University of Manitoba

PEDESTRIAN AND CYCLING PLAN

UNIVERSITY OF MANITOBA

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Acknowledgements

The University of Manitoba campuses are located on original lands of Anishinaabeg, Cree, Oji-Cree, Dakota, and Dene peoples, and on the homeland of the Métis Nation.

We respect the Treaties that were made on these territories, we acknowledge the harms and mistakes of the past, and we dedicate ourselves to move forward in partnership with Indigenous communities in a spirit of reconciliation and collaboration.

Executive Summary

The University of Manitoba has established a goal in its *Sustainable Transportation Strategy* to make its campus a safe and welcoming place for those arriving as pedestrians or by bicycle. One of the strategies to accomplish that goal is to develop a pedestrian and cycling plan that identifies and prioritizes future pedestrian and cycling infrastructure improvements on campus. In 2017, the University engaged Scatliff+Miller+Murray to develop that plan.

The Pedestrian and Cycling Plan presents a 15-year program for bicycle and pedestrian infrastructure projects ranging from upgrades of existing facilities to new construction projects. The 15-year program is broken into 35 projects that are intended to take place incrementally as funding and complementary projects allow. The completion of all recommended projects would provide the University with a fully connected pedestrian and bicycle network serving the campus and the broader city of Winnipeg.

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01 INTRODUCTION

The University of Manitoba (the University) aspires to be a safe and welcoming space for all people whether they arrive by bike, foot, wheelchair, car, bus, or any other means of travel. Pedestrians and cyclists use the University's transportation network comprised of a variety of roads, pathways, sidewalks, plazas, green corridors and other open spaces. Within this transportation network there are many gaps in cycling facilities where connections are missing, underdeveloped, or in poor condition. The University has identified a need to develop a comprehensive Pedestrian and Cycling Plan (the Plan) to direct the next 15-years of investment in these infrastructure facilities to build a complete Pedestrian and Cycling Network.

The projects identified in the Plan will develop and enhance bicycle and pedestrian routes and crossings that are safe, convenient, connected, and accessible, providing corridors that are conducive to the shared and inclusive nature of the University community. The Plan will guide decisions and will provide the tools needed to prioritize and develop facilities that promote, educate, and encourage more people of all ages and abilities to choose human powered modes of transportation more often.

The Plan provides a network of existing and proposed pedestrian and cycling routes which consider the current campus environment. The primary focus of the Plan has been on the Fort Garry campus and does not include Smartpark or the future development of the Southwood Lands that will be subject to a Local Area Plan. Consideration of the Bannatyne campus is limited to maintaining and enhancing connections to City of Winnipeg pedestrian and cycling facilities through University property.

The Plan is meant to be flexible to allow for emerging best practices, evolution of transportation systems and technologies, and changes to the campus environment. The Plan should be reviewed, at minimum, every five years to keep the content current, ensure priorities remain on target and allow new initiatives to be incorporated into the document.

Purpose of Plan

The purpose of the University of Manitoba Pedestrian and Cycling Plan is to build upon the existing system of campus pedestrian and cycling facilities and to link them together in an integrated network. The University of Manitoba aspires to create a pedestrian and cycling network that is visible, safe for all users, accessible by all persons with all abilities, convenient, connected to existing City of Winnipeg facilities, accommodates the needs of existing and future users, and promotes an increase in non-motorized vehicle travel.

The Pedestrian and Cycling Plan will:

- Serve as a road map for the implementation and evaluation of the University`s pedestrian and cycling infrastructure;
- Guide the University decision making process in relation to all pedestrian and cycling matters including, but not limited to, the future placement, design and construction of pedestrian and cycling facilities, and establishing priorities associated with capital and operational expenditures;
- Assign priorities and develop strategies to address future community pedestrian and cycling needs;
- Be used to help secure additional funding for enhancing the pedestrian and cycling network.

Planning Context

The Pedestrian and Cycling Plan is prepared as a successive work, building off of previous plans, strategies, and documents, including:

VISIONARY (RE)GENERATION MASTER PLAN

Mobility in the Visionary (re)Generation Master Plan is largely dependent on the integrated circulation systems that support a variety of transportation forms and allow them to co-exist. The Master Plan identifies pedestrian activity and accessibility for people of all mobility levels as major factors in how the campus is navigated and experienced. Streets will be designed consistent with the established 30 km/hr speed limit on campus. The Master Plan acknowledges the important link between walking and cycling and focuses on ensuring the two remain related in street and pathway designs to facilitate the connection between interior and exterior spaces.

SUSTAINABILITY STRATEGY 2016-2018

The Sustainability Strategy identifies actions related to transportation and accessibility, among others that address the three interrelated and mutually supportive dimensions of sustainability: environmental, social, and economic. The Strategy includes key goals and objectives that this Plan aims to assist with achieving when fully implemented. These key goals and objectives (page 24) include:

1. Reduce drive alone rate by 5% in next 5 years
2. 15% decrease in carbon intensity of average passenger trip from baseline
3. Increase campus walkability

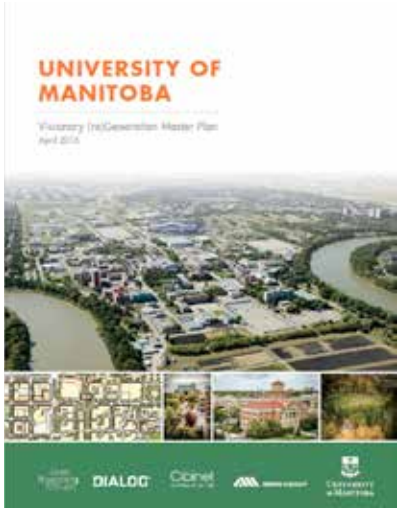


Figure 1: Visionary (re)Generation Master Plan

Figure 2: Sustainability Strategy 2016-2018

SUSTAINABLE TRANSPORTATION STRATEGY

The Sustainable Transportation Strategy defines the University's future transportation system as an "equitable, integrated, flexible, responsible and innovative network that meets the needs of our University community". The development of the Pedestrian and Cycling Plan is an action listed under Strategy 2 of this document (page 16).

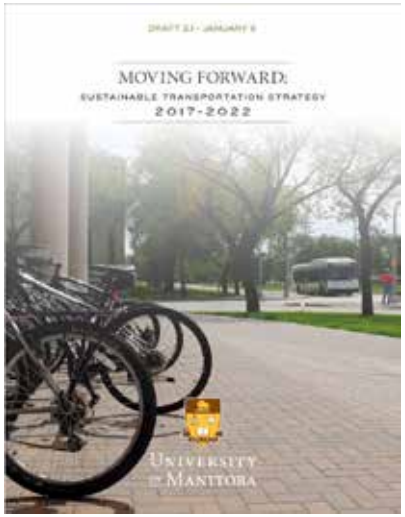


Figure 3: Sustainable Transportation Strategy

TRANSPORTATION SURVEY RESULTS AND RECOMMENDATIONS (2016)

The University hired Green Action Centre to conduct a survey of students and staff at both the Fort Garry and Bannatyne campuses in early 2016 on their commuting habits and preferences. Results from the 4,384 responses received that help inform this Plan include:

- 4.7% of respondents bike to their respective campus between September and April
- 13.6% of respondents bike to their respective campus between May and August
- Approximately 5% of respondents walk to campus
- A vast majority of respondents (89.9%) walk from building to building once they are on campus
- When asked what potential infrastructure and program changes would impact their choice of commute, respondents placed both "Improved walking infrastructure" and "Improved cycling infrastructure" in their top five most important influences

Figure 4: Transportation Survey Results and Recommendations (2016)

Additional University of Manitoba documents that provide background context as well as recommendations for pedestrian and cycling programs, policies and actions include:

- Bannatyne Campus Master Plan (2014)
- Taking Our Place: University of Manitoba Strategic Plan 2015-2020
- University of Manitoba Indigenous Planning and Design Principles (2016)
- Bike Parking Strategy
- University of Manitoba Signage and Wayfinding Strategy (in progress)

CITY OF WINNIPEG PLANNING CONTEXT

Relevant, related City of Winnipeg documents were considered, particularly for the purpose of defining types of facilities. The City of Winnipeg long-term bicycle network was also reviewed to ensure continuity between the University and the surrounding community.

City of Winnipeg documents that provide background context as well as recommendations for pedestrian and cycling programs, policies and actions for the City include:

- OurWinnipeg and Complete Communities Direction Strategy (2011)
- Transportation Master Plan (2011)
- Accessibility Design Standards (2015)
- Winnipeg Pedestrian and Cycling Strategies (2014)

Geographic Scope of Plan

The geographic scope of the Pedestrian and Cycling Plan is the University of Manitoba Fort Garry and Bannatyne campuses located in Winnipeg, Manitoba (Figure 5). The University of Manitoba is populated by more than 29,000 students and 8,900 faculty and staff. The majority of this population is located at the Fort Garry campus (Map 1) which is approximately 279 hectares in total area, including Smartpark, a business park in the southwest quadrant of campus and the yet to be developed Southwood Lands. The area comprising Smartpark is not included within the scope of this project, but will be subject to further study, to determine appropriate pedestrian and cycling facilities and address existing gaps. Geographic considerations include the Red River bounding the campus to the east; Pembina Highway, a major traffic thoroughfare and commercial corridor, bounding the campus to the west; and, mature residential neighbourhoods to the north and south. The Fort Garry campus is also home to Investors Group Field, a football stadium with a capacity of more than 33,000.

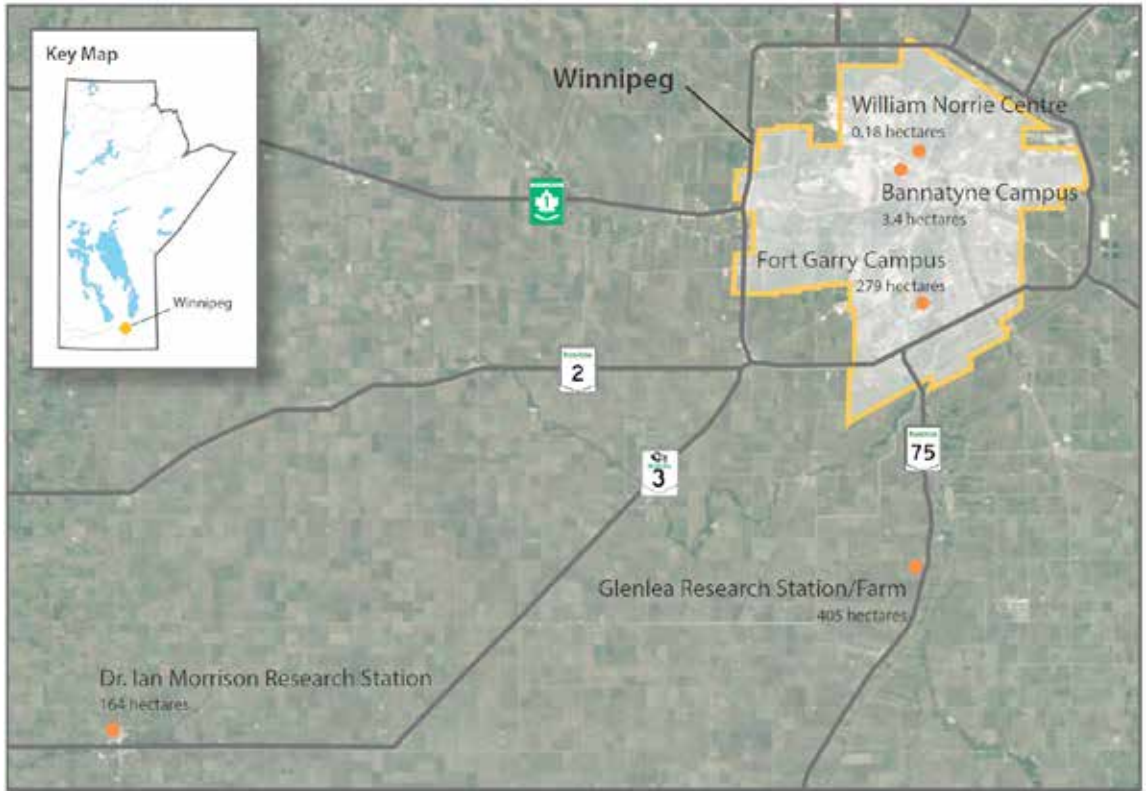


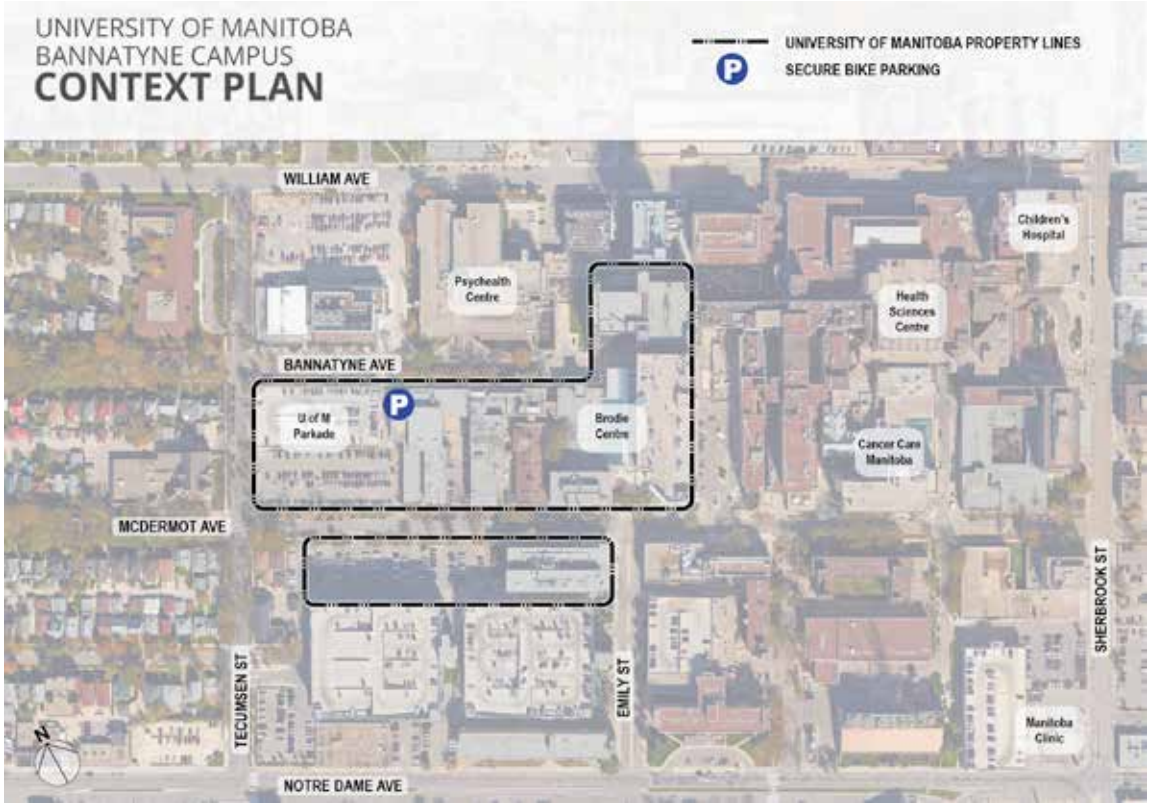
Figure 5: Map of University of Manitoba campuses and research facilities

Map 1: University of Manitoba Fort Garry Campus Context Plan

Although the Plan includes some recommendations for certain areas of the Southwood Lands, all future development in Southwood will be under the jurisdiction of a separate Local Area Plan, currently being drafted. Southwood recommendations in the Pedestrian and Cycling Plan may therefore be adjusted as part of the Southwood planning process. Longer-term pedestrian and cycling infrastructure in Southwood will be a part of the Local Area Plan and planning and engagement process, and are not included in the Pedestrian and Cycling Plan.

The Plan also includes recommendations for some roadways that are City of Winnipeg-owned, with the understanding that any facilities proposed on these roadways will be developed by the City of Winnipeg and subject to continued consultation and discussion with the City.

The Bannatyne campus is located in central Winnipeg within an urban neighbourhood between McDermot and William Avenues (Map 2). The campus occupies 3.4 hectares of contiguous land, approximately thirty percent of which is surface parking.



Map 2: University of Manitoba Bannatyne Campus Context Plan

Plan Process

Development of the Plan was managed by the University of Manitoba Architectural & Engineering Services and involved a steering committee that included representation from the Office of Sustainability and the Campus Planning Office. Meetings were held with the committee over the course of the project to review progress and to incorporate feedback into the Plan.

Development of the Plan included:

- Review of background plans, reports, surveys and strategies
- Review of campus maps and aerial photos
- Site visits for photographic inventory, review of existing conditions and observation of user behaviour
- Gap analysis of pedestrian and cycling networks
- Development of pedestrian and cycling frameworks and plans, recommendations and implementation plan

Figure 6: Participants view storyboards at open house in July 2017.

OPEN HOUSES AND ONLINE ENGAGEMENT

In July 2017, the Office of Sustainability held two open houses at the Fort Garry campus to present preliminary components of the Plan and to gather feedback from students, staff and faculty on proposed pedestrian and cycling improvements. The open houses were attended by more than 140 people and generated 69 individual comments which were captured on an idea board using sticky notes. The information gathered from the comments was used to inform the development of the Plan.

The open houses coincided with an online article published on UM Today regarding the Plan, as well as an online poll. The online poll found that respondents largely cycled on a combination of roads, sidewalks and bike paths on campus. For cyclists, the most common challenge to cycling around campus was:

- "poor connectivity to cycling routes" (61%, 105 votes), and
- "no bike lanes" (57%, 98 votes).

The most common challenge faced by pedestrians for walking around campus was:

- "bad driver behaviour" (38%, 63 votes),
- "no sidewalks" (36%, 60 votes),
- "unsafe intersections" (35%, 58 votes), and
- "poor sidewalks" (32%, 53 votes).

When asked what improvements would be the most effective to support walking and cycling on campus, respondents overwhelmingly replied:

- "more sidewalks/bike lanes" (74%, 151 votes), and
- "maintenance of sidewalks/bike lanes" (36%, 74 votes).

The results of this poll favour the establishment of a safe, connected, complete and comfortable pedestrian and cycling network.

In December 2017, the Office of Sustainability held a second open house to present the draft pedestrian and cycling network plans and the list of potential projects culminating from those plans. The information was also provided alongside an article published on UM Today. Participants were asked to vote for their top two pedestrian projects and top two cycling projects. Participants were also able to provide additional comments on sticky notes.

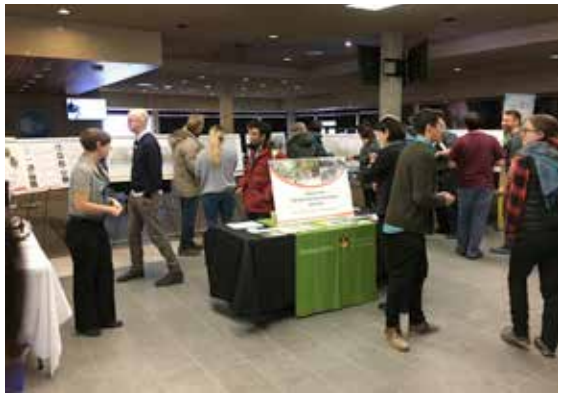


Figure 7: Participants view storyboards at Open House in December 2017

02 TYPES OF FACILITIES

Pedestrian and cycling facilities refer to physical infrastructure, including: multi-use pathways, bicycle lanes (buffered, protected, painted), sidewalks, recreational paths, and shared roadways. The term also includes ancillary facilities such as signage, staging and rest areas, and bicycle parking.

Pedestrians and cyclists use a network of various types of facilities to navigate campus and connect from existing adjacent City of Winnipeg facilities. The following treatments are referenced throughout the Plan. This section provides a definition specific to the context of this Plan with suggested minimum and/or typical dimensions where appropriate. The following treatments are consistent with pedestrian and cycling facilities located throughout the City of Winnipeg. City of Winnipeg Standards and Specifications should be used for detail design and construction of these facilities. The City of Winnipeg Accessibility Design Standard document should also serve as a reference document for construction of any new or renovated pedestrian facilities. Maintenance activities (e.g. snow clearing) should be considered in the design of all new facilities to ensure that factors such as maintenance equipment and snow storage can be accommodated.

1. SIDEWALKS

Sidewalks are pedestrian-only pathways located adjacent to roadways. Sidewalks are beneficial along roadways with increased motor vehicle volumes or speeds as they provide a separate route for pedestrians. New and improved sidewalks are not intended for cyclists due to their narrower width and should therefore only be located where there is an adjoining facility appropriate for bicycles to discourage conflict between cyclists and pedestrians.

Sidewalks vary in width depending on their location and projected pedestrian volumes. New construction of sidewalks should never be less than 1.8 m wide as this is the preferred width for snow clearing equipment. Wide sidewalks not designated as multi-use pathways should include visible signage indicating the facility is for pedestrians only, and, depending on campus conditions, the provision of a parallel route for bicycles to decrease the potential for conflict may be considered.

Figure 8: Typical paving stone sidewalk located on Dafoe Rd

2. MULTI-USE PATHWAYS

Multi-use pathways provide a location for walking and cycling that is separated from motor vehicles. Multi-use pathways can be located adjacent to a roadway or completely separated from the roadway through a naturalized area, park or along other right-of-ways. The most compelling benefit of multi-use pathways is the safety aspect of providing a designated facility for walking, cycling and other modes of active transportation away from motorized traffic.

Multi-use pathways differ from sidewalks in their width and the users they are designed for. Pathways are wider than sidewalks as they are designed to be shared between multiple users such as pedestrians, cyclists and small-wheel users (inline skating, skateboarding, scooters, etc.). Ideally a minimum width of 3.5 meters should be applied for new or upgraded multi-use pathways. A yellow dashed center line may be used on pathways with high volumes of users to delineate direction of travel.

Multi-use pathways of a reduced width (minimum 2.4 m) may be considered as temporary solutions due to site conditions that limit available space. Reduced width pathways may also be considered as temporary solutions in areas where future development or infrastructure projects may provide new opportunities for pathway location.

When considering pathway surface type, pathway location, projected users, and future maintenance shall be considered. In heavily treed areas and along river banks, paved pathways may be subject to heaving, slumping or cracking. This path deterioration may result in greater maintenance costs as well as potential safety or accessibility issues. In these areas, granular surface treatments (i.e. crushed limestone) should be considered. Granular surfaces are also appropriate as an interim pathway treatment for areas where a pathway may not be permanent, such as a detour during construction or to address a gap in the network where a permanent solution (e.g. future road construction or new building development) cannot be implemented in a timely fashion.

Figure 9: Typical multi-use pathway with paving stone

Figure 10: Typical 4.5 m wide multi-use pathway with separation of pedestrian and cyclist users. Pedestrian path 1.5 m concrete. Bike path 3.0 m asphalt

No matter which surface type is chosen, the pathway should be laid-out in such a way to prevent water from ponding anywhere along the trail. Surfaces should have a maximum cross slope of 3.3% to promote run-off away from the trail.

In areas where there may be significant pedestrian and/or cyclist volumes and speeds, and where appropriate to campus conditions, multi-use pathways may be further widened and separated between users (pedestrians and cyclists). Typically this type of wide multi-use pathway consists of a 1.5 m pedestrian path and a 3.0 m bidirectional bike path. Pavement markings including pedestrian and bicycle stencils, a dashed yellow line on the bike path and a green solid line between the bike path and pedestrian path are used to demarcate each user's space.

Figure 11: Typical buffered bike lane on Sidney Smith Street

3. RECREATIONAL PATHWAY

Recreation pathways are trails located in a more naturalized area (i.e. along the riverbank). Characteristics of these trails include low-impact surface treatments such as wood chip mulch, grass/dirt or crushed limestone trails, which do not have as great an impact on tree roots and are more appropriate for recreational users and pathways that may be subject to flooding. Recreational pathways differ from multi-use pathways by being narrower and windier, responding to the natural characteristics of the land.

4. BUFFERED BIKE LANES

A buffered bike lane is an on-street bicycle facility that is separated from motor vehicle traffic by a painted buffer and installation of flexible poly posts or temporary bollards. Buffered bike lanes are suitable on higher volume roadways where vehicle speeds may be greater than 30 km/hr or where there is no space available adjacent to the roadway for a multi-use pathway to accommodate cyclists. Typical minimum bike lane width is 1.5 m unidirectional or 3.0 m bidirectional, and must also include a minimum painted buffer width of 0.5 m between cyclists and vehicles.

5. SHARED ON-STREET LANE

Roadways with low traffic volumes and speeds can be suitable for shared use by cyclists and motor vehicles in the absence of a marked shoulder, bike lane or adjacent pathway. As a designated shared roadway, motorists and cyclists share the same travel lane. Road signs or pavement markings can be used to alert motorists to expect the presence of cyclists. Several of the roads on the Fort Garry campus are appropriate for this designation given their 30 km/hr speed limit and lower traffic volumes.

Shared on-street lanes may incorporate traffic calming measures where traffic volumes and/or speeds may be high. Traffic calming measures appropriate for the University of Manitoba include:

- Speed humps; (Figure 12)
- Raised crossings; (Figure 13)
- Curb extensions; (Figure 14)

When designing any traffic calming measure, a transportation engineer should be consulted to ensure compliance with recent standards and guidelines and to ensure safety of all road users.

Figure 12: Speed Hump: Vertical deflection in the roadway used to slow motor vehicle speeds.

Figure 13: Raised crosswalks are crosswalks above the level of the street at the point of a crossing. They are outfitted with crosswalk markings and signage to channel pedestrian crossings, providing pedestrians with a level street crossing. They can be used as traffic calming in a similar way as speed humps. Raised crosswalks increase safety for pedestrians by increasing their visibility at the crosswalk as well as slowing motor vehicles down at the crosswalk.

Figure 14: Curb extension: An extension or bump-out of the curb used to reduce the roadway width. Can be used at pedestrian crossings to narrow the distance pedestrians need to cross and slow motor vehicles.

6. SHARED CAMPUS CONNECTIONS

The central area of campus (denoted on Figure 15) is an informally defined zone containing greater density and activity. Here, a wide variety of pathways, plazas, open spaces, and green corridors facilitate shared user movements between buildings, residences, transit stops, and parking lots. This area is characterized by a dense concentration of buildings, areas with limited vehicle access, and numerous potential routes that all users can take. Here, pedestrians and cyclists share space in slow, unstructured environments without any designated separation of the users.

Figure 15: Examples of several shared campus connections located in the central area of campus.

03 EXISTING CONDITIONS

The existing pedestrian and cycling networks are shown on separate maps (Maps 3 and 4). The maps illustrate the connectivity and type of existing facilities. The maps also provide the locations of the primary access points to and from the campus showing where routes connect to adjacent City of Winnipeg pathways.

Existing Pedestrian Facilities

Map 3 shows the existing pedestrian network, illustrating where pedestrian facilities (sidewalks and multi-use pathways) exist, and where they connect to Winnipeg Transit stops and campus access points. The pedestrian network is very diverse with facilities ranging from 1.5 m wide paved sidewalks to wider multi-use pathways to "plaza-like" shared campus connections. Collectively, these allow for a variety of pedestrian movements throughout the campus precinct.

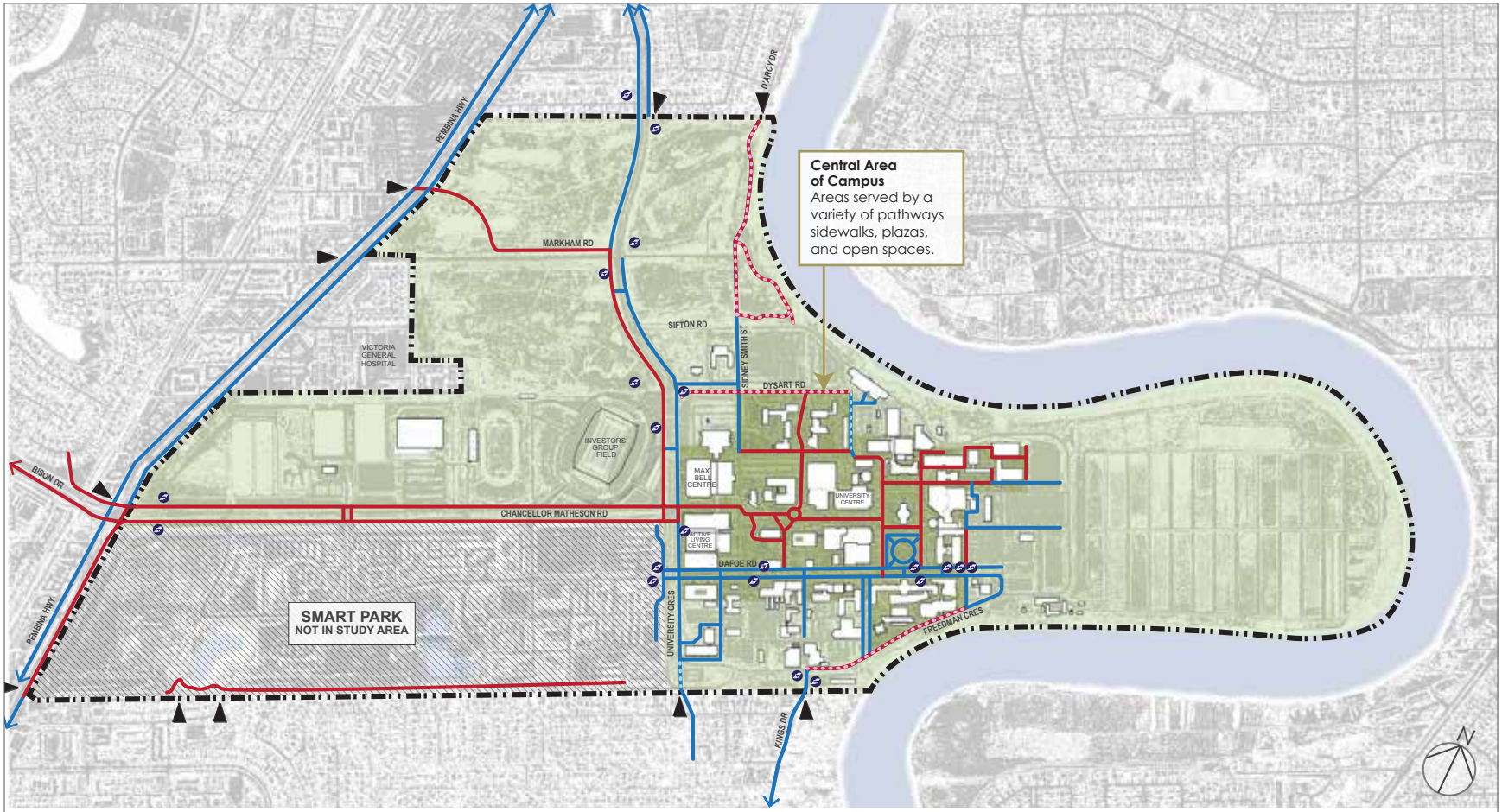
Many of these facilities are in fair to good condition, given that several have been constructed in the last fifteen years. There are however numerous asphalt pathways that are deteriorating, showing significant cracking and uneven surfaces. The pedestrian network also suffers from significant gaps in connectivity.

With distance from the central campus area, the pedestrian network deteriorates. These gaps serve as substantial barriers for pedestrians to walk or wheel through. This outer area is characterized by large parking lots with little to no infrastructure such as accessible walkways, crossings or orientation devices for pedestrians. They typically lack trees or planted islands to provide shade or wind protection. Though there are not high expectations for a sense of arrival in a parking lot, the objective of pedestrian movement through a parking lot should be to safely direct pedestrians through them with clarity and to create a nearby "orientation point" to move towards.

Figure 16: Examples of deteriorating surface condition on asphalt multi-use pathways.

Figure 17: Examples of a gap in the network where a desire line marks the preferred location for a pathway.

Figure 18: Example of a gap in accessible connectivity in the pedestrian network where curb ramps do not exist for an existing crossing.



Map 3: Fort Garry Campus - Existing Pedestrian Infrastructure

Existing Bicycle Facilities

Map 4 shows the existing bicycle network, illustrating where facilities exist to accommodate cyclists and where they connect to campus access points. Nearly the entire network consists of a variety of multi-use pathways that vary in width and design. Within the central area of campus the network is characterized by plazas, open spaces and green corridors. Notable exceptions include the newly constructed buffered bike lanes on Sidney Smith Street between Sifton Road and Dysart Road and the buffered bike lanes on Pembina Highway, outside campus, that the City of Winnipeg recently constructed.

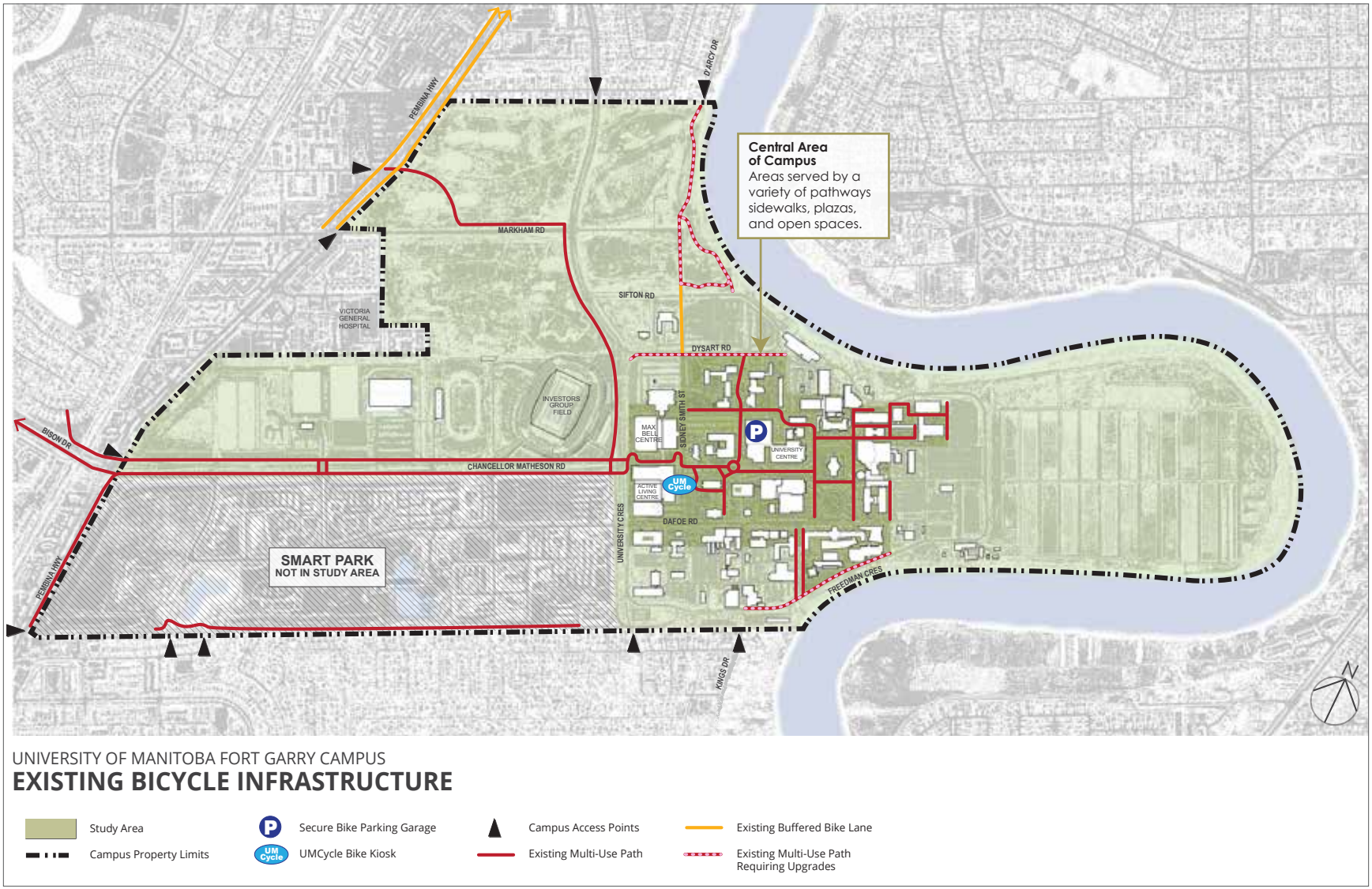
Generally the cycling network is undefined by way of signage or pavement markings to inform cyclists of where they should be riding. The central area of campus is well served by a network of shared campus connections. However, due to the volume of pedestrians, the variety of all users' movements, and the influence of the character of these corridors, cyclists tend to travel at greatly reduced speeds. These reduced speeds are practical for those cyclists reaching their destination, but are not conducive to commuter cyclists travelling through campus. Commuter cyclists tend to keep to the outskirts of campus remaining in the higher speed corridors, such as University Crescent and Pembina Highway.

The majority of roads on the Fort Garry campus have a signed 30 km/hr speed limit. This speed limit, when in practice, should be favourable to shared on-street lanes between bicycles and motor vehicles, particularly on any of the roads with limited traffic volumes. Previous informal speed studies have shown that a majority of motor vehicles do not abide by the 30 km/hr speed limit. Speeding motor vehicles on campus roadways create a barrier to cycling, often leading to cyclists travelling on pedestrian sidewalks or pathways that are too narrow for shared use.

Similar to the pedestrian network, the existing cycling network begins to show significant gaps further away from the central area of campus. This outer area is characterized by large parking lots with little to no infrastructure for cyclists, leaving cyclists to ride on grass boulevards, against the flow of traffic on a one-way road, or to cut through parking lots. These gaps serve as significant barriers for cyclists commuting to and from campus.

Figure 19: Buffered bike lane on Sidney Smith Street.

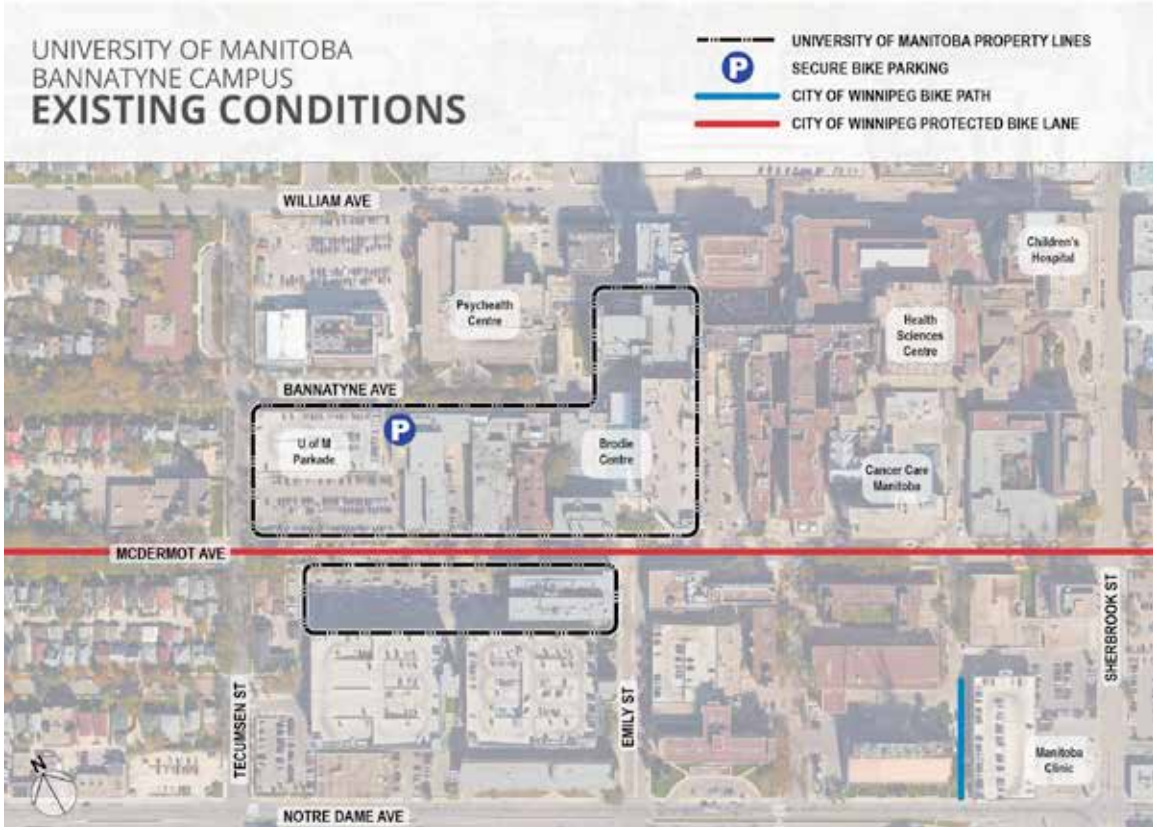
Figure 20: Multi-use pathway on Markham Road with separation between pedestrians and cyclists.



Map 4: Fort Garry Campus - Existing Bicycle Infrastructure

Existing Facilities – Bannatyne Campus

The Bannatyne campus is served by City of Winnipeg pedestrian and cycling facilities. The City of Winnipeg has recently completed construction of a new, two-way protected bike lane on McDermot Avenue. This project included the conversion of McDermot from a two-way street to one-way eastbound, reducing the traffic volumes and potential conflict points for pedestrians and cyclists using the street. Additional traffic calming measures have also been constructed, including a raised intersection and raised crossings. Sidewalks currently exist on both sides of McDermot Avenue and with the recent changes, pedestrian crossing should be enhanced.



Map 5: Bannatyne Campus - Existing Conditions

FIgure 21: Examples of bicycle parking facilities at the Bannatyne campus. Existing connection between Bannatyne and McDermot Avenues through Univeristy of Manitoba property (top left).

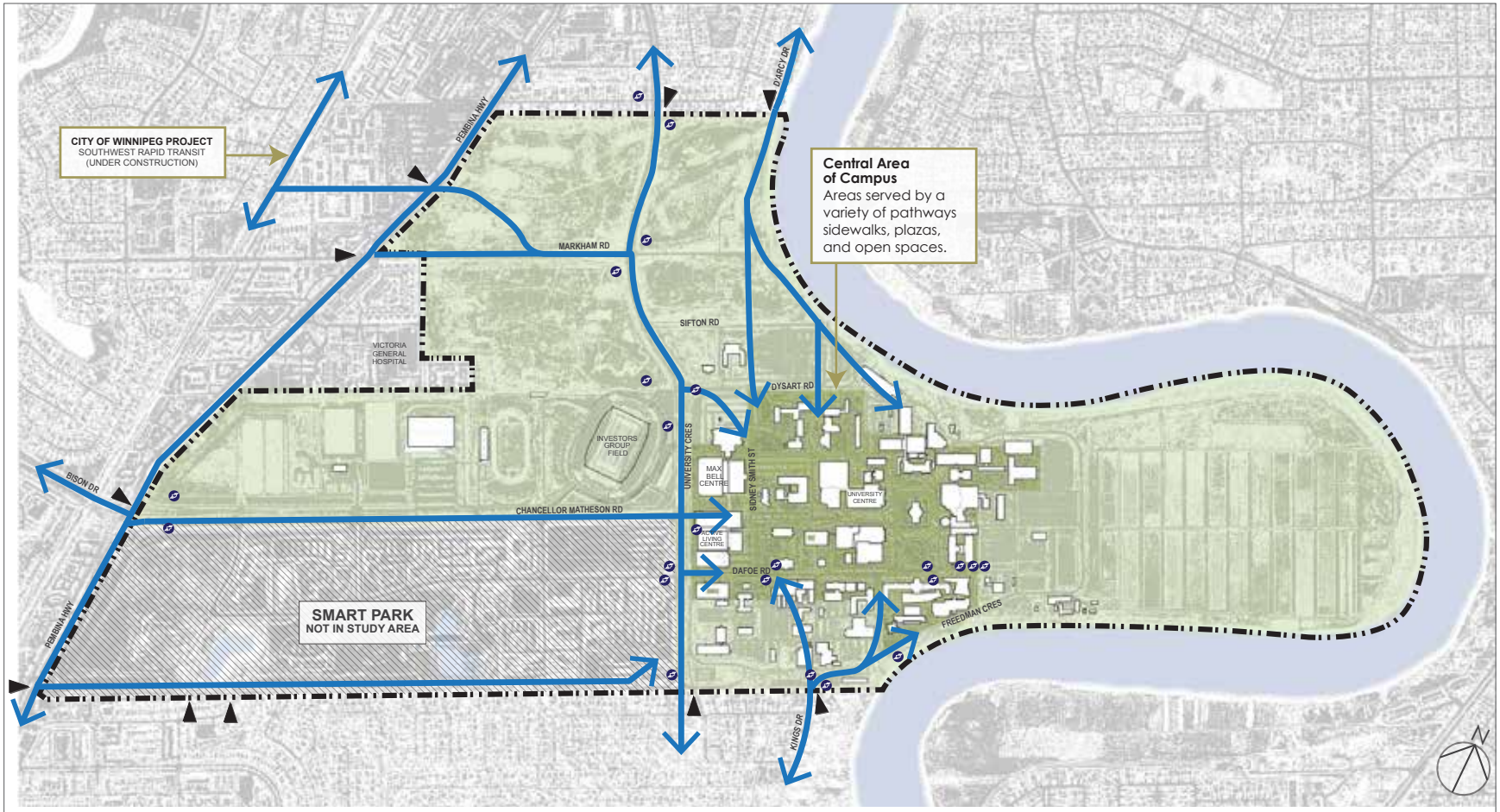
User Movements

The process of developing a pedestrian and bicycle network plan requires first establishing the major movements of the users to guide the future desired locations, purpose, and facility types. The pedestrian and bicycle movements, depicted on Maps 6 and 7 respectively, provide an indication of the major desired connections from campus access points to primary destinations in the central area of campus.

The major pedestrian and cycling corridors highlight the primary connections from the campus access points to the central area of campus. Corridors located outside the central campus area serve mainly as commuter routes to destinations within the central area of campus or as connections beyond campus to adjacent neighbourhoods. These are associated with 50 – 70 km/hr roadways of high volumes such as Chancellor Matheson Road, University Crescent, Pembina Highway and Markham Road. Exceptions to these occur along the river corridor connections that link neighbourhoods by way of a recreational trail.

Facilities along the major commuter routes should be separated from vehicular corridors, integrate all users to optimize infrastructure (e.g. multi-use pathways), provide safe pedestrian priority crossings, offer buffers, wind and sun protection, include wayfinding for orientation, and amenities such as rest stops. In areas where higher volumes of pedestrians and cyclists are encountered and/or higher cyclist speeds, the type of facility should consider appropriate widths for pathways or designated separate spaces to reduce conflicts.

Corridors located within the central campus area serve as the shared campus connections. These are associated with car-free pedestrian malls, plazas, greenway corridors, and large greenspaces such as the Duckworth Quadrangle. Facilities here should be flexible, allowing for a range of movements and uses including outdoor learning spaces, physical activities, gathering areas, and quiet spaces for study and contemplation. Where interactions with motor vehicles may occur, priority treatments should be provided for pedestrians to facilitate their crossing and/or integration with motor vehicles.

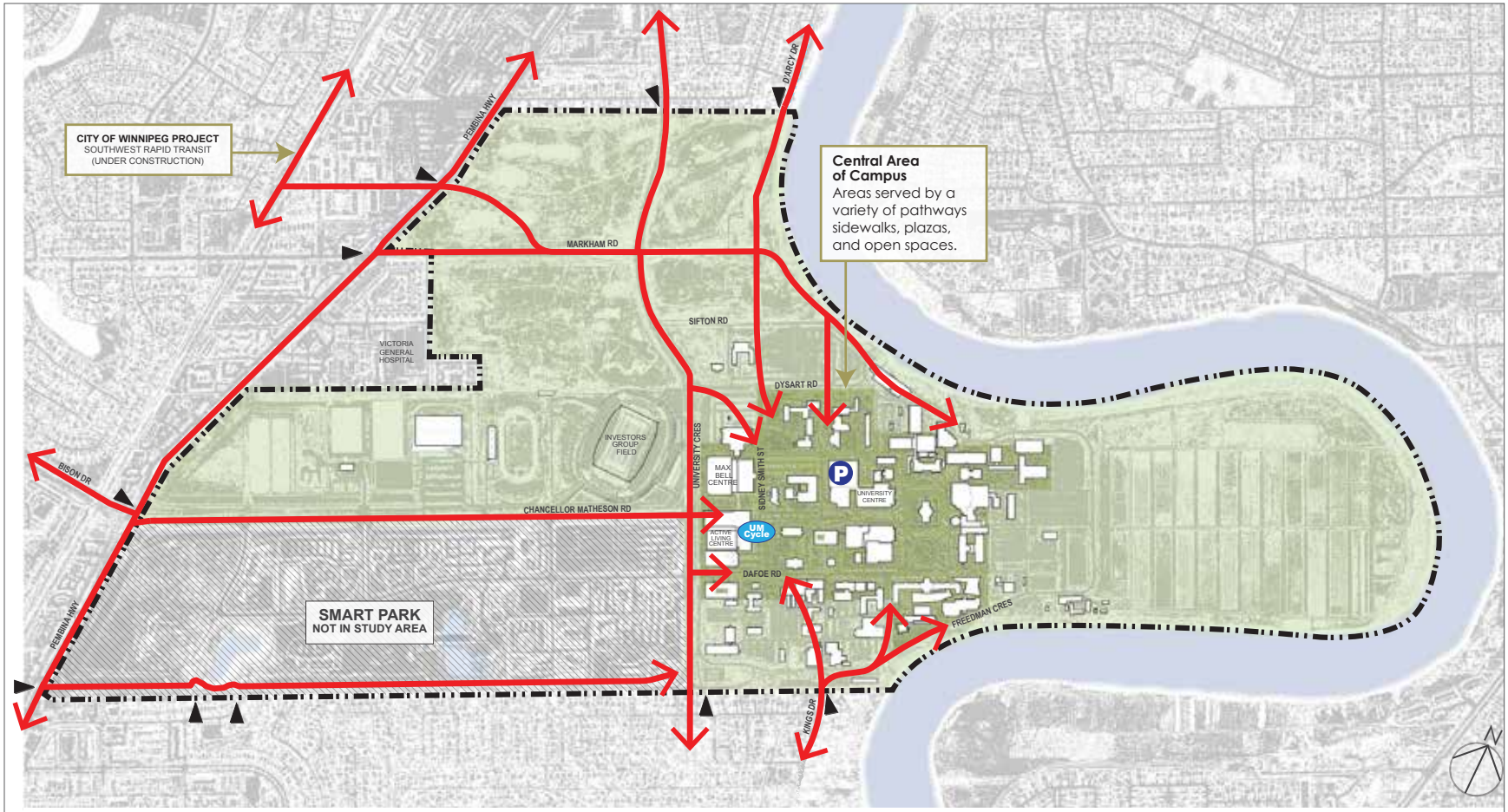


UNIVERSITY OF MANITOBA FORT GARRY CAMPUS

PEDESTRIAN MOVEMENT

Study Area
Campus Property Limits
Transit Stops
Campus Access Points
Major Pedestrian Movements

Map 6: Fort Garry Campus - Pedestrian Movement



Map 7: Fort Garry Campus - Bicycle Movement

Amenities such as bicycle parking and the UMCycle bike kiosk and repair station are located in the central area of campus. Careful consideration is required for locating these facilities to ensure that they do not promote conflicts with pedestrians along priority routes of travel. Bicycle parking in particular should be located so that bikes when parked do not block any portion of the pathway.

Connections from commuter routes to the central area of campus should provide features that create gateways, provide wayfinding orientation and offer streetscape characteristics that enhance the public realm. As these routes are often located adjacent to parking lots or roadways, separation should be provided between pedestrians and motor vehicles, including priority pedestrian crossings of roadways. Landscape treatments should include plantings and greenspaces similar to Dafoe Road which create visual buffers and a narrowing of space, promoting slower vehicle speeds.

Summary of Community Needs – Gap Analysis

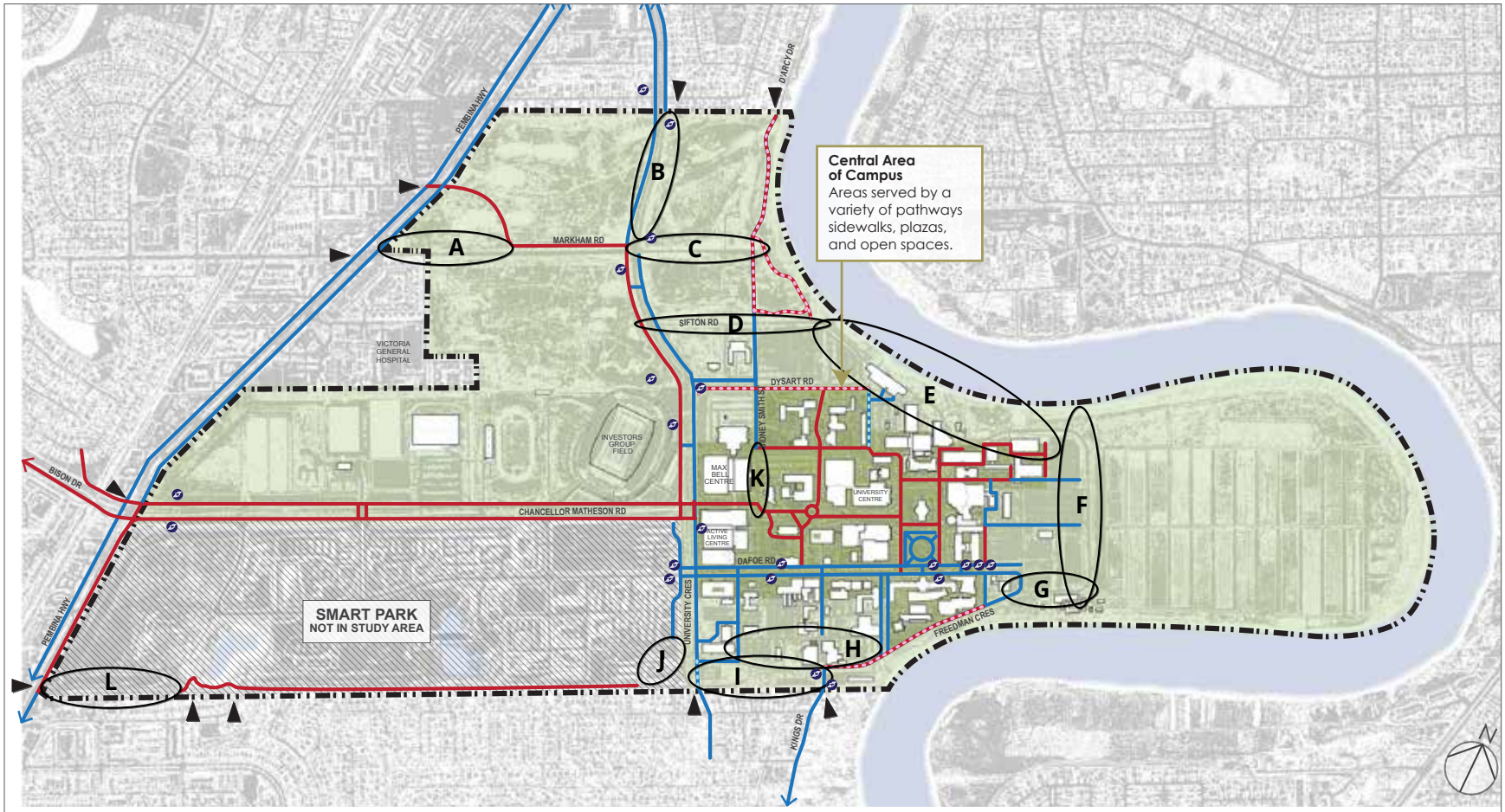
There are ten primary campus access points. From these access points to the central area of campus, significant gaps, largely through parking lots, exist in each of the networks, limiting connectivity.

A gap analysis for each network was undertaken to identify areas not serviced by pedestrian or cycling facilities. In addition to these gaps there are a number of barriers that should be identified as they limit access to campus from neighbouring communities. These include:

- Limited access through the Southwood Lands, including locked gates and fences,
- Restricted access to lands occupied by the Southwest Rapid Transitway,
- Pembina Highway as a high speed, high volume arterial roadway,
- Private lands and residential development along the southern property line, and
- Lack of crossings of the Red River to neighbourhoods on the east side.

Pedestrian Network Gap Analysis

Map 8 highlights the significant gaps in the Existing Pedestrian Network. Gaps are identified A-L on the map and described on the following pages.



UNIVERSITY OF MANITOBA FORT GARRY CAMPUS

PEDESTRIAN NETWORK GAP ANALYSIS

Study Area
Campus Property Limits
Transit Stops
Campus Access Points
Existing Sidewalk
Existing Sidewalk Requiring Upgrades
Existing Multi-Use Path
Existing Multi-Use Path Requiring Upgrades
Gaps in Network

Map 8: Fort Garry Campus - Pedestrian Network Gap Analysis

A. Markham Road – Pembina Highway to Southwest Rapid Transitway (City of Winnipeg right-of-way)

The section of Markham Road from Pembina Highway to Snow Street is a paved City of Winnipeg roadway that does not have a sidewalk or pathway adjacent to it. From Snow Street to the Southwest Rapid Transitway, Markham Road is a gravel vehicular roadway characterized by a high volume of on-street parking. There is no associated space for pedestrians. Pedestrians must walk on the road until they can access the multi-use pathway. Pathways exist in the former Southwood Golf Course but these have become disconnected with the construction of the Southwest Rapid Transitway. Access is further restricted by an existing ditch and chain link fence.

B. University Crescent – Thatcher Drive to Markham Road (City of Winnipeg right-of-way)

There is no sidewalk or pathway along the east side of University Crescent between Markham Road and Thatcher Drive. Pedestrians must cross to the west side or use the roadway shoulder.

C. Access road east of Markham Road – University Crescent to Southwood Pathway

This section of Markham Road is closed to motor vehicle traffic with the exception of maintenance vehicles. The roadway is suitable for pedestrians to walk on, but the gate at University Crescent is often closed, creating a barrier to accessing the pathways.

D. Sifton Road – University Crescent to Gate 'L'

There is no pedestrian facility along Sifton Road east of University Crescent. Pedestrians must either walk along the side of the one-way road adjacent to ditches or take an alternate pathway further north in the Southwood Lands that is not maintained year-round and is not visible from the roadway.

E. Gate 'L' Entryway, Sifton Road, and Dysart Road – Gate 'L' to Saunderson Street

From Gate 'L' there are no pedestrian facilities or safe crossings of Sifton Road to connect to campus. A desire line exists along Sifton Road towards Wallace building and through Parking Lot Q. There are no pedestrian facilities along Dysart Road between Wallace building and Chancellor's Hall and along the riverbank to Saunderson Street. There is no safe crossing of Dysart Road from Chancellor's Hall to the Duff Roblin building.

F. Saunderson Street

There is no pedestrian facility along the entire length of Saunderson Street. There are no safe crossings of Saunderson Street to Parking Lot L.

G. Freedman Crescent – Alumni Lane to Service Street 7S
There is no pedestrian facility along Freedman Crescent from Service Street 7S to Saunderson Street. There are no safe crossings of Freedman Crescent along this same stretch.

H. South Entry to Campus – Service Road 1S, Service Street 2S, Parking Lot S
From Kings Drive into the central area of campus there is no direct or designated pedestrian connection. Parking Lot S between Physical Plant building and the Stores building is a significant barrier to campus access. There are no pedestrian facilities along Service Road 1S or Service Street 2S.

I. Freedman Crescent – University Crescent to Kings Drive
There is no pedestrian facility along Freedman Crescent connecting this south access to campus.

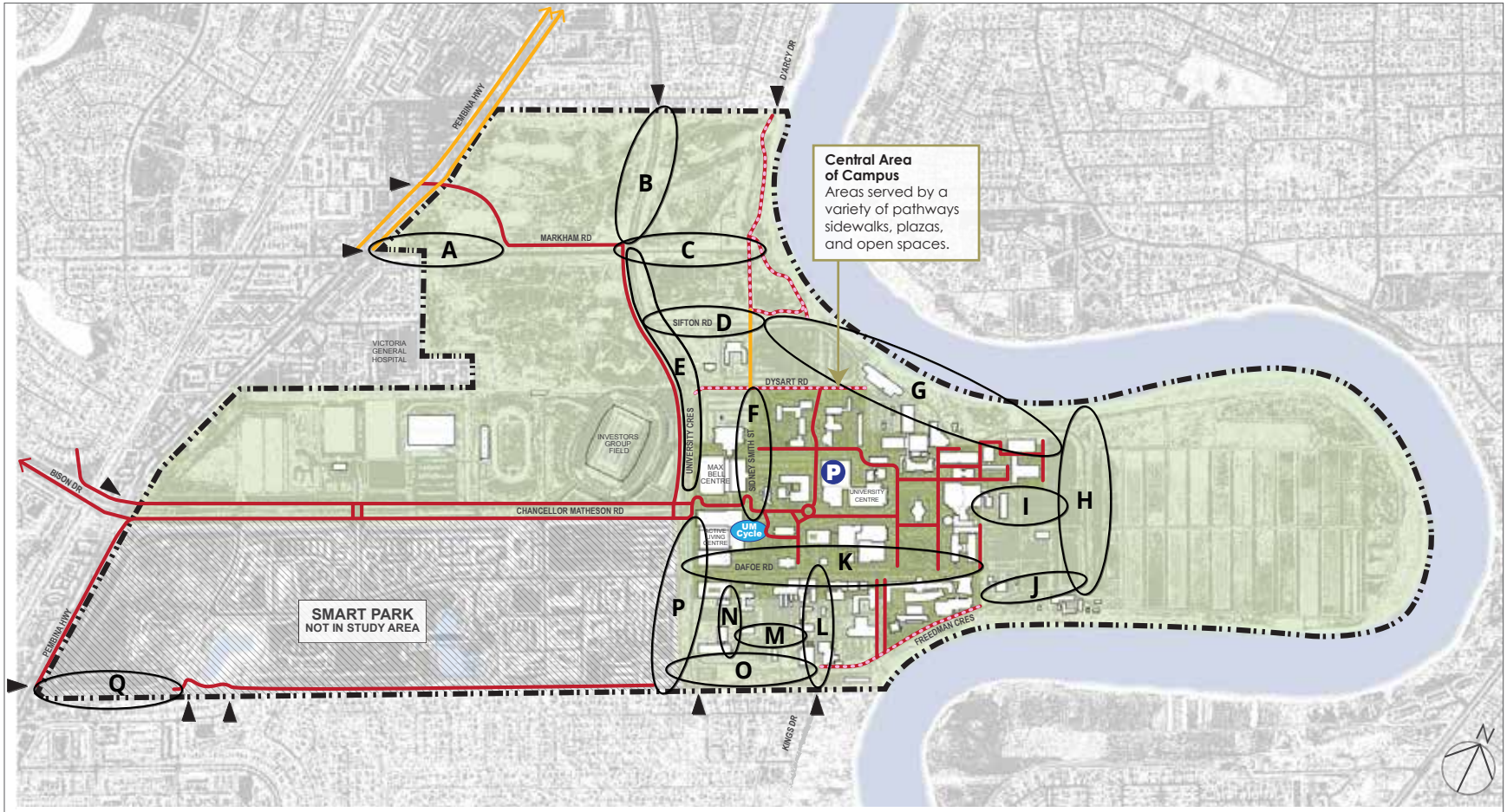
J. South Campus Pathway to University Crescent
There is no pedestrian facility connecting the south campus pathway to the existing sidewalk on University Crescent near the Agricultural Services Complex.

K. Sidney Smith Street – Ralph Campbell Road to Currie Place
There is no pedestrian facility along Sidney Smith Street between Ralph Campbell Road and Currie Place. On the west side of Sidney Smith Street there are accessible parking stalls located outside of the Max Bell Centre. These parking stalls are not connected to any pedestrian facilities.

L. Southwest Gate
Between Pembina Highway and Allegheny Drive there is no pedestrian facility connecting to the existing Smartpark retention pond pathway.

Bicycle Network Gap Analysis

Map 9 highlights the significant gaps in the Existing Bicycle Network. Gaps are identified A-Q on the map and described on the following pages.



Map 9: Fort Garry Campus - Bicycle Network Gap Analysis

A. Markham Road – Pembina Highway to Southwest Rapid Transitway (City of Winnipeg right-of-way)

The section of Markham Road from Pembina Highway to Snow Street is a paved City of Winnipeg roadway that does not have a bicycle facility. From Snow Street to the Southwest Rapid Transitway, Markham Road is a gravel road that is characterized by a high volume of on-street parking. There is no associated space for bicycles as well, periodic deterioration of the gravel road bed creates ruts hazardous to cyclists. Cyclists must share the road with motor vehicles until they can access the multi-use pathway. Pathways exist in the former Southwood Golf Course but these have become disconnected with the construction of the Southwest Rapid Transitway. Access is further restricted to these routes by an existing ditch and chain link fence.

B. University Crescent – Thatcher Drive to Markham Road (City of Winnipeg right-of-way)

No formal cycling facility exists along the west side of University Crescent until the Southwest Rapid Transitway pathway begins at Markham Road. Cyclists must share the road with motor vehicles until this point. The City of Winnipeg Cycling Map indicates cyclists can use the shoulder of the roadway beginning at Thatcher Drive and ending at the pathway. However, the infrastructure has been degrading, often has a number of pedestrians using it, and as a result is undesirable for cyclists.

C. Access road east of Markham Road – University Crescent to Southwood Pathway

This section of Markham Road is currently closed to motor vehicle traffic with the exception of maintenance vehicles. The roadway is suitable for cyclists, but the gate at University Crescent is often closed, creating a barrier to accessing the pathways.

D. Sifton Road – University Crescent to Gate 'L'

There is no cycling facility along Sifton Road east of University Crescent. Cyclists must either ride along the side of the one-way road adjacent to ditches or take an alternate pathway further north in the Southwood Lands that is not maintained year-round and is not visible from the roadway. Cyclists riding eastbound ride against the flow of motor vehicles on the one-way road.

E. East Side of University Crescent – Markham Road to Chancellor Matheson Road

No formal cycling facilities exist on the east side of University Crescent. The City of Winnipeg Cycling Map indicates cyclists can use the shoulder of the roadway north of Sifton Road. However, the infrastructure has been degrading, often has a number of pedestrians using it, and as a result is undesirable for cyclists. There are only two controlled crossings from the east side of University Crescent to the west side where a multi-use pathway exists.

F. Sidney Smith Street – Dysart Road to Curry Place

There is no cycling facility along Sidney Smith Street from Dysart Road to Curry Place. Cyclists must share the road with motor vehicle traffic and pedestrians. With numerous parking lot access points, loading areas and high volume turning movements at Ralph Campbell Road conditions create numerous conflict areas.

G. Gate 'L' Entryway, Sifton Road, and Dysart Road – Gate 'L' to Saunderson Street

From Gate 'L' there are no cycling facilities or safe crossing of Sifton Road to connect to campus. A desire line exists along Sifton Road towards Wallace building and through Parking Lot Q. Sifton Road is a one-way road where cyclists are often riding against the flow of traffic on the roadway. There are no cycling facilities along Dysart Road between Wallace building and Chancellor's Hall and along the riverbank to Saunderson Street. The width of the roadway, combined with the speeds and volumes of motor vehicles, is not adequate for a shared facility. While signed as a 30 km/hr roadway, motor vehicles have been observed in previous, unpublished speed studies to exceed that limit. There is no safe crossing of Dysart Road from Chancellor's Hall to the Duff Roblin building.

H. Saunderson Street

There is no cycling facility along the entire length of Saunderson Street. Cyclists must share the two lane, bidirectional road with motor vehicles. The width of the roadway, combined with the speeds and volumes of motor vehicles, is not adequate for a shared facility. While signed as a 30 km/hr roadway, motor vehicles have been observed in previous speed studies to exceed that limit.

I. Service Road 3 North and South
There are no cycling facilities along Service Road 3 North or South. Both roads function as circulator routes for the adjacent parking lots which promote a high volume of turning vehicles creating multiple conflict points. The south service road also has one lane dedicate to on-street parking.

J. Freedman Crescent – Saunderson Street to Alumni Lane
There is no cycling facility along Freedman Crescent between Saunderson Street and Alumni Lane. Cyclists must share the two lane, bidirectional road with motor vehicles. The width of the roadway, combined with the speeds and volumes of motor vehicles, is not adequate for a shared facility. While signed as a 30 km/hr roadway, motor vehicles have been observed in previous speed studies to exceed that limit.

K. Dafoe Road
There are no cycling facilities along Dafoe Road. Cyclists must share the two lane, bidirectional road with motor vehicles and transit buses.

L. King's Drive Entry, Parking Lot S and Service Street 3S
From Kings Drive into campus there is no defined cycling facility, although it is part of the Trans-Canada Trail. Parking Lot S between the Physical Plant building and the Stores building serves as a significant barrier to access the campus due to restricted sightlines around buildings and manoeuvering around parking vehicles. Service Street 3S has no cycling facility associated with it. Cyclists are forced to share the road with motor vehicles.

M. Service Road 1S
There are no cycling facilities along Service Road 1S.

N. Service Street 1S
There are no cycling facilities along Service Street 1S. There is a pedestrian sidewalk that connects Service Street 1S to Dafoe Road, but the sidewalk is narrow and used by many pedestrians which can cause conflicts with bikes cutting through.

O. Freedman Crescent – University Crescent to Kings Drive
There is no cycling facility along Freedman Crescent connecting this south access to central campus.

P. University Crescent – South Property Limit to Chancellor Matheson Road
There is no cycling facility along University Crescent from the south property limit to Chancellor Matheson Road.

Q. Southwest Gate
Between Pembina Highway and Allegheny Drive there is no cycling facility connecting to the existing Smartpark retention pond pathway. Cyclists are currently travelling on the grass to access the pathway as indicated by desire lines.

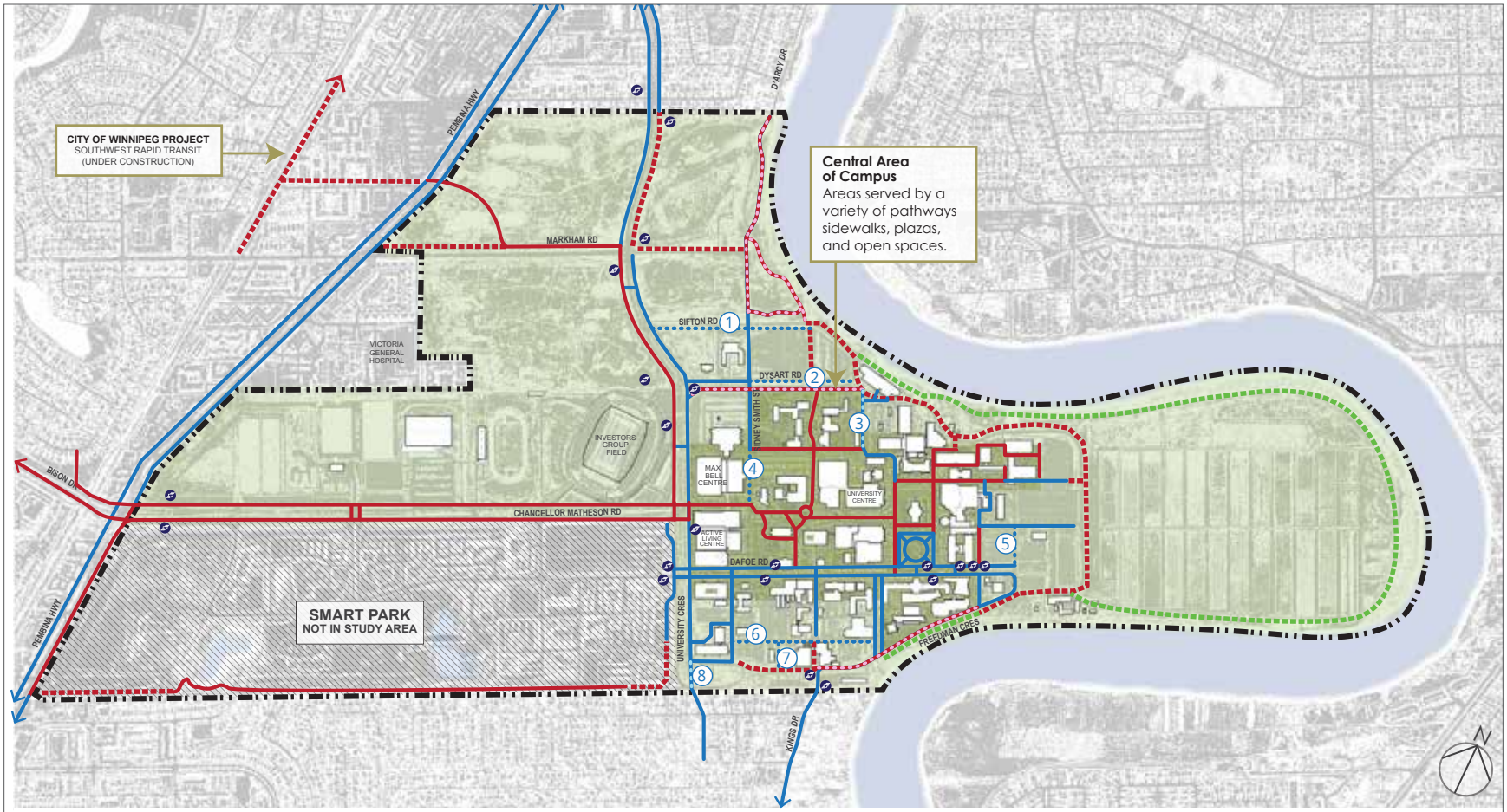
04 RECOMMENDATIONS

The pedestrian network plan recommendations are presented on Map 10, and the bicycle network plan recommendations are presented on Map 11. Each map provides numbered projects which are detailed in the following recommendations tables. The tables provide the detailed location of the project, the facility type, the project rationale, and considerations for design. Also presented are a magnitude of order of the potential cost of the facility, the complexity of the design and constructability, and the potential positive impacts for the campus. These criteria consider factors including engineering design (transportation, structural, geotechnical), range of stakeholders to engage (City of Winnipeg, Transit) and scale of impact on future development.

Pedestrian Network Plan

The 15-year pedestrian network plan for the University of Manitoba is illustrated in Map 10. This Plan incorporates the existing pedestrian network, considers the user movements, and addresses the gaps in the network. The recommendations presented here are for consideration as part of any future right-of-way improvements, new development or construction projects and for public engagement activities. Map 10 identifies a recommended network of pedestrian routes to be contemplated in the long term transportation planning of the University, in order to address the goals of the Sustainability Strategy 2016-2018. The resulting projects identified by this network of routes are subject to further study and detailed design on a route by route basis. The Plan also recognizes opportunities to address recreational facilities that connect to adjacent neighbourhoods and destinations beyond the central campus area.

While the full Plan presents a comfortable, connected and complete network that includes proposed multi-use pathways that function for both pedestrians and cyclists, the focus on the recommendations in the pedestrian network plan will be on the projects that are improvements specific for pedestrians only. The proposed multi-use pathways shown in the Plan will be detailed within the bicycle network plan in the subsequent section.



UNIVERSITY OF MANITOBA FORT GARRY CAMPUS

PEDESTRIAN NETWORK PLAN

Note: *Chancellor Matheson Rd, Markham Rd and University Cres North of Chancellor Matheson Rd are City of Winnipeg road right-of-ways. These facilities are owned and maintained by the City.*

- Study Area
- Campus Property Limits
- Transit Stops
- Existing Sidewalk
- Proposed Sidewalk
- Existing Sidewalk Requiring Upgrades
- Existing Multi-Use Path
- Existing Multi-Use Path Requiring Upgrades
- Proposed Multi-Use Path
- Proposed Recreational Path

Map 10: Fort Garry Campus - Pedestrian Network Plan

Pedestrian Project Recommendations

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
1	Sifton Road –south side East of University Crescent	sidewalk	> Provides facility where no pedestrian infrastructure currently exists. > Can be built in phases (i.e. connection between University Crescent and Sidney Smith Street). > Consider as part of future upgrades/development of parking lots adjacent. > Consider connections into adjacent parking lots.	$$ 96 K	↑↑↑	++
2	Dysart Road – north side East of Sidney Smith Street to Wallace building	sidewalk	> Addresses desire line along grassed boulevard in front of Parking Lots Q and K. > Reduces potential for jaywalking by directing pedestrians to existing crossings of Dysart Road. > Can be built in phases (i.e. connection between Sidney Smith Street and existing pedestrian crossing). > Consider as part of future upgrades/development of Parking Lot Q. > Consider connections into adjacent parking lots.	$$ 61 K	↑	+
3	Sifton Road – west side Dysart Road to Ralph Campbell Road	upgrade existing sidewalk pavement provide curb stops on all parking stalls	> Provides separation between pedestrians and parked cars. > Upgrades deteriorating infrastructure. > Reduces tendency of pedestrians to use roadway. > Project cost estimate assumes replacement of 50% of sidewalk concrete and installation of preformed concrete parking stops.	$ 19 K	↑	++
4	Sidney Smith Street – west side Ralph Campbell Road to Curry Place	sidewalk	> Addresses gap in pedestrian network. > Consideration required for Max Bell Centre loading, ice dumping, and parking areas to reduce conflicts with motor vehicles, connect to accessible parking stalls, and improve pedestrian safety in slippery ice areas. > Project cost estimate assumes incorporation of existing pavement into sidewalk design and construction of curb and sidewalk around accessible parking area.	$ 23 K	↑	++

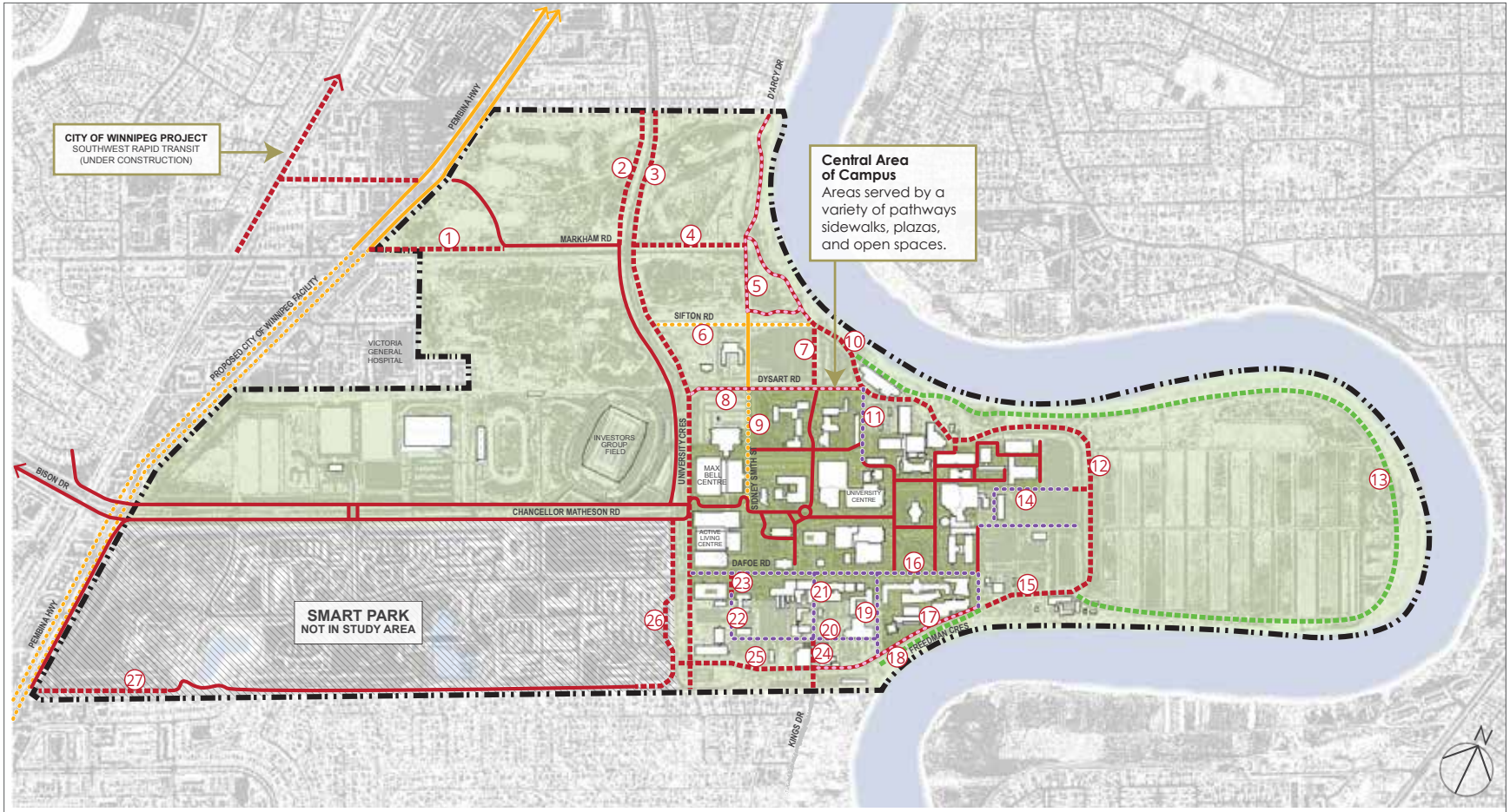
PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
5	Service Street 7S – Dafoe Road to Service Road 3S	sidewalk	> Addresses gap in pedestrian network to eliminate pedestrians walking on roadway. > Consider as part of future development of adjacent parking lots.	$ $ 25 K	↑	+
6	Service Road 1S – north side	sidewalk	> Addresses gap in pedestrian network through parking lots and maintenance operations.	$ $ $ 150 K	↑ ↑	+
7	Service Street 2S – west side	sidewalk	> Addresses gap in pedestrian network.	$ 17 K	↑	+
8	University Crescent at Freedman Crescent	crossing improvements and realignment of existing pathways	> Improves pedestrian safety. > Provide signed and painted pedestrian crossings of all crossings of University Crescent and Freedman Crescent. > Realign pathways to facilitate one pedestrian crossing of Freedman Crescent prior to merge onto University Crescent.	$ 21 K	↑ ↑	+ + +

** Project costs provided are to an order of magnitude. Estimates are in 2017 dollars. These estimates are based on the level of design presented in the report and should be re-visited upon the completion of engineering and more detailed study . In light of this, and as these costs are intended to assess project viability and assist in long range capital planning, a -25% to +75% cost variation should be factored into decision making.*

Bicycle and Multi-Use Path Network Plan

The 15-year bicycle network plan for the University of Manitoba is illustrated in Map 11. This Plan incorporates the existing bicycle network, considers the user movements, and addresses the gaps in the network. The recommendations presented here are for consideration as part of any future right-of-way improvements, new development or construction projects and for public engagement activities. Map 11 identifies a recommended network of cycling routes to be contemplated in the long term transportation planning of the University, in order to address the goals of the Sustainability Strategy 2016-2018. The resulting projects identified by this network of routes are subject to further study and detailed design on a route by route basis. The plan also recognizes opportunities to address recreational facilities that connect to adjacent neighbourhoods and destinations beyond the central campus area.

The goal of this bicycle network is to provide a cycling friendly environment that enhances travel by bike and overall quality of life for students, staff, faculty and visitors of the University. This includes facilities that are safe, convenient, connected, and whose character reflects the needs of cyclists.



UNIVERSITY OF MANITOBA FORT GARRY CAMPUS

BICYCLE NETWORK PLAN

Note: *Chancellor Matheson Rd, Markham Rd and University Cres North of Chancellor Matheson Rd are City of Winnipeg road right-of-ways. These facilities are owned and maintained by the City.*

- Study Area
- Campus Property Limits
- Existing Multi-Use Path
- Existing Multi-Use Path Requiring Upgrades
- Proposed Multi-Use Path
- Proposed Recreational Path
- Existing Buffered Bike Lane
- Proposed Buffered Bike Lane
- Proposed Shared On-Street Lane

Map 11: Fort Garry Campus - Bicycle Network Plan

Bicycle Multi-Use Path Project Recommendations

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
1	Markham Road west of University Crescent	multi-use pathway Note: City of Winnipeg owned road.	> Continuity of existing appropriate facility type to connect commuters to campus. > Consider as part of future upgrades/development of Southwood Lands. > Pathway connection involves crossing of Southwest Rapid Transit. > Further consultation with City of Winnipeg required.	$$$ 115 K	↑↑	+
2	University Crescent – west side north of Markham Road	multi-use pathway Note: City of Winnipeg owned road.	> Addresses gap in bicycle network. > Continuity of existing appropriate facility type to connect commuters to campus. > Existing 1.5m wide sidewalks frequently used by cyclists. > Consider as part of future upgrades/development of Southwood Lands. > Consider path on Southwood Lands to reduce cost associated with ditch and tree removals. > Consider as enhancement to existing pedestrian sidewalk. > Further consultation with City of Winnipeg required. > Project cost estimate assumes retention of existing 1.5 m concrete sidewalk and construction of adjacent 3.0 m asphalt pathway. Project cost estimate includes some consideration of tree clearing and grubbing, but does not include costs for tree compensation.	$$ 98 K	↑↑	++
3	University Crescent – east side	multi-use pathway Note: City of Winnipeg owned road north of Chancellor Matheson Road.	> Addresses gaps in pedestrian and bicycle networks. > Eliminates need for pedestrians to cross University Crescent at uncontrolled crossings. > Existing 1.5m wide sidewalks frequently used by cyclists. > Increasing path width will reduce user conflicts. > Consider future roadway and/or sidewalk rehabilitation projects as opportunity to upgrade to multi-use path. > Can be built in phases. > Further consultation with City of Winnipeg required. > Project cost estimate assumes retention of existing 1.5 m concrete sidewalk and construction of adjacent 3.0 m asphalt pathway where existing concrete sidewalk in good condition.	$$$ 450 K	↑↑↑	+++

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
4	Access road east of Markham Road and University Crescent	designate existing road as a multi-use pathway	> Ensure gate on roadway is appropriate for both pedestrians and cyclists. > Provides more opportunities for connections to Southwood Lands Riverbank Area. > Promotes use of river trail by increasing entry and exit points (CPTED). > Project cost estimate assumes pedestrian and bicycle use of existing access road.	$ 5 K	↑	+
5	Southwood Lands – Riverbank Area	upgrade existing multi-use pathways	> Existing temporary granular multi-use pathways are narrow and surfaces are uneven. > Widening existing granular pathways reduces conflicts between users. > Regular upkeep, topping up granular surface will encourage use. > Consider pathway locations, width, and facility type as part of future upgrades/development of Southwood Lands. Future development through Southwood Lands should maintain corridor from D'arcy Drive to Sifton Road. > Consider asphalt surfacing and lighting as adjacent development occurs. > Project cost estimate assumes granular pathways.	$ $ 85 K	↑	+ +
6	Sifton Road – north side East of University Crescent	buffered bike lanes	> Provides enhanced comfort and safety to existing shoulder bikeway. > Consider allocating more width (3.5 m) to create bi-directional buffered bike lanes. > Final design consideration may include extending buffered bike lanes to Dysart Road. > Requires traffic study with transportation engineer. > Project cost estimate assumes reallocation of existing roadway surface for buffered bike lane.	$ $ 25 K	↑ ↑ ↑	+ + +
7	Parking Lot Q connect Gate 'L' to Dysart Road	multi-use pathway	> Addresses desire line for pedestrians and cyclists from Gate 'L' through Parking Lot Q to central area of campus. > Consider as part of future upgrades/development of Parking Lot Q. > Project cost estimate assumes new construction of asphalt pathway, rather than reallocation of parking space.	$ $ 56 K	↑	+

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
8	Dysart Road – south side University Crescent to Sifton Road	upgrade existing multi-use pathway	> Existing asphalt multi-use pathway is narrow and the surface is deteriorating. > Widening existing pathways reduces conflicts between users. > Consider future roadway and/or sidewalk rehabilitation projects as opportunity to upgrade path. > Detail design to consider: adjacent trees may limit pathway width. Seek maximum pathway width possible while maintaining minimum 0.5 meter setback from boulevard trees. > Project cost estimate assumes full removal of existing asphalt with new replacement.	$$$ 175 K	↑	+
9	Sidney Smith Street Dysart Road to Curry Place	buffered bike lanes	> Provides continuation of existing bicycle facility north of Dysart Road. > Reduces conflict between motor vehicles and bicycles and removes bicycles from existing narrow pedestrian pathway. > Detailed design to consider: bidirectional on west side of road versus unidirectional on each side of road, conflicts with loading zone requirements, and other users. > Coordinate planning with associated pedestrian infrastructure improvements. > Project cost estimate assumes reallocation of existing roadway surface for buffered bike lane.	$$ 25 K	↑↑↑	+++

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
10	Sifton and Dysart Roads – river side Gate 'L' to Saunderson Street	multi-use pathway	> Addresses gap in the pedestrian and bicycle networks and link to proposed recreational trail. > Can be built in phases (i.e. connection between Gate 'L' and Wallace building or Wallace building and Chancellor's Hall). > Pathway along riverbank between Gate 'L' and Wallace building can be included in required culvert upgrades to optimize costs through shared facility improvements. > Addresses accessibility to the Wallace building which is significantly restricted due to the street configuration, parking, drop-off, and crossings in this area. > Additional considerations include re-configure front entry area of Wallace building to raised plaza. > Interim multi-use pathway connections of reduced width and granular material may be considered until future street network reconfiguration. > Consider new crossing of Dysart Road to Duff Roblin building entrance. > Project cost estimate assumes $65K allocated to Wallace building entrance improvements and plaza space. > Project cost estimate does not include costs for culvert upgrades or significant bank work.	$$$ 310 K	↑↑↑	+++
11	Sifton Road Dysart Road to Ralph Campbell Road	shared on-street lane	> Road is currently not conducive for shared use between bicycles and motor vehicles. > Adjacency of Sifton Road alongside Parking Lot A creates numerous conflict points with motor vehicles entering and leaving parking stalls. > Significant traffic volumes during peak hours when parkade is emptying. > Broader objectives should consider parking lot reconfiguration with clearer designation of lanes in conjunction with street network in front of Wallace building. > Provide designated space for cyclists on-road via paint in area away from motor vehicles movement in and out of parking stalls. > Install "Share the Road" signs to coincide with reconfigured roadway and parking lot.	$ 15 K	↑↑↑	++

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
12	Saunderson Street – river side	multi-use pathway	> Consider pathway as recreational opportunity and link to Point Lands. > Included as part of Saunderson Street Road Renewal and Landscape Development project	$$$ 135 K	↑↑↑	++
13	Point Lands - riverbank pathway Wallace building to Maclean Crescent	recreational pathway	> Enhance existing recreational pathway through designation, regular maintenance of surface and pruning of trees. > Consider low impact surface materials such as wood chip mulch, grass, or a narrow granular path that preserves as much of the naturalized riverbank as possible. > Provide proper gated access.	$$$ 150 K	↑↑	+
14	Service Road 3N and Service Road 3S	shared campus connection on existing road network	> Area is dominated by parking lots, streets interrupted by curb cuts. > Consider incorporating streetscape character features similar to Dafoe Road to improve cyclists' orientation, reduce vehicular speeds, and enhance cycling environment. > Consider traffic calming features and "Share the Road" signage. > Consider connections across Saunderson Street to connect to proposed river side pathway.	$ 20 K	↑	+
15	Freedman Crescent – south side Saunderson Street to Alumni Lane	multi-use pathway	> Continuation of Saunderson Street recreational pathway to Alumni Lane. > Consideration required for possible parking relocation in front of Plant Science Field Station building.	$$ 58 K	↑↑	++
16	Dafoe Road and Alumni Lane	shared on-street lane	> Initiate study for enhancing Dafoe Road for cyclist use. > Considerations may include additional traffic calming, enhanced crossings to facilitate north-south movements and bus stop bypasses for cyclists to navigate around stopped transit buses. > Consideration at east end for connection to Freedman Crescent via Alumni Lane	$$ 50 K	↑↑↑	++

PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
17	Freedman Crescent – north side Kings Drive to Alumni Lane	upgrade existing multi-use pathway	> Existing asphalt multi-use pathway is narrow and the surface is deteriorating. > Widening existing pathways reduces conflicts between users. > Consider future roadway and/or sidewalk rehabilitation projects as opportunity to upgrade path. > Detail design to consider: adjacent trees may limit pathway width. Seek maximum pathway width possible while maintaining minimum 0.5 meter setback from boulevard trees. > Project cost estimate assumes maintaining existing asphalt pathway with widening with new asphalt.	$$ 50 K	↑	+
18	Freedman Crescent – south side	recreational pathway	> Enhance existing park area with recreational pathway through the greenspace. > Consider low impact surface materials such as wood chip mulch, grass, or a narrow granular path that preserves as much of the naturalized riverbank as possible. > Provide resting areas with consideration for river views and shade. > Pathway can be extension of proposed Point Lands recreational pathway. > Future development of Parking Lot R should consider ability for riverbank recreational pathway to extend to King's Drive.	$$ 50 K	↑	+
19	Maclean Crescent	shared on-street lane	> Maclean Crescent currently has wide sidewalks that function as multi-use pathways. > Future development in area will increase pedestrian activity providing potential user conflict. > Enhance the street environment to entice cyclists to ride on the road to alleviate conflict with pedestrians. > Considerations may include reconfiguration of on-street parking, incorporating traffic calming, change to pavement surface materials or enhanced streetscaping. > Opportunity for improvements during redevelopment/ upgrades in area.	$ 15 K	↑	+

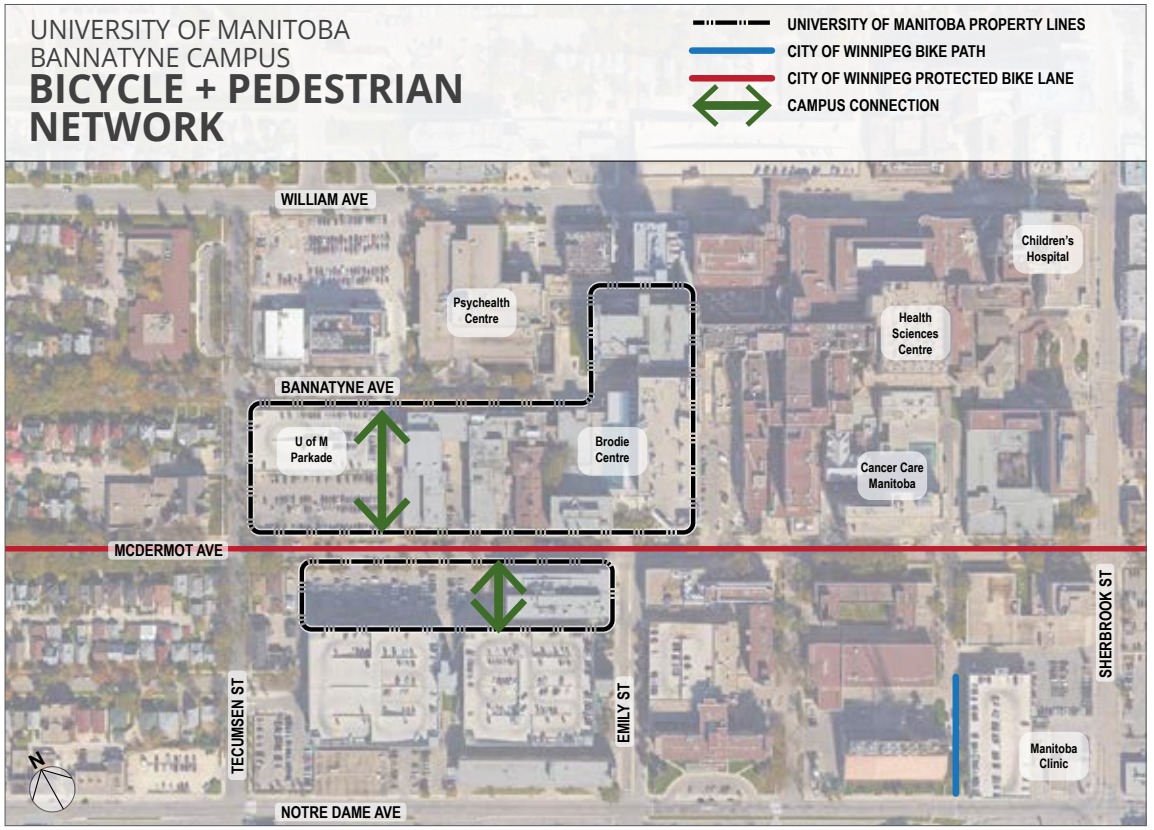
PROJECT NUMBER ON MAP	LOCATION	RECOMMENDED FACILITY TYPE	PROJECT RATIONALE / OTHER CONSIDERATIONS	COST*	COMPLEXITY	POTENTIAL POSITIVE IMPACT
20 21 22	Service Road 1S, Service Street 3S, and Service Street 1S	shared on-street lanes on existing road network	> Area is dominated by parking lots and "back of house" services for campus maintenance. > Consider incorporating streetscape character features similar to Dafoe Road to improve cyclists' orientation, reduce vehicular speeds, and enhance cycling environment. > Consider traffic calming features and "Share the Road" signage.	$$ 50 K	↑	+
23	Connection between Dafoe Road and Service Street 1S	multi-use pathway	> Existing 1.5m wide sidewalks frequently used by cyclists. > Increasing path width will reduce user conflicts. > Consider future roadway and/or sidewalk rehabilitation projects as opportunity to upgrade to multi-use path.	$ 15 K	↑	+
24	Kings Drive Campus Entry	protected multi-use pathway – interim solution	> Addresses a critical gap in the pedestrian and bicycle networks at one of the most used campus access points. > Minimum interim solution should include paint and signage to mark pedestrian and cyclist route through parking lot towards the central area of campus. > Broader objectives should be considered to eliminate parking and vehicular access to create a multi-use pathway to Dafoe Road. > Project cost estimate assumes reallocation of existing pavement to pedestrians and bicycles.	$ 20 K	↑↑	+++
25	Freedman Crescent – north side west of Kings Drive to University Crescent	multi-use pathway	> Addresses a gap in pedestrian and bicycle networks. > Project cost estimate assumes pathway location along existing desire line from parking lot and widening of existing sidewalk.	$$ 95 K	↑↑	++
26	University Crescent Freedman Crescent to Chancellor Matheson Road	multi-use pathway	> Addresses gaps in bicycle and pedestrian networks. > Provides north/south connectivity to residential neighbourhoods outside of campus precinct. > Portion of gap currently has existing sidewalk. Consider future roadway and/or sidewalk rehabilitation projects as opportunity to upgrade to multi-use path. > Consider existing desire line from parking lot to existing sidewalk when considering final pathway location.	$$$ 110 K	↑	+
27	Southwest Campus Entry at Pembina Hwy	multi-use pathway	> Provides connection between existing pathway and a campus access point. > Project cost estimate range for granular or asphalt surfacing.	$$ 68-116 K	↑	++

** Project costs provided are to an order of magnitude. Estimates are in 2017 dollars. These estimates are based on the level of design presented in the report and should be re-visited upon the completion of engineering and more detailed study . In light of this, and as these costs are intended to assess project viability and assist in long range capital planning, a -25% to +75% cost variation should be factored into decision making.*

Bannatyne Campus Recommendations

Map 12 highlights the existing north-south connections that currently exist on University property that facilitate user movements between buildings and parking. The existing connection between McDermot and Bannatyne Avenues, is not currently designed and constructed to the standards required for a multi-use path. This connection is frequented by cyclists given its proximity to bicycle parking as well as by pedestrians. Future development of the surface parking lot should not close off this important multi-use connection, but should enhance and formalize it. In the interim, this connection should be maintained and where possible, efforts made to enhance the existing condition.

South of McDermot Avenue, west of the Apotex Centre there is an existing pavingstone pathway that connects McDermot to the Emily Street and Tecumseh Parkades. This pathway is an important mid-block connection that facilitates north-south pedestrian movement. This connection should be maintained and any future development of the adjacent surface parking lot should ensure that this desire line is respected.



Map 12: Bannatyne Campus - Bicycle and Pedestrian Network

Figure 22: UMCycle Bike Kiosk

05 IMPLEMENTATION PLAN

Implementation of the infrastructure projects described in the University of Manitoba Pedestrian and Cycling Plan are intended to take place incrementally over the next 15-years. The projects are intended to be facilitated through partnerships with other campus and City of Winnipeg initiatives, maintenance and capital improvement programs and dedicated pedestrian and bicycle infrastructure improvement projects.

For most of the projects identified, the University of Manitoba will need to take the lead. However, some projects identified occur alongside City of Winnipeg-owned roads. For these projects, the University is encouraged to coordinate efforts with the City which may include:

- assisting with or leading public engagement with university stakeholders,
- working with the City of Winnipeg to coordinate wayfinding signage along these facilities to direct users into campus,
- consider University land adjacent to the road right-of-way for possible location of facilities where other options do not exist
- engage the City in discussions and provide input during planning, design and/or public engagement events.

Project Prioritization and Decision Making

The University is encouraged to use the information provided in the recommendations as well as their ongoing public engagement programs to develop a project priority list to set a strategy for the 15-year implementation plan. When developing a project priority list there should be the flexibility to change the order of project implementation as plans evolve, complementary roadway projects are initiated, or other opportunities for adjacent improvements arise. To assist with project prioritization the following criteria provides a framework for assessment.

CRITERIA

A. SAFETY – Does the project provide a measured improvement from existing conditions?

B. CONNECTIVITY – Does the project address an identified gap? Does it connect to existing infrastructure?

C. MAINTENANCE – Does the project account for future ease of maintenance?

D. CHARACTER – Does the project provide an opportunity to enhance the character of a corridor?

E. CONSTRUCTABILITY – Does the project overlap with other capital projects?

F. COMPLEXITY – Is the project easy to implement within current infrastructure?

G. COST – Does the project cost fit within existing budgets? Can future costs be avoided or minimized?

H. ACCESSIBILITY – Does the project enhance to campus accessibility?

I. SUSTAINABILITY – Does the project address Sustainable Transportation Strategy goals?

J. CAMPUS USER PRIORITY – Has the project been identified as a priority by campus users?

CONSTRAINTS AND INTERIM SOLUTIONS

Retro-fitting existing roads to accommodate pedestrian and cycling facilities is often challenging. During the planning process, a balance must be struck between a level of prescriptiveness versus adapting to the local conditions. Often conditions such as existing trees, available space, or location of existing infrastructure may limit potential treatments that may be considered. When designing a pedestrian and cycling facility with these limitations one should remember that "an imperfect but safe something is better than a perfect nothing." With this in mind, interim solutions should be considered in areas where future development may present a final solution, but is still years away from completion.

MONITORING SUCCESS AND UPDATING THE PLAN

The University has recently commenced a pedestrian and bicycle counting program. This data should be reviewed against the Plan to assist with developing priorities as well as making adjustments in proposed facility locations if the data suggests alternate routes would be preferred. Similarly, the Office of Sustainability is encouraged to continue their public engagement programs with the campus community. These public engagement programs can be used to further develop project priority for implementation as well as confirm project locations and designs.

This Plan is intended to be a living document. The University is encouraged to periodically review the recommendations presented and the Pedestrian and Cycling Networks proposed and make adjustments when new projects are completed or when other conditions change.

OPERATIONS AND MAINTENANCE

Considerations should also be made in maintenance operations budgets for snow clearing and upkeep of all new pedestrian and bicycle infrastructure.

IMPLEMENTATION PLAN AND FUNDING

The Plan proposes improvements to existing infrastructure and new linkages to facilitate the movement of students, staff, faculty and visitors to and through campus lands.

IMPLEMENTATION PLAN AND CAPITAL PLAN

It is recommended that the University consider the Pedestrian and Cycling Plan in conjunction with the larger campus development and capital plans to identify opportunities to take advantage of construction activities on adjacent property parcels and other infrastructure maintenance projects or improvements. Doing so will:

- Help maximize budgets by incorporating pathway improvements and construction into larger capital projects which tends to reduce per unit construction costs;
- Take advantage of synergistic and overlapping requirements such as utility installation and compaction for pathway substructure, further reducing costs;
- Minimize conflicts between new infrastructure and pathways to provide a more cohesive campus; and
- Avoid multiple construction disruptions for the campus community in the same area by coordinating activities.

The University should also explore additional potential funding sources such as:

Alumni Donations/Gifts

New pathway segments are opportunities for donor funded/recognized projects for industry or large capital donors. At a smaller scale benches and trees provide an opportunity for Alumni to contribute.

Partnership with Local Government

Joint projects with the City of Winnipeg may create cost saving opportunities by capitalizing on larger infrastructure projects, and avoid breaks in pathway systems due to timing of projects.

Grants from Other Levels of Government and Industry

With increased focus on carbon emissions reduction, grant funding opportunities may be available to cost share infrastructure projects that encourage sustainable transportation options.

Construction Ready

As part of implementation, designs and specifications should be scheduled and developed so that the projects are construction ready with cost estimates so that they can be implemented as opportunities arise. This will place the University at an advantage as funding opportunities arise or budgets become available.