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## Executive Summary

### Report Section | Administration & Infrastructure Priorities | Education & Planning Priorities
--- | --- | ---
**TDM Program Administration & Travel Avoidance** | • Extend SmartTrip programs (GRH, EPASS)  
• Priorities include continuing TDM-related data collection and analysis, administration, and Bike Centre funding | • Continue promoting teleconference and work shift programs  
• Continue promoting SmartTrip program  
• Continue to review TDM programs annually  
• Continue participation in Institutional TDM Committee

**Active Transportation** | • More bicycle parking  
• More covered bicycle parking  
• Continue planning & implementing cycling corridors on campus  
• Consider participating in a bike-share program if offered by city  
• Continue developing bike loan fleet at Dal Bike Centre  
• Support Dal Bike Centre Society and loan program | • Continue facilitating AT promotional events on campus  
• Continue drafting reports, plans, and policy documents related to AT  
• Work with Dal Bike Centre to promote cycling on campus  
• Update Dal’s AT Guidelines

**Transit** | • Address bus shelter deficiencies | • Continue promoting transit to the Dalhousie community (support for UPASS and EPASS)  
• Continue participating in municipal and provincial transit discussions  
• Consider partnering on development of carpooling lots near transit routes

**Vehicle Sharing Alternatives** | • Install new electric vehicle charging stations according to demand | • Continue promoting and annually reviewing Dalhousie’s RideShare program  
• Develop more efficient system to administer and promote Guaranteed Ride Home (GRH) program  
• Update Dalhousie’s Vehicle Sharing and Green Fleet guidelines in future

**Parking & Fleet Management** | • Consider the efficiency of land-use with parking management decisions  
• Provide more short-term parking options on campus  
• Consider parking share partnership as a method of increasing university parking supply | • Provide the campus and the public with up-to-date parking maps and parking options  
• Communicate parking updates, upgrades, and changes to the campus and the public  
• Re-evaluate rates and management systems with a goal of making the system cost neutral  
• Continue annual parking survey to provide data for parking management decisions
Introduction

The following report is a Transportation Demand Management (TDM) action plan. In this plan we highlight current TDM activities, project ideas and opportunities for the next 5-10 years. This report builds on the 2011 University TDM plan, the 2014 Dalhousie Bike Summit report, a recent bus shelter study, annual parking lot studies, annual sustainability and commuter survey results, recent Halifax Transit and parking reports, and conversations with municipal and provincial staff and the Institutional TDM committee (a bi-monthly TDM committee with representatives from Dalhousie, SMU, IWK, NS Health Authority- Central Zone, and Halifax).

Through a set of strategic initiatives (e.g. policies, programs, services, products), TDM aims to make personal travel decisions more sustainable (by shaping economic and social factors behind personal travel decisions) and to make more efficient use of our existing transportation system (Dalhousie University, 2011).

Dalhousie has established its own TDM mission:

"Promote a balanced, multi modal transportation system that promotes choices for students, faculty and staff and influences the demand for a limited transportation supply. Transportation Demand Management (TDM) will provide information and education about travel options and offer incentives and programs to reduce Single Occupant Vehicle (SOV) travel trips. TDM is an essential component of an overall sustainable transportation solution for the campus."

On campus, implementing a well planned TDM program means a reduced reliance on parking spaces; improved air quality from a reduction in auto-related emissions; a reduction in traffic congestion; improved travel options for students, faculty, staff and visitors; and an overall improved quality of life on campus. Some of the core TDM strategies include carpooling, transit, cycling, walking, as well as teleworking for staff. Parking management, rideshare matching, marketing and promotions, incentives, and subsidies are among the strategies to improve TDM effectiveness.

Dalhousie University’s 2011 TDM report highlights transportation challenges and opportunities, and has laid out a strategic direction towards achieving sustainability goals across campus. The report highlights important management goals such as ride sharing/carpooling, transit, active transportation, marketing and outreach, university housing, TDM program management, TDM partnerships, and parking.
TDM Program
Administration & Travel Avoidance

Table 1: Dalhousie TDM program administration & travel avoidance actions as identified in the 2011 University TDM Plan.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term 2012-2013</strong></td>
<td></td>
</tr>
<tr>
<td>Hire a TDM coordinator</td>
<td>No funding</td>
</tr>
<tr>
<td>Establish TDM roles and reporting</td>
<td>Complete</td>
</tr>
<tr>
<td>Create a Dal SMART trip website</td>
<td>Complete</td>
</tr>
<tr>
<td>Continue to be a partner in the Institutional TDM committee</td>
<td>Ongoing</td>
</tr>
<tr>
<td><strong>Medium term 2013-2016</strong></td>
<td></td>
</tr>
<tr>
<td>Develop an integrated marketing and outreach plan</td>
<td>No funding</td>
</tr>
<tr>
<td>Promote TDM program and services more broadly</td>
<td>Some funding</td>
</tr>
<tr>
<td>Track performance of programs and administer annual commuter survey</td>
<td>In progress</td>
</tr>
<tr>
<td><strong>Long term 2016-2026</strong></td>
<td></td>
</tr>
<tr>
<td>Explore the creation of a Transportation Management Association with partners</td>
<td>Complete</td>
</tr>
</tbody>
</table>

What Dalhousie is Doing:

Summary of Current Activities

Administration
- Dalhousie currently does not have a TDM coordinator. Ongoing research, programming, and administration is coordinated by the Office of Sustainability (OfSust), Facilities Management, Human Resources and Security Services. Funding for TDM office support and for new programs is derived from traffic boot and parking ticket fees (~$15,000 - $25,000/year), grant-writing, and support from other departments such as Ancillary Services for specific projects.
- Where job appropriate, travel avoidance programs such as flex time and tele-working are available. Commercial Conference Call Services can be purchased by Dalhousie units. Webinar and voice conference software is available to employees through Integrated Learning Online (ILO).

Education
- OfSust promotes TDM activities through social media, blog and website updates and by hosting and facilitating events. OfSust tracks sustainable transportation activity through annual sustainability and commuter surveys. The Dalhousie Transportation Collaboratory (DalTRAC) analyses the data and creates the annual commuter report.
- OfSust administers the SmartTrip program offered by Halifax Transit. SmartTrip offers a number of programs on campus including Smart Cycling sessions, Guaranteed Ride Home, Employee Bus Passes, and educational and policy material on carpooling and travel avoidance.

Policy and Planning
- OfSust has developed a communications plan that outlines appropriate networks to share information.

Where Dalhousie is Going:

Summary of Next Steps

Administration
- Dalhousie’s participation in SmartTrip has been approved as an ongoing program. Costs for the programs are approximately $55,000 a year, mainly for the Employee Bus Pass program. The SmartTrip programs are popular offerings that are considered as important, ongoing programs for meeting TDM objectives.
- Priority action areas include support for student data analysis and commuter reporting through DalTRAC, parking lot studies, TDM administration and planning, and bike centre activities and infrastructure. These actions will be funded using departmental, ticket, and boot resources.

Education
- OfSust will continue to promote Human Resources efforts regarding teleconference and work shift programs.
- OfSust will continue to work with Halifax Transit on their SmartTrip program offerings.
- OfSust will continue to make the best use of Halifax SmartTrip by promoting SmartTrip benefits within OfSust’s networks.

Policy and Planning
- OfSust will continue to review its TDM programs annually, to determine what changes should happen to the SmartTrip program, TDM promotion, TDM data collection, and work shift opportunities.
- OfSust and Facilities Management will continue to participate in the Institutional TDM committee and pursue partnership and grant opportunities.
## Active Transportation

**Table 2:** Dalhousie active transportation actions as identified in the 2011 University TDM Plan

<table>
<thead>
<tr>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term</strong> 2012-2013</td>
<td></td>
</tr>
<tr>
<td>• Finalize and promote Institutional Cycling Plan.</td>
<td>Complete</td>
</tr>
<tr>
<td>• Install more bike racks on campus and end-of-trip facilities in new buildings</td>
<td>In progress</td>
</tr>
<tr>
<td>• Working on planning for University Avenue revitalization.</td>
<td></td>
</tr>
<tr>
<td><strong>Medium term</strong> 2013-2016</td>
<td></td>
</tr>
<tr>
<td>• Explore creation of a bike share program and covered bike shelters.</td>
<td>Complete</td>
</tr>
<tr>
<td>• Identify space for the Bike Centre.</td>
<td>Complete</td>
</tr>
<tr>
<td>• Work on Institutional Cycling Plan corridors (i.e. University Avenue).</td>
<td>In progress</td>
</tr>
<tr>
<td><strong>Long term</strong> 2016-2026</td>
<td></td>
</tr>
<tr>
<td>• Complete University Avenue and Cycling corridors.</td>
<td>In progress</td>
</tr>
<tr>
<td>• Facilitate more walking and cycling programs and events.</td>
<td>Limited funding</td>
</tr>
</tbody>
</table>

### What Dalhousie is Doing:

#### Summary of Current Activities

**Infrastructure**
- Standards for bike parking design and numbers are outlined in the Active Transportation (AT) Guidelines document.
- Over 200 new bike parking spaces have been added to Dalhousie’s campuses since 2013, bringing the total number to approximately 1050 spaces.
- The University Avenue Cycle Track is being coordinated through Facilities Management and Halifax. Additional funding was provided by the Nova Scotia Department of Energy.

**Education**
- At the 2014 Cycling Forum, participants discussed opportunities for future cycling infrastructure on campus as well as opportunities to connect to current and future bikeways in the city.
- Student groups and OfSust researched the possibility of a Dalhousie bike-sharing program. A Dalhousie bike loan program is offered at Halifax and AC campuses. For bike sharing programs, the University may be interested in participating in a city-wide model if one is offered.

**Policy and Planning**
- In 2012, the *Urban Halifax Institutional District Bikeways Plan* was released. This plan outlines future actions both for cycling infrastructure in South End Halifax and for city-wide connections.
- Dalhousie’s AT Guidelines document was approved in 2009 and revised in 2011.

### Where Dalhousie is Going:

#### Summary of Next Steps

**Infrastructure**
- Increase the number of bike parking spaces in priority areas on campus.
- Install more covered bike parking options on campus.
- Continue to plan and implement cycling corridors on campus (e.g. College Rd. multipurpose trail, University Avenue, and Studley and Sexton campus corridors).
- Consider future participation in a bike-share program if one is offered in the city.
- Continue to support bike loan fleet at the Dal Bike Centre and for Facilities Management staff to get around campus.

**Education**
- Continue to facilitate events that promote active transportation on campus (i.e. bike week, commuter challenge)
- Engage employees on the AT services and opportunities available.
- Engage employees in campus events.
- Work with the Dal Bike Centre to promote cycling on campus and host cycling events (e.g. workshops, tune-ups).
- Work with students to draft reports, plans, and policy documents related to active transportation. Students will continue to use the campus landscape to design alternate futures, including active transportation opportunities.

**Policy and Planning**
- Dalhousie’s AT Guidelines document will be updated in 2015.
The following images represent potential ideas for future active transportation projects and programs at Dalhousie University.

**Figure 1:** An illustration from the 2015 Sexton Campus Sustainability Report showing a potential path between the Ralph M. Medjuck Building and the Halifax Central Library (Cushing, 2015). The 2012 Institutional District Bikeways Plan and 2014 Cycling Forum identified a cross campus Active Transportation (AT) connection between Spring Garden Road and Morris Street as a valued AT link.

**Figure 2:** A conceptual layout of the proposed multipurpose trail through the Agriculture Campus. This trail would provide a separated bike and pedestrian experience along College Road in Bible Hill (Cushing, 2013).

**Figure 3:** A rendering of the proposed University Avenue Cycle Track. A municipal decision on the project will be more certain in 2016 (Megenblr, 2014).
Figure 4: The completed bike corral in the Killam loop features permeable pavers and landscaping as a demonstration area for stormwater management (Cushing, 2014).

Figure 5: In addition to adding more bike parking spaces on all four campuses, Dalhousie’s AT Guidelines encourage more of these spaces to be covered. This rendering shows the potential for covered bike parking outside the Killam Library. A more substantial covered bike parking corral is possible to the east of the Killam Library when the Killam Loop is redeveloped. (Cushing, 2015).

Figure 6: OfSust is exploring the best possible models for covered bike parking that could be replicated on campus. There are many examples of structures that could shelter bikes from the weather, including free standing and cantilevered systems. There is no universally appropriate form for these structures; the specific design for covered bike parking on campus should be tailored to the building and site (Bike Portland, 2014).
Active Transportation

Education

Figure 7: Advocate Jared Kolb of Cycle Toronto presented his work at the Dalhousie Cycling Forum. OfSust will continue to promote cycling through campus engagement events like the Dalhousie Cycling Forum (Cushing, 2014).

Figure 8: The student run Dal Bike Centre is a key component of campus education and engagement. OfSust will continue to partner with the Dal Bike Centre on programs and events promoting cycling and cycling knowledge (Abriel, 2014).

Figure 9: OfSust co-hosted the University Avenue Cycle Track demonstration with Capital Health and IWK for Halifax Bike Week 2013. Each year OfSust coordinates a bike event for Halifax Bike Week. In 2015, a Bike Rodeo event is being planned with partners such as Security Services.(Office of Sustainability, 2013).
Public Transit

Table 3: Dalhousie transit actions as identified in the 2011 University TDM Plan.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term 2012-2013</strong></td>
<td></td>
</tr>
<tr>
<td>• Implement Employee Bus Program Pilot</td>
<td>Complete</td>
</tr>
<tr>
<td>• Shuttle study for Institutional partners complete</td>
<td>Complete</td>
</tr>
<tr>
<td>• Explore student summer bus pass</td>
<td>Complete (summer pass available)</td>
</tr>
<tr>
<td><strong>Medium term 2013-2016</strong></td>
<td></td>
</tr>
<tr>
<td>• Continue advocating for improved transit routes and amenities on campus</td>
<td>In Progress</td>
</tr>
<tr>
<td>• Evaluate pilot programs for implementation</td>
<td>In Progress</td>
</tr>
<tr>
<td><strong>Long term 2016-2026</strong></td>
<td></td>
</tr>
<tr>
<td>• Work with partners on longer-term municipal solutions that are timely, convenient, and cost relevant.</td>
<td>In Progress</td>
</tr>
</tbody>
</table>

What Dalhousie is Doing:

<table>
<thead>
<tr>
<th>Summary of Current Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
</tr>
<tr>
<td>• Transit infrastructure (e.g. shelters, signage, seating, paving) on LeMarchant Street is currently owned and maintained by Halifax Transit. Winter maintenance around the Student Union transit terminal is done by Dalhousie grounds staff or Dalhousie hired contractors.</td>
</tr>
<tr>
<td>• The Employee Transit Pass program (EPASS) continues to grow. In 2014/2015 over 300 people registered.</td>
</tr>
<tr>
<td>• The Office of Sustainability conducted a bus shelter study in 2015 evaluating the physical transit infrastructure on campus, transit stops near campus (e.g. shelters, stops), and the frequency of use of these transit stops. From this study, over 250 boardings were recorded at the Howe Hall stop (shelter space for five people) and an average of 581 boardings at the LeMarchant Street stop (shelter space for 10 people) over an average eight hour day. Passengers avoided shelters too far from bus stops and in the shade (winter time results).</td>
</tr>
</tbody>
</table>

Where Dalhousie is Going:

<table>
<thead>
<tr>
<th>Summary of Next Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infrastructure</strong></td>
</tr>
<tr>
<td>• A number of recommendations resulted from the Bus Shelter study including moving the Howe Hall shelter closer to the bus stop, moving the LeMarchant shelter in the shade closer to the other shelter, and expanding services and shelter coverage at the LeMarchant Street stop (considered a Terminal due to the number of boardings and buses).</td>
</tr>
<tr>
<td>• Transit routes to Dalhousie University are being modified by Halifax Transit for a 2016 implementation. Feedback was submitted by Dalhousie students, employees and the Office of Sustainability based on proposed changes to a number of different transit routes.</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>• The Office of Sustainability continues to work with Halifax Transit to promote alternate modes of transportation (including transit) for the campus community.</td>
</tr>
<tr>
<td><strong>Policy and Planning</strong></td>
</tr>
<tr>
<td>• Participate in municipal and provincial transit discussions by bringing data and perspectives from the Dalhousie community.</td>
</tr>
</tbody>
</table>
| • Analysis has been completed on a direct shuttle service option. The cost to run the system, subsidization of unreserved university parking fees, and few transit priority measures resulted in this option not being pursued by institutional partners at this time. Another potential option is partnering on the development of carpooling lots near key transit routes.
The following images represent some of the future transit projects and programs happening at Dalhousie University.

**Figure 10:** Changes to the 2017 Epass program include new passes with swipe technology. In 2015, over 300 employees registered for the Employee Transit Pass program (EPASS).

**Figure 11:** OfSust conducted a transit shelter study in 2015 that identified the need for improved infrastructure for transit users on campus (Yang, 2015). The above concepts illustrate potential upgrades for transit users including new transit shelters, improved site furnishings, improved access and site landscaping (Cushing, 2014).
Vehicle Sharing Alternatives

Table 4: Dalhousie vehicle sharing actions as identified in the 2011 University TDM Plan.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term 2012-2013</strong></td>
<td></td>
</tr>
<tr>
<td>• Review current car share pilot to determine next steps</td>
<td>Complete</td>
</tr>
<tr>
<td>• Re-launch Dal ride share program (two people in a car)</td>
<td>Complete</td>
</tr>
<tr>
<td><strong>Medium term 2013-2016</strong></td>
<td></td>
</tr>
<tr>
<td>• Formalize a Dal Guaranteed Ride Home Program</td>
<td>Complete (SmartTrip)</td>
</tr>
<tr>
<td>• Review the potential for vanpooling</td>
<td>In Progress</td>
</tr>
<tr>
<td>• Explore latest ride sharing matching trends</td>
<td>Complete (SmartTrip)</td>
</tr>
<tr>
<td><strong>Long term 2016-2026</strong></td>
<td></td>
</tr>
<tr>
<td>• Provide electric vehicle charge stations</td>
<td>In Progress</td>
</tr>
</tbody>
</table>

What Dalhousie is Doing:

**Summary of Current Activities**

**Infrastructure**
- Dalhousie has signed an agreement with CarShare HFX for access to cars that can be used for workplace travel and ride sharing.
- Dalhousie offers reserved RideShare parking spaces on all four campuses for those who carpool (defined as two people in a car from different addresses).
- Dalhousie has installed three electric car charging stations (one at the Oceans Sciences Building, one behind the Lemarchant Mixed-Use Building and one on Sexton campus).
- A 2014 OfSust student study found that a Dalhousie operated shuttle between Truro and Halifax would not be cost effective if the University was the only participant. Possible alternatives include supporting bookable reserved trips with a private van shuttle entity.

**Education**
- The Guaranteed Ride Home (GRH) program is offered to employees who commute to work at least three times a week by carpool, vanpool, transit, bike, or walking. Up to five free taxi rides (per year) are offered in the event of a personal emergency or unexpected overtime.
- Aside from Dalhousie’s rideshare program, Dalhousie students, faculty, and staff can share a ride using the Halifax’s online ride-matching System.

Where Dalhousie is Going:

**Summary of Next Steps**

**Infrastructure**
- New electric car charging stations will be added in response to demand and research needs.

**Education**
- As part of regular office promotion and communications, OfSust will continue to promote the SmartTrip program and rideshare opportunities available to Dalhousie employees.
- OfSust will work with Halifax Transit to develop the most efficient system to administer and promote the GRH program. OfSust hopes to develop beyond the almost 400 people currently using the program.
- Education sessions and information will continue to be provided to the Dalhousie community and fleet administrators.

**Policy and Planning**
- Changes to the rideshare program and passes issued are evaluated on an annual basis.
- In 2014, the Vehicle Sharing and Green Fleet guidelines were passed. In future years, these guidelines will be assessed and updated as needed.
Parking & Fleet Management

Table 5: Dalhousie parking and fleet management actions as identified in the 2011 University TDM Plan.

<table>
<thead>
<tr>
<th>Actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Short term 2012-2013</strong></td>
<td></td>
</tr>
<tr>
<td>• Launch online parking registration</td>
<td>Complete</td>
</tr>
<tr>
<td>• Prepare a brief for ABC on parking supply management-pricing options</td>
<td>Complete</td>
</tr>
<tr>
<td>• Make parking enforcement a Dal responsibility</td>
<td>Complete</td>
</tr>
<tr>
<td>• Add GPS units to fleet vehicles</td>
<td>Complete</td>
</tr>
<tr>
<td><strong>Medium term 2013-2016</strong></td>
<td></td>
</tr>
<tr>
<td>• Launch an annual parking survey</td>
<td>Complete</td>
</tr>
<tr>
<td>• Increase parking capacity through management options (i.e. reserved spots converted to lots with a small oversell)</td>
<td>In Progress</td>
</tr>
<tr>
<td><strong>Long term 2016-2026</strong></td>
<td></td>
</tr>
<tr>
<td>• Create a reserve fund to replace some existing parking which is being built on (not new spots) with underground or parkade structures.</td>
<td>In Progress</td>
</tr>
</tbody>
</table>

What Dalhousie is Doing:

**Summary of Current Activities**

**Infrastructure**
- The Dalhousie parking office switched to administering their own parking tickets and boot program for the Halifax campuses in 2013. Funding for TDM programs is provided to the Office of Sustainability each year based on boot and parking ticket fees (~$15,000 - $25,000/year).
- OfSust supports departmental fleet actions such as down-sizing and using fuel efficient vehicles. Facilities Management has converted some of their trucks to mini-trucks and purchased an electric-hybrid for Security Services.

**Education**
- Parking at Dalhousie is administered and enforced through Security Services. Information is available online and permits can be ordered on the Facilities Management website.
- To reduce fuel consumption and greenhouse gas emissions, an information campaign and online course was launched in 2014/2015. This effort focuses on behaviours such as idling and driving.

**Policy and Planning**
- To inform future parking regulations on campus, OfSust conducts an annual parking survey. In 2013, parking management changes increased capacity by converting reserved spots to lots with a small oversell.

Where Dalhousie is Going:

**Summary of Next Steps**

**Infrastructure**
- Continue evaluating the efficiency of current land-uses and parking management.
- Provide flexibility in parking options based on the needs of users (i.e. increase the availability of short-term parking in addition to permit parking, and create market conditions to reward drivers who take advantage of underutilized supply).
- If more parking supply is required, consider solutions that will expand the campus parking supply without requiring new capital and infrastructure, such as implementing a parking share partnership. Other more expensive options could include temporary parking solutions, or the construction of a new institutional parkade (See page 16). The construction of a new parkade at a central location would relieve short-term parking pressures for multiple organizations and free up space for active transportation corridors and public uses on University Avenue.

**Education**
- Provide up-to-date parking maps and parking options to the campus and public.
- Communicate parking updates, upgrades, and changes to the campus and the public.
The majority of students, faculty and staff travel to Dalhousie on foot, bike, and bus. Parking, however, is still a key service. For a campus population of about 25,000, Dalhousie’s Facilities Management is responsible for almost 2000 parking spaces across the three Halifax campuses and almost 700 spaces at the Agriculture Campus. Most of the parking on campus is by permit (both reserved and general parking)—only 4% is metered. General parking permits are oversold by 25-30% whereas reserved permits are over sold by 2-5% depending on the lot. As a result, general parking is often full while some reserved lots remain underutilized. Current parking rates are such that an unreserved parking permit costs approximately $1/day which is well below the cost for a transit pass. Additionally, Dalhousie runs a parking deficit as revenue is insufficient to cover costs (Dalhousie University 2011).

Despite a perceived need for more parking at Dalhousie, there are available parking spots in reserved lots. During periods of the day there can be a shortage of short-term parking, which can be accommodated by reorganizing the existing supply and through other proposed methods included in this report. The Halifax Municipal Planning Strategy (MPS) outlines parking regulations for universities (MPS; Halifax, 2015b, p. 97-99). The MPS recommends that parking at the university’s periphery (especially next to private residences) be buffered by high quality design standards (i.e. landscaping). Should a parking structure be required, the MPS encourages Dalhousie to locate the structure adjacent to South Street across from Dalplex. According to the Halifax Peninsula Land-Use By-Law (LUB) (Halifax, 2015c), 1730 parking spaces should be provided in the university zones. This number comes from an MPS and parking inventory made in 1977. The Dalhousie Faculty Association collective agreement has terms regarding parking pricing.

In 2016, Halifax staff will complete the ‘Centre Plan’ for the Regional Centre. This plan will combine existing plans of the former cities of Halifax and Dartmouth and provide a unified MPS and LUB. Parking management will be reviewed in the preparation of the plan. This is an opportunity for Dalhousie to submit ideas and propose amendments as to how Halifax and the University can work together to coordinate TDM objectives.

Summary
• Facilities Management is responsible for almost 2000 parking spaces across Halifax.
• Dalhousie actively monitors TDM indicators, including parking demand.
• Reorganizing parking supply to increase short-term parking would improve the availability of parking.
• Currently, Dalhousie’s parking operating expenses exceed revenue.
• The low cost of unreserved parking compared to transit means there is less financial incentive to take alternate forms of transportation.
• Halifax’s requirement for 1730 parking spaces remains unrevised since 1977.
• In 2016, there is an opportunity to renegotiate parking numbers with Halifax staff through the new Centre Plan.
In Halifax, parking management has historically focused solely on capacity issues instead of more holistic approaches to management. In the review of the 2008 Regional Parking Strategy, Halifax staff released a ‘Parking Roadmap’ report in January 2015 (Halifax, 2015c). This new report was drafted to address issues of parking governance, payment technology, and management in high-demand residential neighbourhoods. The multi-year plan has been created to work towards a coordinated and effective parking system in Halifax.

To tie parking into a larger TDM system, Halifax has outline key actions such as:
- Revise parking zoning standards
- Improve user information
- Optimize on-street parking management
- Expand municipally-owned parking supply
- Improve transit options
- Promote active transportation
- Encourage ride sharing
- Create a parking pricing plan

Summary
- Halifax recognizes the importance of TDM.
- Parking management is under review to provide a much more holistic management program.
- Parking in high traffic areas, like Dalhousie, will begin to be monitored via parking passes and on-street pay-and-display payment systems.

Some of the parking related changes that may be considered for municipal streets around the University include:
- The replacement of existing parking meters with new parking payment and management systems.
- A GIS mapping inventory of municipally-owned parking.
- A parking permit tracking system to manage and improve the issuance, tracking, and reporting of the residential parking permit program.

These changes will affect Dalhousie through changing the conditions of municipally managed street parking surrounding the University.
Opportunity Costs: Opportunity costs refer to the time and/or capital that cannot be realized due to a choice made.

The opportunity costs for parking largely revolve around the other possible uses that cannot be realized if a property is used for parking. Currently 20% of Dalhousie property is devoted to parking. Non-parking uses include buildings, green space, or the disposal of the land for profit (through lease or sale). The opportunity costs of parking are particularly significant in dense urban areas, where the demand for land is high, and so are the prices and taxes that come with such property.

Reducing parking demand can provide cost savings and other benefits by avoiding the need to construct additional parking, and by allowing the land previously required for parking to be utilized in other, more beneficial ways.

Environmental Costs: Paving over land for parking imposes environmental costs including green space loss, increased stormwater management costs, increased heat island effects, and aesthetic degradation. The construction of parking facilities also consumes large amounts of energy and results in increased greenhouse gas emissions. The provision of additional parking also increases automobile reliance, by making driving a more attractive transportation option.
Improving Parking at Dalhousie

There are a number of opportunities to improve parking on Dalhousie’s Halifax campuses, such as:

- Negotiating amendments to parking requirements in the LUB with Halifax.
- Negotiating an amendment to the parking provision and parking pricing clauses in collective agreements with Dalhousie staff and faculty.
- Developing off-site parking partnerships.
- Converting some reserved spaces to short-term, high turn-over spaces.
- Converting individually reserved spaces in lots to general reserved spaces.
- Introducing pay-and-display stands in short-term parking locations.
- Create a strategic parking planning process and plan that integrates Dalhousie and Halifax’s parking solutions.
- Developing additional temporary and long-term parking infrastructure if required (with other partners) that is revenue positive and supports other TDM goals.

The above modular structure (Figure 15) was photographed in St. Lambert, Quebec. The structure is pre-assembled and can be installed in as little as four to six days. This particular system may serve as a temporary or permanent solution to alleviate parking capacity constraints. As a temporary system, it is recommended that this structure be installed for a minimum of six months to a maximum of three years. The structure is made of galvanized steel to ensure durability in transportation, assembly, and use. This parking system has the advantage of being reusable, as well as being composed of recycled materials.

System costs:
The cost is variable according to the duration of rental. The price below does not include the required concrete footings, but does include delivery to Halifax, installation and removal, and a maintenance service during the rental period (based on a parking system with 100 spaces):

- $370/parking space/month for a 18 months renting period.
- $250/ parking space/month for a 3 year renting period.

(Serge Moreau, 2014 - email correspondence)
New Parking Structure

Existing conditions
Currently, the site at 5940 South Street is a gravel parking lot with the capacity for some 350 cars.

Proposed parking arrangement
Should the development of a new arena proceed, a few changes to the existing site proposal could create more parking options. In place of surface parking along South Street, we suggest moving the arena forward to allow for a parking structure on the south-end of the property. A parking structure for up to 500 cars could accommodate an increase in parking for the institutional district. To reduce the visual impact on the surrounding neighbourhood, a number of parkade greening solutions (i.e. planters, green roof) should be explored. A green buffer between residents and the arena/parkade should be planned. A private parkade could support visitor hourly parking and monthly parking for hospital and university employees/students.

The Metro Park Parkade on Granville Street in downtown Halifax can be used as an example for market rate parking operations (Parkopedia, 2015).

Metro Park summary

- 20 Minutes $1.50
- Additional Hour, $3.00
- Daytime, $17.50
- Overnight, $7.00
- Month, $170.00

Sat-Sun (reduced rate)
- 12 Hours, $7.00
- Additional Hour, $3.00

Figure 17: Proposed plan view of arena and parking arrangement for 5940 South Street (Fowler Bauld & Mitchell, MacLennan Jaunkalns Miller Architects, 2014)

Figure 18: Concept model to illustrate how a new arena with a parking structure could fit into the surrounding landscape (Cushing, 2015).
Short-Term Parking Options

The purpose of this section is to identify interim parking opportunities at Dalhousie University that offset University Avenue on-street parking and to provide parking for visitors and others requiring short-term parking options.

- The LeMarchant Place pay-and-display parking was developed in 2015 to provide short-term parking to off-set metered spots to be taken from university avenue for active transportation projects highlighted in the Campus Master Plan and Institutional Cycling Plan. A total of 86 parking spots are available for use.
- An electric vehicle charging station has been installed at this site.
- This is the third charging station for Dalhousie.

Additional parking has been added to the Sexton campus with the purchase of land beside the Halifax library.

- Long-term use may include a building site.
- In the short-term, the site will be used for unreserved parking and a pay-and-display section.
- An active transportation corridor through Sexton campus is planned and some of the unreserved parking along this section will be reduced.
- As a result of these recent and planned changes there is an increase in parking supply for the short-term.

Figure 20: Newly installed electric vehicle charging station. (Source: http://www.plugshare.com/?location=62441)
Establishing a parking share program

*Shared parking* is a term that refers to parking spaces that have multiple users in an effort to create more efficient parking facilities. A shared parking system recognizes that parking spaces at many facilities are only used at specific times on specific days, often changing seasonally. In this proposed system, empty parking spaces suddenly have value that Dalhousie could use to its advantage. In predictably used parking lots with availability, parking share options are viable (Victoria Transport Policy Institute, 2013).

**Examples of parking share programs**

Shared parking is already an established concept in many high-density urban neighbourhoods. Shared parking is used more frequently in cities as an accompaniment to development, especially when adjacent land-uses have different peak parking hours. Many of these shared parking programs are not officially documented, but many new web-based parking share management tools have recently come online:

*Park Circa:* A phone application that logs available parking spots around any given city with multiple users. A city map illustrates available parking and a schedule. The success of this application depends on the number of users. Available spots can change depending on the month, day, or hour. Parking payment amounts are set and facilitated by program. However, the entire system is based on parking credit-no cash payments. You earn credit and spend credit within the parking system. http://www.parkcirca.com/

*Park Share:* An online parking program where users list parking spaces they have available and users looking for parking can find and pay (online) for parking close to major destinations. Parking rates are set by those that own the parking. In addition to paid parking, free community parking is also listed. https://www.parkshare.net/search/

Other web-based parking share programs include:
- ParkingList http://www.parkinglist.de/
- Parking Panda https://www.parkingpanda.com/how-it-works
- yourparkingspace http://www.yourparkingspace.co.uk/
- parkit https://parkit.ch/landing page?locale=en

**Support Existing Parking Systems**

Local property owners have surface and parkade parking for rent. The university and hospitals have rented parking space availability from private owners and/or promoted these supply options to employees. The university could promote local parking supply and/or enter in agreements with private landowners instead of constructing and operating additional parking supply.
References


