THE UNIVERSITY OF BRITISH COLUMBIA

Fall 2011 UBC Okanagan Transportation Status Report

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THE UNIVERSITY OF BRITISH COLUMBIA

Fall 2011
UBC Okanagan
Transportation Status Report

Contents

1. INTRODUCTION

Consistent with its sustainability goals, UBC wishes to reduce automobile trips to and from the UBC Okanagan campus (UBCO), and encourage the use of other modes of transportation, including transit, carpooling, cycling and walking. To date, UBC has implemented several initiatives in support of non-automobile modes of transportation, including a student U-Pass program and bicycle parking facilities.

In order to measure progress in achieving a shift to non-automobile modes of transportation, a biennial transportation data collection and monitoring program was initiated in 2009. Information regarding travel patterns, traffic volumes and transportation conditions at UBCO will be collected every two years in odd-numbered years. Data collected in 2009 establish the "benchmark" conditions against which progress in future years will be measured.

This *Fall 2011 UBC Okanagan Transportation Status Report* presents a summary of data collected in late September and early October 2011 at UBC Okanagan. This represents the first year of "post-benchmark" data collection, and travel patterns in Fall 2011 are compared with travel patterns in Fall 2009.

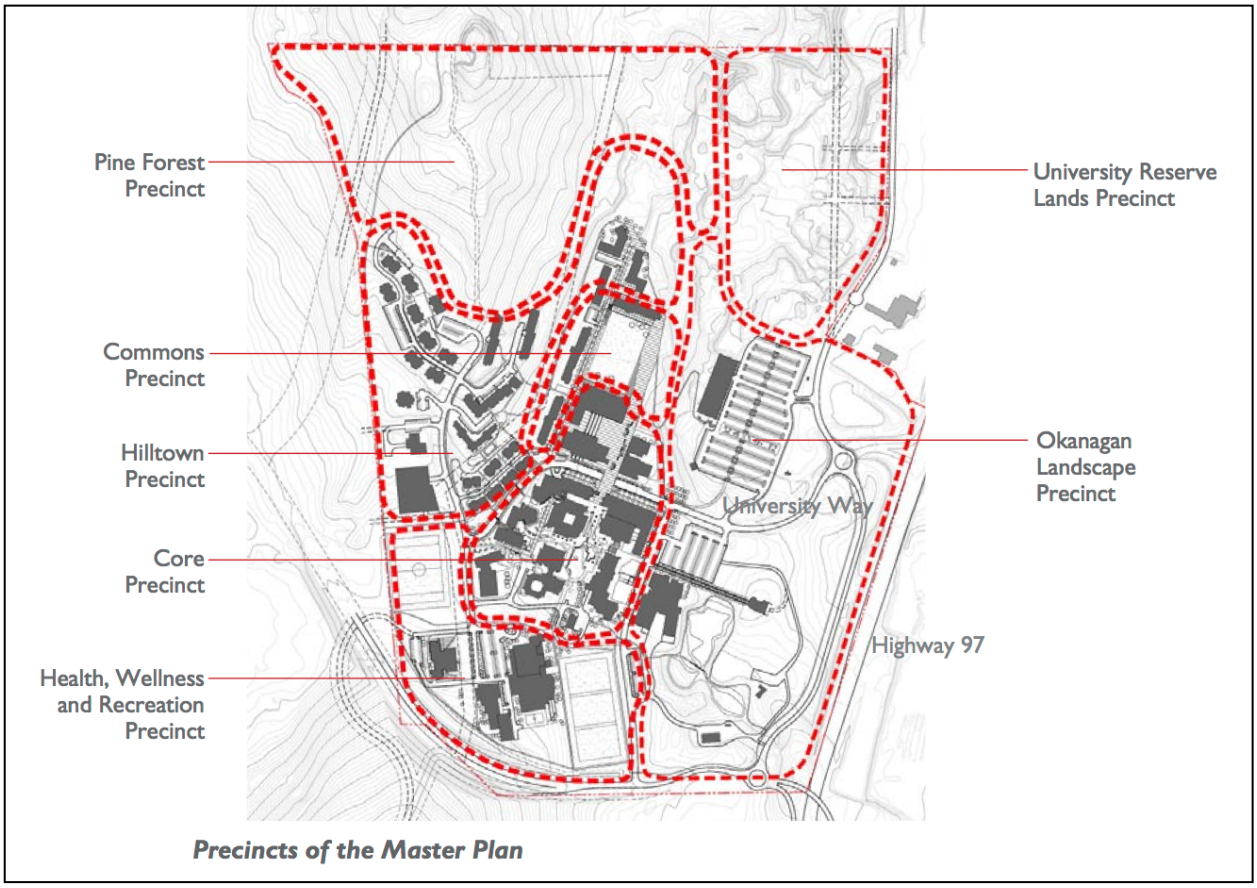
1.1. Context

Transportation planning at UBCO is undertaken within the direction and context provided by several plans and policies, including:

- **The Master Plan** for UBCO describes how the campus will develop to accommodate increased student enrolment and expanded university activities. The Master Plan separates the campus into eight distinct precincts, as illustrated in Figure 1.1. The plan describes buildings and infrastructure to be developed in each precinct, as well as overall guidelines for development, and a phasing plan. The Master Plan was updated in 2009.

- **Place and Promise: The UBC Plan** establishes the University's vision and values, and makes specific commitments in nine areas of strategic priority. For each commitment, the UBC Plan establishes goals and actions designed to see them through. The University's core commitments are to student learning, research excellence and community engagement. Other commitments that are particularly relevant to transportation planning include sustainability and creating an outstanding work environment.

Figure 1.1 – UBC Okanagan Precincts



1.2. Transportation Monitoring Program

Travel patterns to and from UBCO are monitored on an on-going basis through a variety of different data collection methods. Data are collected during the fall, to provide a consistent basis for year-by-year comparisons of travel patterns, mode shares and traffic volumes. Additional data collection activities may be undertaken at other times of the year to obtain information regarding specific modes of travel, seasonal variations and localized traffic volumes.

Data collection activities for Fall 2011 are summarized in Table 1.1, and data collection locations are illustrated in Figure 1.2.

Table 1.1 – 2011 Data Collection Activities

Data Collection Activity	Locations	Description
Traffic volumes to/from campus	• North access • South access	7 consecutive days 24 hours/day
Vehicle occupancies and classifications	• North access • South access	1 weekday 11 hours (7 am – 6 pm)
Transit ridership	• North access • South access	1 weekday 19 hours (6 am – 1 am)
Cyclists and pedestrians	• North access • South access • Roberts Lake Rd.	1 weekday 16 hours (6 am – 10 pm)
Traffic speeds and volumes on campus	7 on-campus locations	7 consecutive days 24 hours/day
Intersection traffic volumes	5 intersections	1 weekday 8 hours (7–10 am + 11–1 pm + 3–6 pm)

1.3. Understanding the Data

The following terms and measures are used throughout the Transportation Status Report to describe various characteristics of travel patterns and trends at UBCO:

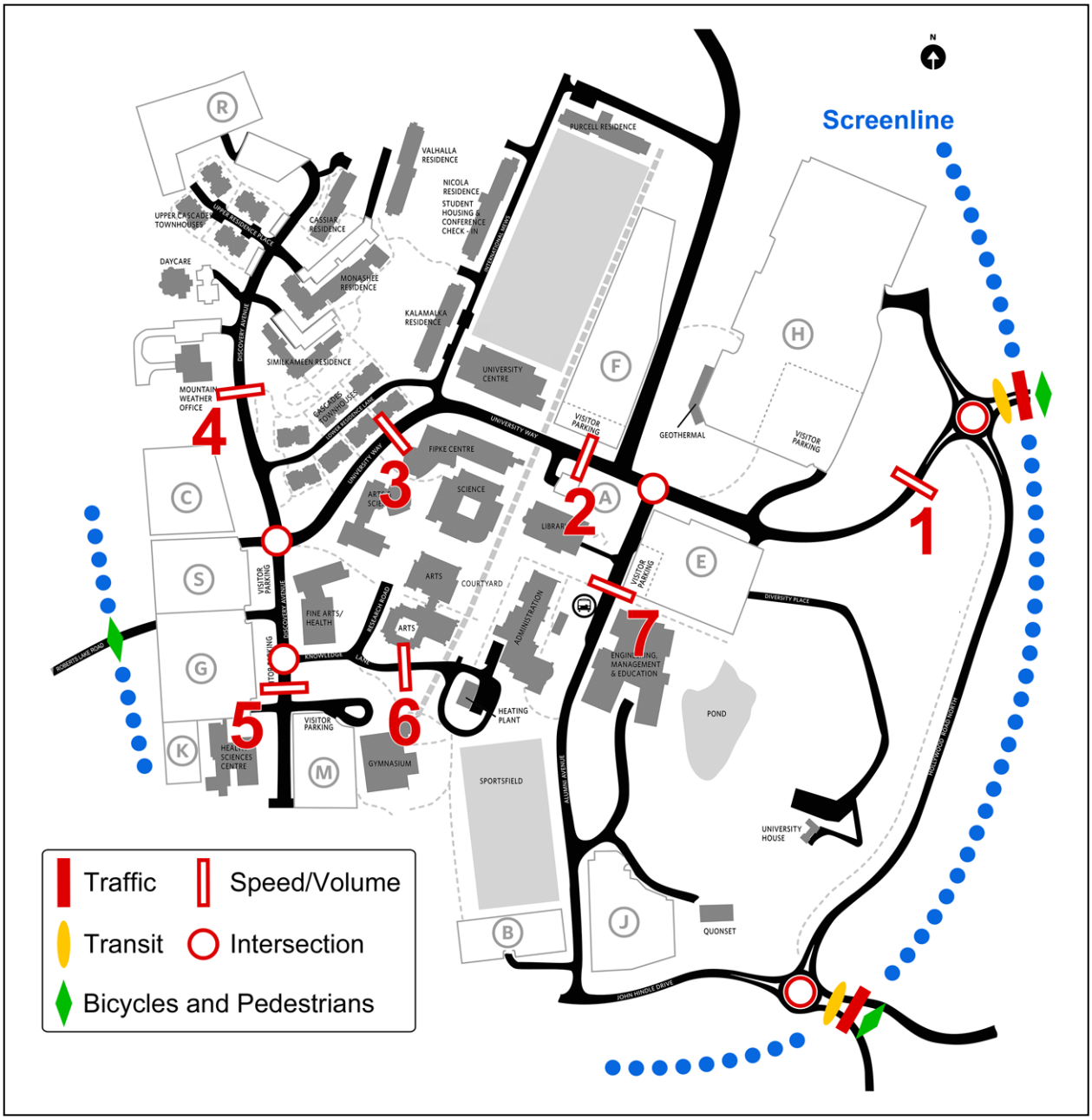
- A **screenline** is an imaginary line across which trips are recorded. At UBCO, the screenline around the campus is located on the west side of Highway 97 (between the roundabouts and the highway) and across Roberts Lake Road west of the G parking lot, as illustrated by the dotted blue line in Figure 1.2.

- **Mode share** (also called "mode split") refers to the relative proportions of trips by various travel modes during a particular time period. Mode shares are generally reported for single occupant vehicles (SOVs), carpool and vanpools (also called high occupancy vehicles or HOV's), transit, bicycle, pedestrians and other modes such as motorcycles and trucks.

- **Person trips.** The data presented in the *Transportation Status Report* include traffic volumes and person trips. Traffic volumes are simply the number of vehicles passing a point, whereas person trips are the number of people passing a point by all modes of transportation. A person trip is a one-way trip made by one person. For example, in one hour there might be 500 vehicles travelling along a section of road (traffic volumes generally reflect vehicles travelling in both directions). These 500 vehicles might include 450 automobiles with a total of 600 persons in them, 30 buses with a total of 1,000 persons in them, and 20 light and heavy trucks with 25 persons in them. The total number of person trips associated with these 500 vehicles is 1,625 person trips.

  Throughout this report, unless otherwise stated, all reported trips are person trips.

Figure 1.2 – 2011 Data Collection Locations



- **Trips per person.** The population at UBCO — students, staff, faculty and others —increases each year. This means that when comparing absolute numbers of person trips and traffic volumes, and changes from one year to another reflect the effects of two different factors — changes in travel patterns and increases in population growth. To distinguish changes in travel patterns from changes due to population increase, a different measure is used — trips per person. This provides a consistent basis for monitoring travel trends regardless of how

much or how little population growth occurs. Trips per person are calculated as the number of person trips divided by the number of persons at UBCO during the weekday daytime. The number of persons is calculated as the student enrolment plus the number of staff and faculty, as reported by UBC's Planning and Institutional Research department.

- **Time periods.** Substantial effort and cost are required to collect travel data at UBCO. Consequently, it is neither reasonable nor necessary to collect all data in all locations at all hours of the day and night. Instead, some data are collected during selected time periods only (Table 1.1 indicates the time periods for each type of data collection activity). Traffic data on all routes leading to and from UBCO are collected over a period of one week. These data are collected using automatic counters placed on the roadway, and consequently it is cost-effective to collect a full week of data. On the other hand, vehicle occupancy and classification counts are done manually, and as a result are relatively expensive. These counts are undertaken for a total of 11 hours from the morning peak through the afternoon peak periods. When combined with other 24-hour data, daily totals can be reliably estimated from occupancy and classification data collected for 11 hours in a day.

2. TRAVEL TO AND FROM UBCO

This section of the *Transportation Status Report* describes travel patterns and trends for trips to and from the UBC Okanagan campus. Information regarding transportation conditions on campus is presented in Section 3.

2.1. Person Trips

On average, there were 16,730 person trips to and from UBCO on a typical weekday in Fall 2011. Table 2.1 provides a summary and comparison of daily person trips by mode in Fall 2011 and Fall 2009, and Figure 2.1 illustrates the relative shares for each mode of travel.

Table 2.1 – Weekday Person Trips To/From UBCO

	Person Trips			
	Fall 2009		Fall 2011	
Single occupant vehicle (SOV)	7,040	42.4%	8,170	48.8%
Carpool and vanpool	3,260	19.7%	2.990	17.9%
Transit	5,680	34.2%	4,720	28.2%
Bicycle	100	0.6%	200	1.2%
Pedestrian	120	0.7%	230	1.4%
Truck and motorcycle	400	2.4%	420	2.5%
Totals	**16,600**	**100%**	**16,730**	**100%**

Key observations regarding modes of travel to and from UBCO include:

- Automobiles are the dominant form of travel to and from UBCO. Single occupant vehicle travel (driving alone) is the most popular mode of transportation, accounting for almost half of all trips. SOV travel has increased significantly from Fall 2009, by more than 1,100 trips per day.
- The increase in SOV trips was primarily at the expense of transit trips. In Fall 2011, transit accounted for 28% of trips, a decrease from 34% in Fall 2009, amounting to almost 900 fewer trips per day.
- Although numbers of cycling and walking trips have doubled from Fall 2009, each mode only accounts for slightly more than 1% of all trips to and from UBCO. This is not a surprising result given that the location of the campus is a significant distance from most residential areas in the region.

It is important to note that the experience collecting similar data at UBC Vancouver over the past 14 years has been that numbers of trips by specific modes of transportation fluctuate from year to year. Over time, trends will emerge, but with only one year of data available for UBCO, it is not appropriate to draw any conclusions regarding changes in travel patterns from 2009 to 2011.

Figure 2.1 – Weekday Person Trips To/From UBCO

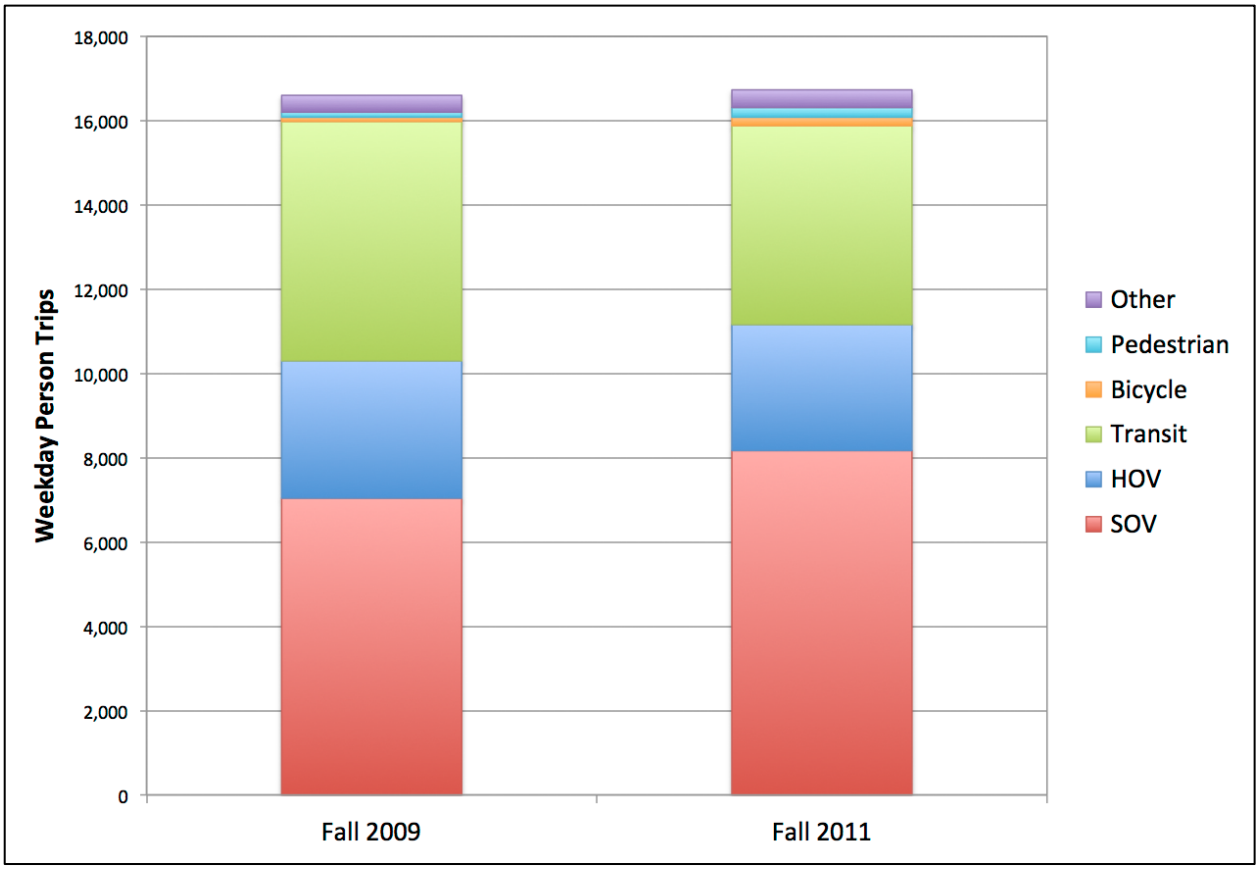
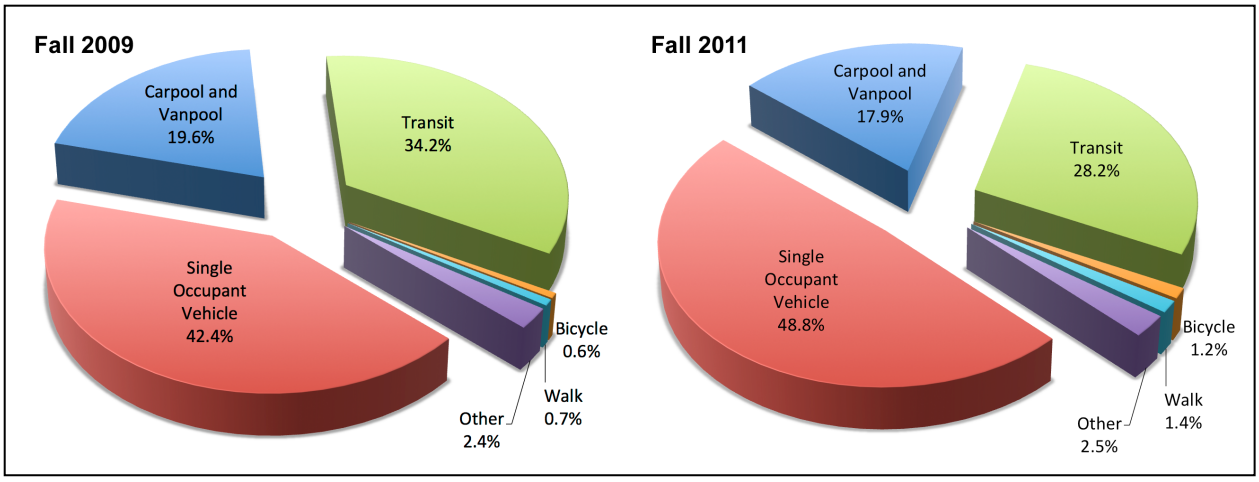


Figure 2.2 – Weekday Mode Shares of Trips To/From UBC Okanagan

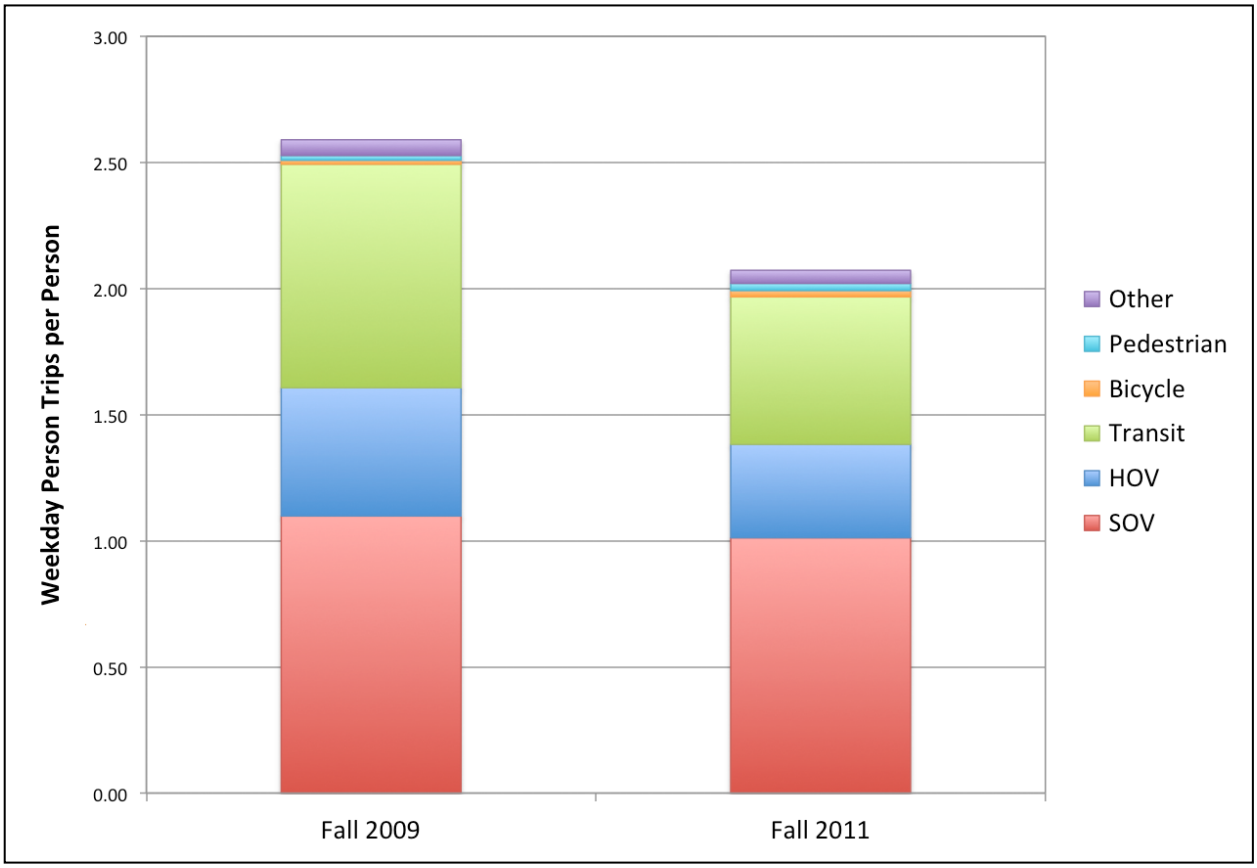


In order to compare travel patterns from year to year on a consistent basis, it is important to negate the effects of population and enrolment growth. This means comparing trips per person, where the number of daily person trips is divided by the daytime campus population of students, staff and faculty. Trips per person to and from UBCO in Fall 2011 and Fall 2009 are summarized in Table 2.2 and illustrated in Figure 2.3. These figures reflect daytime campus populations of 8,070 persons in Fall 2011, and 6,410 persons in Fall 2009.

Table 2.2 – Weekday Trips Per Person To/From UBCO

	Trips per Person	
	Fall 2009	**Fall 2011**
Single occupant vehicle (SOV)	1.10	1.01
Carpool and vanpool	0.51	0.37
Transit	0.88	0.59
Bicycle	0.02	0.02
Pedestrian	0.02	0.03
Truck and motorcycle	0.06	0.05
Totals	**2.59**	**2.07**

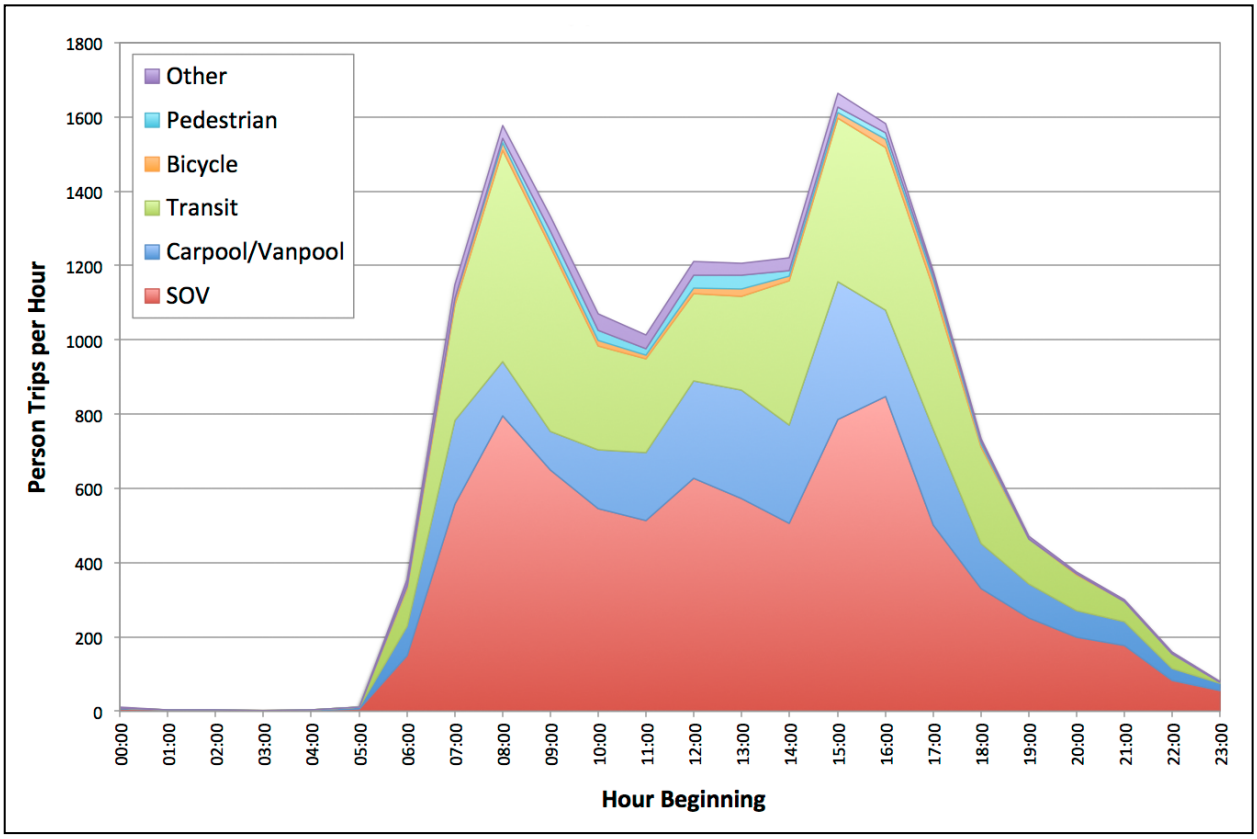
Figure 2.3 – Weekday Trips Per Person To/From UBCO



There were significantly fewer trips per person in Fall 2011 than in Fall 2009, for the three primary modes of transportation. The magnitude of the decrease was greater for transit and carpools (decreases of 33% and 28%, respectively) than for SOVs (an 8% decrease). As noted earlier, the experience collecting similar data at UBC Vancouver has been that the average number of trips per person fluctuates from year to year. With only one year of data available for UBCO, it is not appropriate to draw any conclusions regarding changes from 2009 to 2011.

Figure 2.4 illustrates the daily arrival and departure patterns for all person trips to and from UBCO in Fall 2011, by all modes. The greatest number of trips per hour occurs during the afternoon peak hour from 3:00 to 4:00 p.m., which accounts for 10.0% of daily trips. The following hour from 4:00 to 5:00 p.m. accounts for 9.5% of daily trips. The morning peak hour from 8:00 to 9:00 a.m. accounts for 9.4% of daily trips.

Figure 2.4 – Weekday Person Trips To/From UBCO Okanagan, Fall 2011



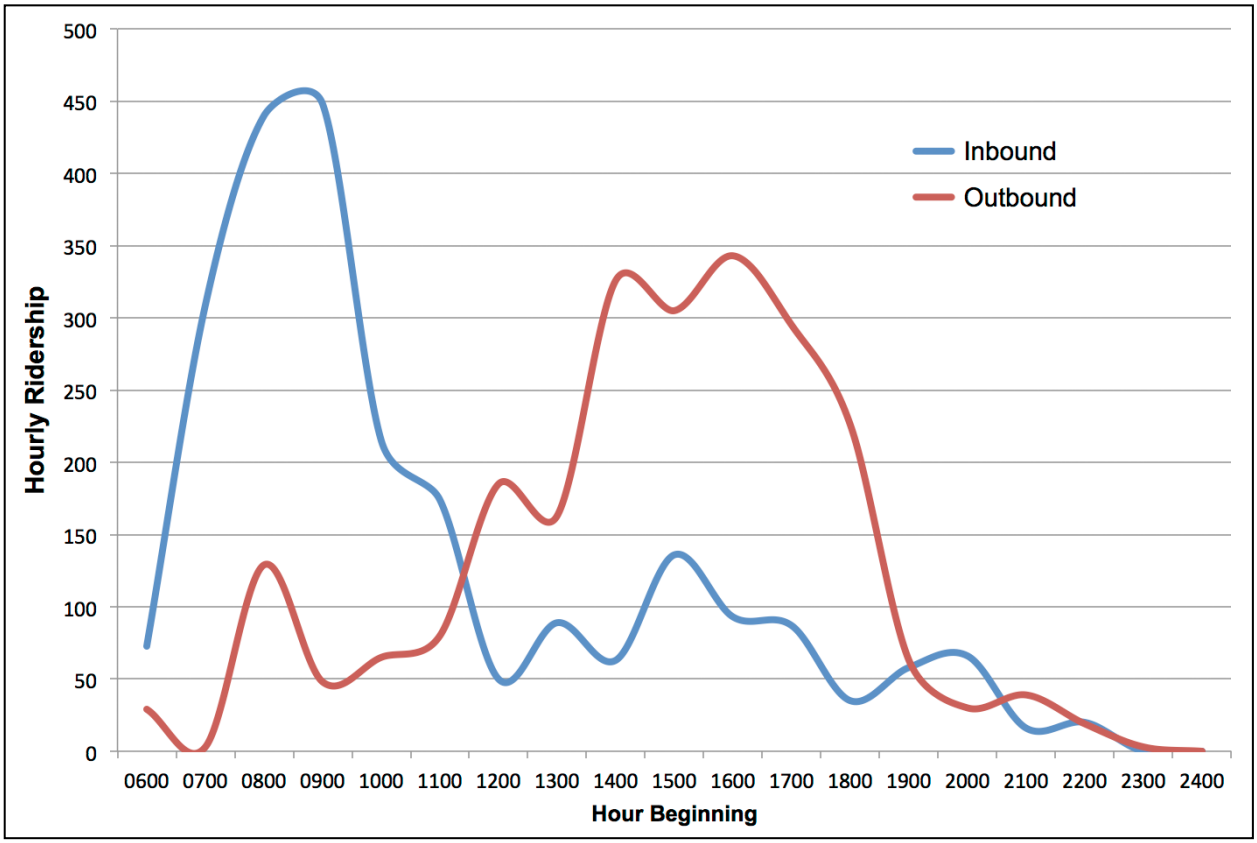
2.2. Transit

There were a total of 4,720 transit trips to and from UBCO on a weekday in Fall 2011, as summarized in Table 2.3. Figure 2.5 illustrates transit ridership by hour.

Table 2.3 – Weekday Transit Trips To/From UBCO, Fall 2011

Route		AM Peak 0600 to 0900	Midday 0900 to 1500	PM Peak 1500 to 1800	Evening 1800 to 0100	Totals	
4	Pandosy *via Hwy 97*	260	0	90	0	350	7.3%
6	Glenmore	40	0	40	0	80	1.8%
8	Pandosy *via Rutland*	320	1,040	370	220	1,950	41.3%
23	Lake Country	70	90	200	100	460	9.8%
90	Vernon	90	20	70	50	230	4.9%
97	Express	200	760	480	210	1,650	34.9%
Totals		**980 20.8%**	**1,910 40.4%**	**1,250 26.7%**	**580 12.2%**	**4,720 100%**	**100%**

Figure 2.5 – Weekday Transit Trips To/From UBCO, Fall 2011



There were almost 900 fewer transit trips per day in Fall 2011 than in Fall 2009, and transit trips per person decreased 33%. Key observations regarding transit use at UBCO include:

- Ridership is highest on Route 8, which provides service to UBCO via Rutland. In Fall 2009, ridership was highest on Route 97, which at that time operated via Rutland, while Route 8 remained on Highway 97. This suggests that Rutland is a significant origin for transit trips to UBCO, and consequently improvements in transit service between UBCO and Rutland would likely result in increased transit use at UBCO.
- The Route 97 express service carried 35% of the trips to and from UBCO. This is a substantial decrease form fall 2009, when Route 97 carried 63% of all transit trips. There have been significant changes to the Route 97 service in the past two years, including conversion to a "rapid bus" service with only four stops between UBCO and downtown Kelowna, and shortening the route to remain on Highway 97 and not divert through Rutland. The decrease in ridership suggests that in the short term, these changes have reduced the attraction of the Route 97 express service for trips to and from UBCO.
- Almost 15% of transit trips were from areas north of UBCO, on routes 23 and 90.
- The morning peak hour for transit trips occurs from 8:00 to 9:00 a.m., and accounts for 12% of all trips. The afternoon peak hour occurs between 4:00 and 5:00 p.m., and accounts for 9.2% of all trips.

2.3. Bicycles and Pedestrians

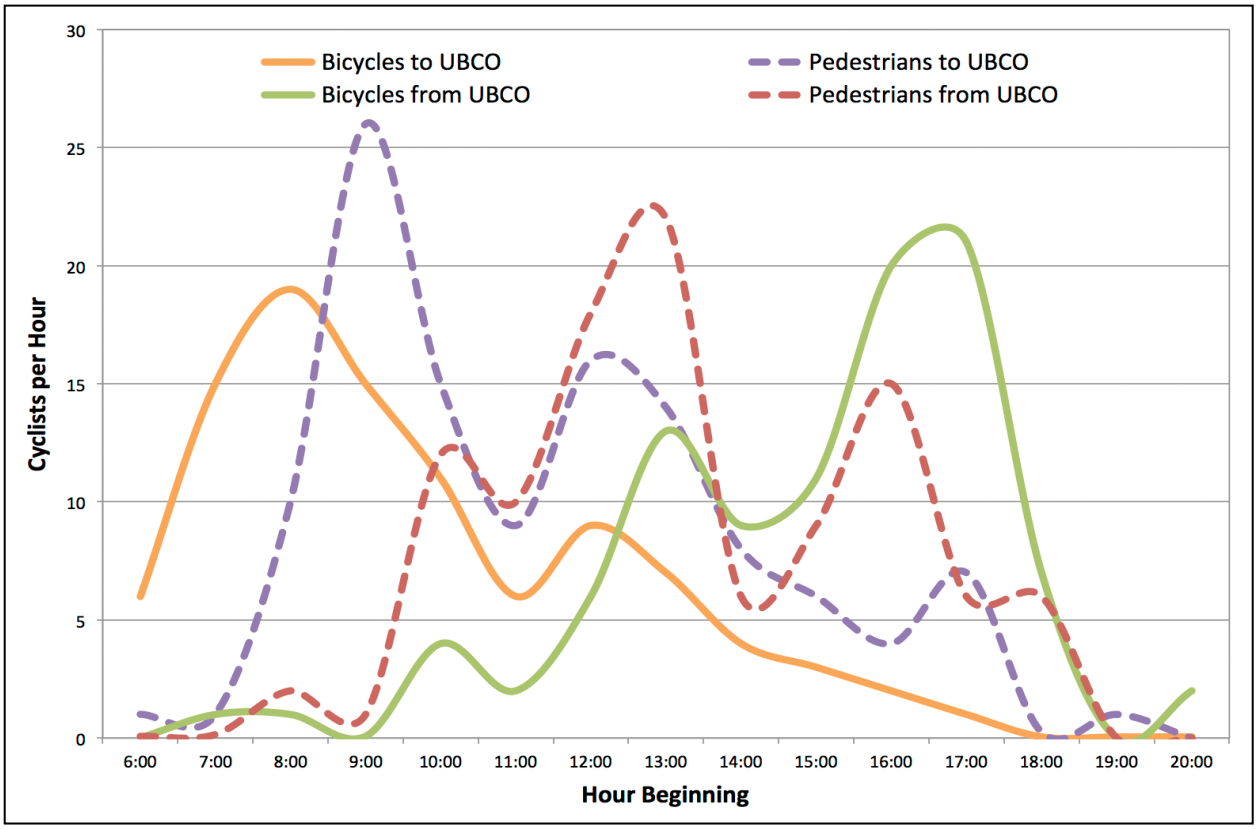
Table 2.4 and Figure 2.6 summarize bicycle and pedestrian trips to and from UBCO in Fall 2011. Key observations regarding bicycle and pedestrian trips include:

- Numbers of cycling and walking trips doubled from Fall 2009 to Fall 2011.
- Roberts Lake Road is the main route to campus for cyclists and pedestrians, accounting for 87% of all bicycle and pedestrian trips.

Table 2.4 – Weekday Bicycle and Pedestrian Trips To/From UBCO, Fall 2011

Route	Bicycles		Pedestrians	
	To Campus	From Campus	To Campus	From Campus
North access	1	1	4	1
South access	15	27	4	2
Roberts Lake Road	82	69	110	104
Totals	**98**	**97**	**118**	**107**

Figure 2.6 – Weekday Bicycle and Pedestrian Trips To/From UBCO, Fall 2011



All buses operating on transit routes serving UBCO are equipped with bicycle racks, each of which has space for two bicycles. A total of 57 bicycles were observed in one day in Fall 2011, representing an average rack utilization of 0.10 bicycles per available space. This represents no significant change from the 0.11 bicycles per available space observed in Fall 2009.

2.4. Traffic

Table 2.5 provides a summary of weekday motor vehicle traffic to and from the UBCO campus. Key observations regarding automobile traffic include:

- There were 1,040 more motor vehicle trips per day to and from UBCO in Fall 2011 than in Fall 2009, representing an 11% increase in traffic.
- Automobiles accounted for 94% of motor vehicle traffic in Fall 2009 and Fall 2011.
- The proportion of single occupant vehicles increased slightly from 77% of all motor vehicle trips in Fall 2009 to 81% in Fall 2011.

Table 2.5 – Weekday Traffic Volumes To/From UBCO

	Fall 2009		Fall 2011	
Single occupant vehicles	7,040	77.4%	8,170	80.6%
Carpool and vanpool vehicles	1,520	16.7%	1,370	13.5%
Total automobiles *(SOV + carpool/vanpool)*	8,560	94.1%	9,540	94.1%
Trucks, buses and motorcycles	540	5.9%	600	5.9%
Total motor vehicles	9,100	100%	10,140	100%

Table 2.6 summarizes weekly traffic volumes to and from UBCO. Traffic volumes in Fall 2011 were highest on Tuesdays, which represents a shift from Fall 2009 when volumes were highest Wednesdays and Thursdays. The weekday morning peak hour for traffic occurs from 8:00 to 9:00 a.m., while the weekday afternoon peak hours occur between 3:00 and 5:00 p.m. The south access to campus accommodates over 85% of all motor vehicle traffic to and from UBCO.

Table 2.6 – Weekly Traffic Volumes To/From UBCO

Time Period	Fall 2009		Fall 2011	
Weekday (average)				
• AM peak hour (8–9 a.m.)	830	9.1%	910	8.9%
• PM peak hour (3–4 p.m.)	900	9.9%	1,000	9.8%
• PM peak hour (4–5 p.m.)	870	9.6%	1,010	9.9%
• 24 hours	9,100	100%	10,250	100%
Weekend (average)				
• Peak hour (2–3 p.m.)			320	8.8%
• Peak hour (5–6 p.m.)	280	8.1%		
• 24 hours	3,500	100%	3,560	100%
Week (daily)				
• Monday	8,910	96%	10,100	96%
• Tuesday	8,800	95%	10,550	100%
• Wednesday	9,280	100%	10,290	98%
• Thursday	9,280	100%	10,360	98%
• Friday	9,130	98%	9,920	94%
• Saturday	4,200	45%	3,810	36%
• Sunday	2,800	30%	3,310	31%

2.5. Vehicle Occupancy

Vehicle occupancy is a measure of the average number of people travelling per vehicle during a certain period of time. It is calculated by dividing the total number of person trips by the total number of vehicles during a specified time period. Table 2.7 provides a summary of vehicle occupancies in Fall 2011 and Fall 2009. Key observations regarding vehicle occupancies include:

- The average automobile occupancy in Fall 2011 was 1.17 persons per vehicle, which represents a reduction from Fall 2009 as a result of a higher proportion of single occupant vehicles.
- The average occupancy for carpools and vanpools was 2.18 persons per vehicle, which reflects 88% two-person carpools, 9% three-person carpools, and 4% vehicles with four or more persons. The average vehicle occupancy for carpools and vanpools increased from fall 2009 as a result of a higher proportion of vehicles with three or more persons.

Table 2.7 – 24-Hour Automobile Occupancies To/From UBCO

	Fall 2009	Fall 2011
Single occupant vehicles Carpools and vanpools	1.00 2.15	1.00 2.18
All automobiles	1.20	1.17

3. CONDITIONS ON CAMPUS

This section of the *Transportation Status Report* summarizes transportation conditions on campus, particularly traffic volumes and speeds at key locations.

3.1. Traffic Volumes

Peak hour traffic volumes at key intersections on campus are illustrated in Figures 3.1 and 3.2. For each movement, two figures are given — the Fall 2011 hourly volume, followed by the Fall 2009 volume in parentheses. Key observations regarding traffic volumes include:

- Approximately 86% of traffic travelling to and from UBCO uses the south access.
- During the morning peak hour, approximately 25% of the traffic to UBCO continues through the campus to Discovery Avenue. During the afternoon peak hour, approximately 20% of the traffic leaving the campus originates on Discovery Avenue.

Figure 3.1 – Morning Peak Hour Traffic Volumes

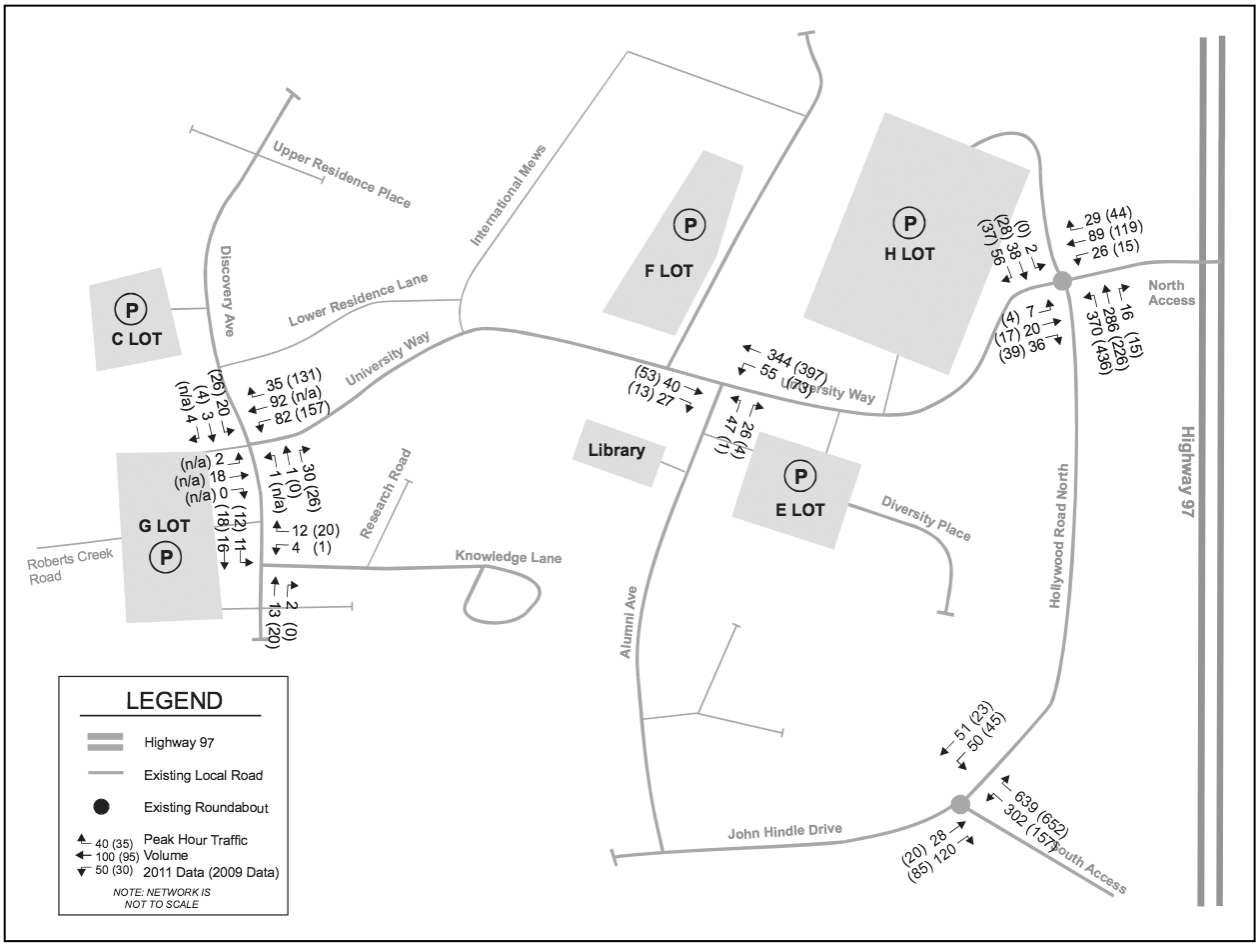
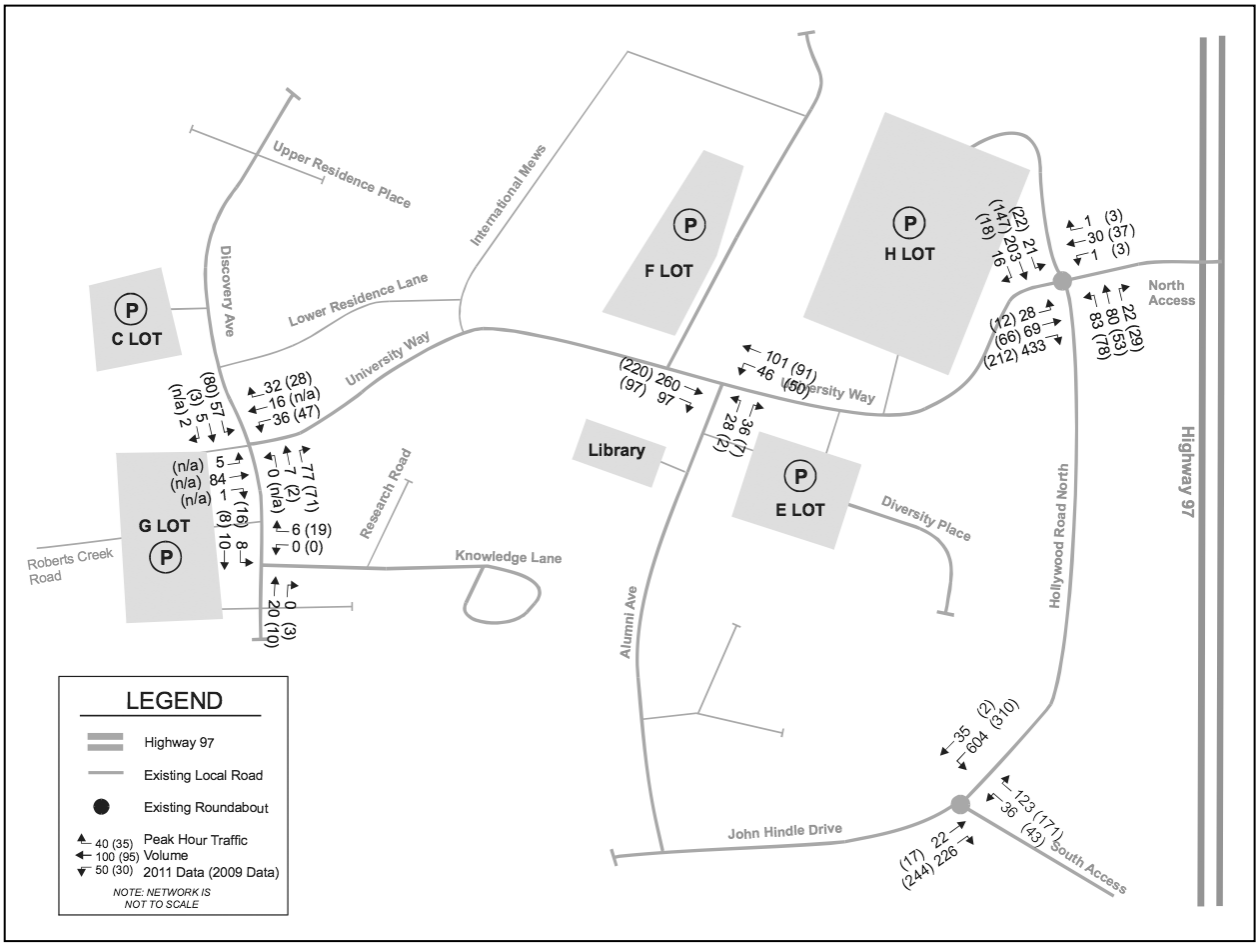


Figure 3.2 – Afternoon Peak Hour Traffic Volumes

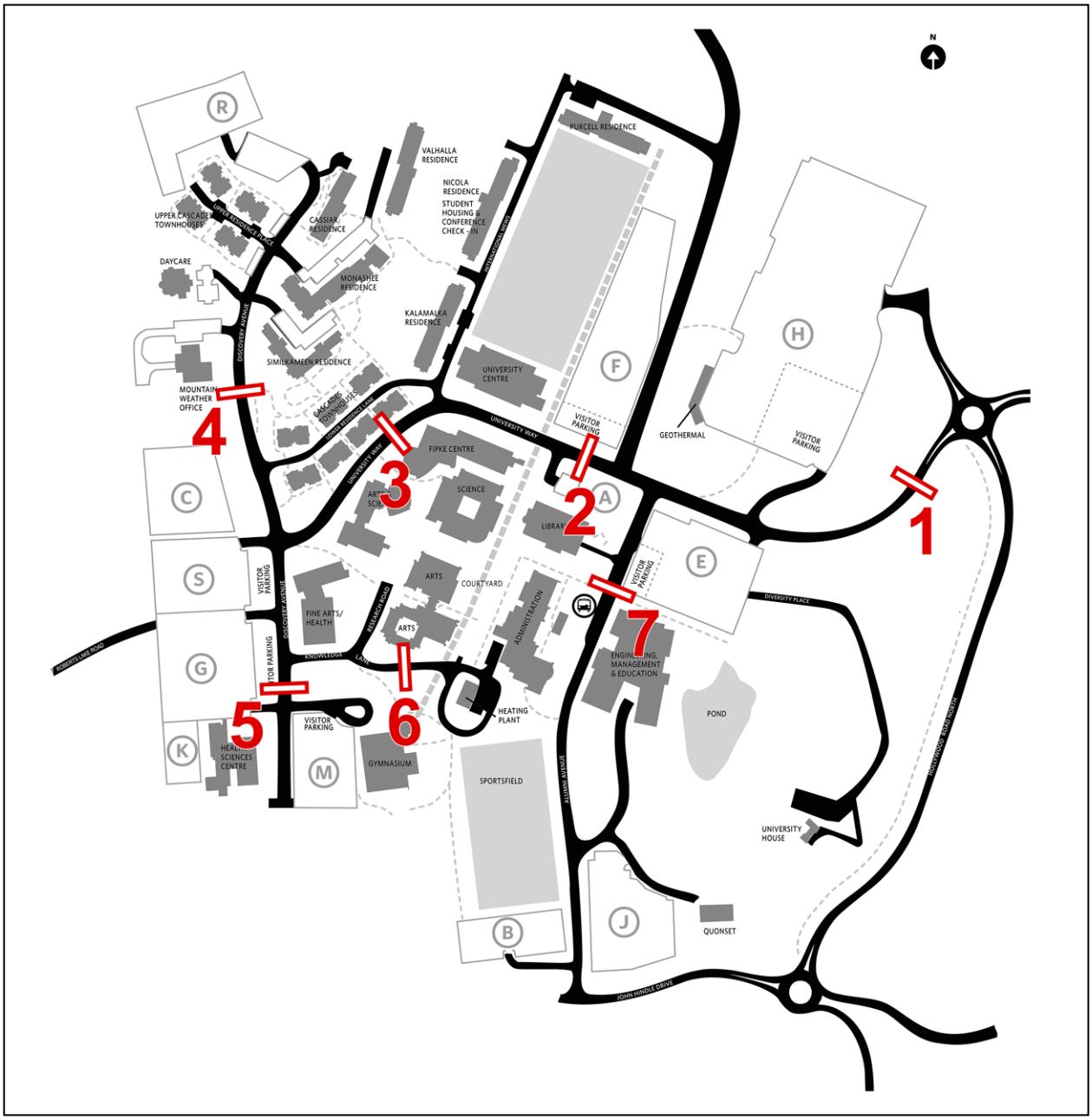


- Although there were more automobile trips to and from UBCO in Fall 2011 than in Fall 2009, traffic volumes on Discovery Avenue and at the west end of University Way were lower in Fall 2011. This suggests that parking lots on the east side of the campus are attracting more automobile trips, thereby reducing traffic volumes through the campus.
- Approximately three-quarters of the traffic leaving the campus in the afternoon peak hour via the south access travels via University Way and Hollywood Road, rather than by Alumni Avenue.

3.2. Traffic Speeds

Traffic speeds were recorded at seven locations on campus, as illustrated in Figure 3.3 and as summarized in Table 3.1. Eighty-fifth percentile speeds are typically used for the purposes of assessing traffic speeds, as these represent the speeds below which 85% of the traffic is travelling.

Figure 3.3 – Traffic Speed Locations



Key observations regarding traffic speeds on campus include:

- The highest observed speeds on campus were on the south section of Discovery Avenue at G Lot (location 5), where northbound 85th percentile speeds are 57 km/h, and southbound speeds exceed 60 km/h. Speeds on this section of Discovery Avenue have doubled since Fall 2009, likely as a result of extending Discovery Avenue to the south.

Table 3.1 – Weekday 85th Percentile Traffic Speeds (km/h)

Location	Eastbound/ Northbound		Westbound/ Southbound	
	Fall 2009	Fall 2011	Fall 2009	Fall 2011
1 University Way west of roundabout	52.9	49.1	49.8	49.6
2 University Way west of Alumni	39.1	39.3	37.0	36.2
3 University Way at Arts & Sciences	39.3	37.0	40.0	35.2
4 Discovery Avenue near C lot	54.5	31.6	48.3	31.3
5 Discovery Avenue near G lot	28.3	57.4	29.1	60.7
6 Knowledge Lane	29.9	29.4	30.3	29.5
7 Alumni Avenue south of library	43.4	37.1	43.6	36.7

- Speeds on the north section of Discovery Avenue (location 4) have decreased considerably since Fall 2009, and are now just above 30 km/h.
- Speeds on Alumni Avenue south of the library (location 7) have decreased from 43 km/h in Fall 2009 to 37 km/h in Fall 2011.
- Speeds along University Way in the centre of the campus (locations 2 and 3) have not changed significantly since Fall 2009, and remain close to 40 km/h.