, pools, ice arenas and equipment labs.
7. Lower velocity, displacement ventilation systems within areas high occupancy, high ceiling heights. This also maintains a clean aesthetic in older buildings by eliminated overhead services.
8. Consider natural ventilation in transient, high occupancy spaces
9. Control systems via CO2 and Occupancy sensors.

10. Installation of PVs arrays

11. Consider installing individual meters within each building on campus, with users sharing savings from the current baseline.

Campus Systems

Based on their age, fuel source and efficiency, there is a requirement to replace two of the existing boilers in the central steam plant. In addition, some sections of the steam piping will need to be replaced, specifically the West Campus line. These requirements create an opportunity to consider alternative central systems.

As the distance between the two campuses is fairly large (approximately 2 kilometres), it makes sense to install an independent system and infrastructure for the West Campus.

The solutions for both Main Campus and West Campus which may be considered are described on the following pages.

Short Term

- 12. The simplest consideration would be to replace the existing 1974 and 1969 boilers with efficient gas fired alternatives fed from the main TransCanada line. The existing steam infrastructure can be replaced where needed to support and the Combined Heating and Power (CHP) turbines, installed in 2006, would supplement.
- 13. An independent gas fired CHP/steam plant should be installed to support the West campus directly.
- 14. In addition, the existing independent cooling systems which serve each building can be replaced with high efficiency alternatives. This may be new chillers or air handling units within each building.

- 15. Based on the total capacity of steam available from the plant, investigate installing absorption chillers to provide cooling from the steam generated by the CHP turbines. A cost analysis can be performed based on the annual load requirements.

Medium Term

- 16. To increase efficiency, consider replacing the existing steam system and infrastructure with an efficient gas fired hot water system alternative fed from the main TransCanada line. The existing CHP turbines would supplement the system via heat exchangers. An independent, gas fired hot water/CHP system should be installed to support the West campus directly.
- 17. The hot water system may be supplemented by solar thermal systems or recovered heat from independent systems such as de-humidification, swimming pools and ice arenas.

- 18. In addition, a central chilled water cooling system can be installed for the Main Campus and West Campus independently, to serve all buildings. A new infrastructure to support both systems will be required and can follow the heating routing.

Long Term

- 19. In an effort to meet the long term energy goals of the University, bring added efficiency and flexibility for both campuses, a geothermal system may be considered due to Kingston's desirable ground conditions to provide high thermal conductivity. This system would also provide cooling and an efficient combined infrastructure that can be scaled for existing and future expansion.
- 20. A central or multiple geothermal vertical borehole fields could serve individual building heat pump systems throughout campus wherever space is available. The fields would be supplemented by the existing CHP turbines. Through further examination, and depending on the existing infrastructure

Other Considerations

sizing, there may be an opportunity to re-use the pathways and piping as conduits for new infrastructure.

21. Due to the distance between the two campuses, the installation of an independent system and infrastructure for the West Campus is recommended. This could also be an independent vertical, borehole field to support all facilities and future considerations. The field may be supplemented by a smaller gas fired CHP plant.

Wind Energy

Based on the Campus location and proximity to the lake, there may be an opportunity to investigate and install stand-alone wind turbines on campus. This may be a viable option to support the West campus and also an extremely visible measure to promote Queen's commitment to sustainability within the University and local communities.

Large Solar Arrays

Large solar PV arrays can be installed on building facades, rooftops, parking structures or on the ground. Further study and cost analysis may be performed campus wide.

Deep Lake Water Cooling

Further study this potential and investigate depths/annual temperatures to support a district system. Even if low temperatures cannot be achieved to directly generate a chilled water system, with higher temperatures, the lake may still be used as a heat source/sink to create a district condenser water system. This may be used to support central chillers or heat pumps within each building. This would be similar in nature to the geothermal system.

Waste Energy

If there is a consistent volume of waste which can be sourced from the University and local community, there may be a potential to install a waste energy system. This could be a gasification process to generate fuel to serve central heating, CHP or fuel cell systems to support both campuses.

Additionally, the system could be used to fuel waste collection and campus vehicles to create a full cycle energy process. This would be a great promotional sustainable system for the University.

Each of these alternatives may be affordable through an energy partner and energy services agreement. If there is a business case, a third party investor could support the capital, operations and maintenance costs to create affordability and implement.