UBC Vancouver Transportation Status Report Fall 2013

July 2014

campus + community planning
transportation planning

a place of mind
THE UNIVERSITY OF BRITISH COLUMBIA

1. Introduction

Consistent with its sustainability goals, UBC wishes to reduce automobile trips to and from the UBC Vancouver campus, 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.

Since 1997, UBC has collected data each year regarding travel patterns to and from the Point Grey campus. A year-to-year comparison of this information provides a measure of UBC's progress in achieving its transportation goals.

This Fall 2013 Transportation Status Report presents the most recent data that UBC has collected. This report provides a picture of overall travel trends, and details of travel patterns for each mode of transportation to and from UBC as well as an overview of transportation at UBC.

1.1. Context

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

- **Place and Promise: The UBC Plan** is the strategic vision for the kind of university that UBC aspires to be. Prepared through widespread community consultation, Place and Promise establishes UBC's vision to be one of the world's leading universities, creating an exceptional learning environment that fosters global citizenship, advances a civil and sustainable society, and supports outstanding research to serve the people of British Columbia, Canada and the world. Place and Promise is focused around six core values — academic freedom, advancing and sharing knowledge, excellence, integrity, mutual respect and equity, and public interest — which are supported by specific commitments goals and actions.
- **The UBC Land Use Plan.** In June 2010, the Minister of Community and Rural Development enacted legislation that realigned the responsibility for this plan, previously known as the Official Community Plan. The OCP is no longer a regional district bylaw. The University is responsible for the Land Use Plan with direct oversight by the Minister. The Land Use Plan retains a number of transportation demand management objectives aimed at increasing walking, cycling and transit in preference to trips by single-occupant vehicles. The Land Use Plan also sets the framework for campus development, including the infill of academic lands and the ongoing development of residential neighbourhoods on campus.
- **The Vancouver Campus Plan.** In 2010, UBC adopted a new Vancouver Campus Plan, which covers the academic lands of UBC's Vancouver campus. This plan guides the institutional capital investment in facilities for teaching and research, student housing and campus infrastructure and services.
- **Neighbourhood Plans.** For each of the non-institutional neighbourhoods on campus, there is a neighbourhood plan describing site-specific land uses, development controls, design guidelines, and servicing and transportation strategies consistent with UBC's Land Use Plan. Each

neighbourhood is designed to support the University's academic core, while providing the amenities and services required to achieve a compact, transit-oriented, pedestrian friendly community.

- **The Strategic Transportation Plan.** UBC has committed to implement a comprehensive and integrated transportation management strategy. The Strategic Transportation Plan is the result of that commitment, and was approved by UBC's Board of Governors in November 1999 and renewed in 2005. The targets in the STP provide the context for the annual monitoring exercise documented in this report.

1.2. Transportation Monitoring Program

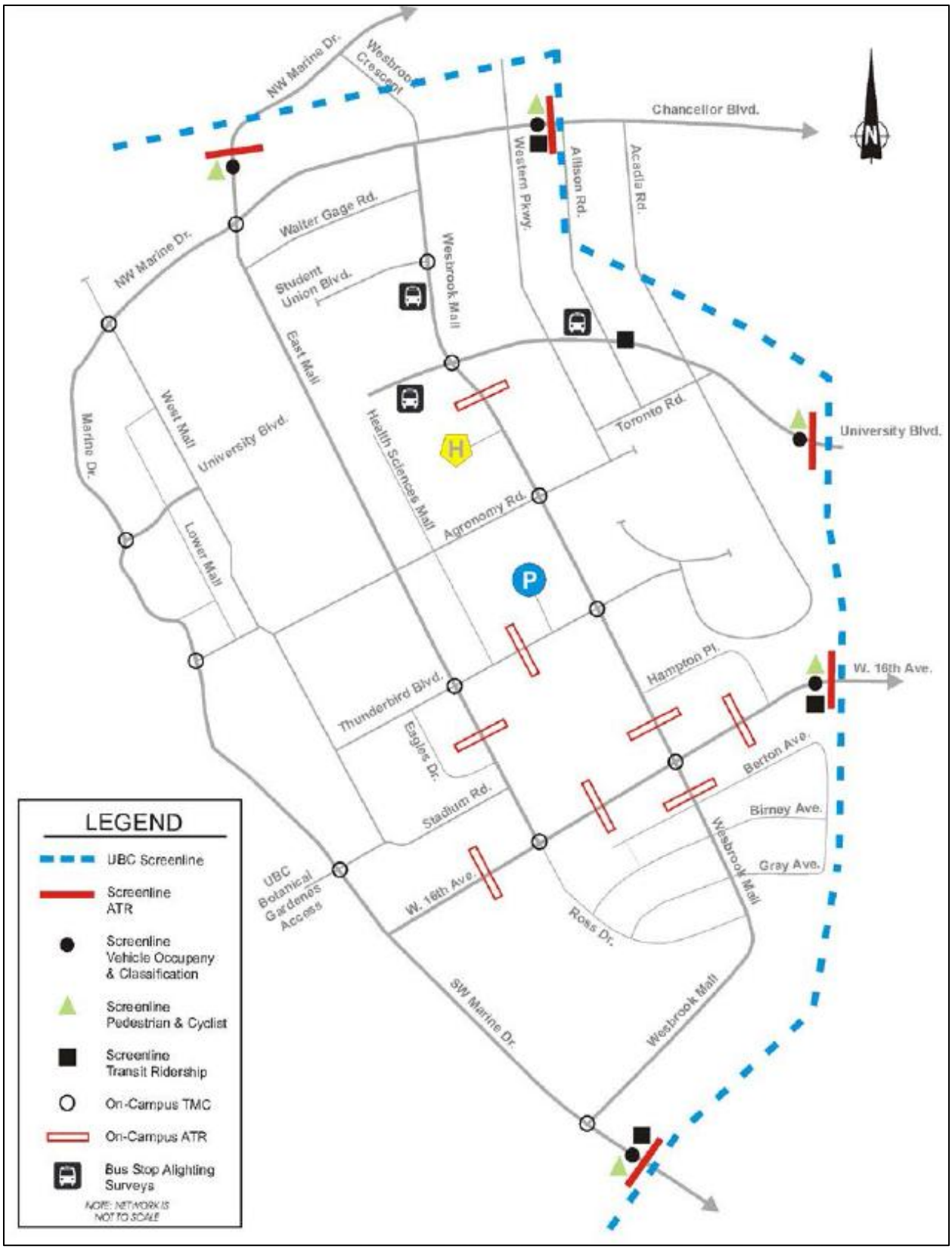
Travel patterns to and from UBC are monitored on an on-going basis through a variety of different data collection methods. Data is collected during the fall to enable consistent year to year comparisons of travel patterns, mode shares, and traffic volumes. Additional data collection activities may be 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 2013 are summarized in ***Table 1.1***, and data collection locations are illustrated in ***Figure 1.1***.

Table 1.1: Summary of 2013 Transportation Data Collection

Data Collection Activity	Locations	Description
Intersection Counts	At intersections throughout campus.	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Campus Traffic / Speed Counts	Roads throughout campus.	Automatic tube counters on roads for 7 days (24 hours / day).
Screenline Traffic Counts	Screenlines	Automatic tube counters on roads for 7 days (24 hours / day).
Transit Ridership	Screenlines	Manual observation from 6:00AM to 4:30AM for one day.
Vehicle Occupancy & Classification	Screenlines	Manual observation for 8 hours (3hrs in AM, 2hrs in Midday, 3hrs in PM) for one day.
Bicycle and Pedestrian Counts	Screenlines	Manual observation for 15 hours over one day.
Heavy Trucks	Screenlines	Manual observation for 13 hours (6:00AM to 7:00PM) for one day each quarter.

Figure 1.1: Data Collection Locations



1.3. Changes at UBC Affecting Travel Patterns

There have been a number of changes at UBC that have affected attitudes towards travel among students, staff, faculty and others at UBC, and consequently have affected travel patterns. This section of the report identifies key changes that have occurred at UBC since 1997.

- **Population.** The daytime population at UBC has increased 51% in the 16 years since 1997. This includes increased student enrolment and associated increases in faculty and staff. For the purposes of monitoring trends in travel to and from UBC, the daytime population comprised of students, staff and faculty is used to calculate person trips. ***Table 1.2*** summarizes population figures for Fall 1997 and Fall 2013.

  It is important to also note that the estimate of campus population is challenging. It is dependent on the means by which the data is collected and grouped and is impacted by the increasing trend in online courses and expanding residential campus community. However, efforts are made to allow for consistent cross comparison in the status reports.

Table 1.2: Daytime Population at UBC, 2013 vs. 1997

Group	Fall 1997	Fall 2013	Increase (count / percentage)	
Students	33,200	49,900	+16,700	+50%
Staff	7,250	10,800	+3,500	+49%
Faculty	1,850	3,300	+1,500	+82%
Totals	**42,300**	**64,000**	**+21,700**	**+51%**

Source: UBC Planning and Institutional Research Department

- **U-Pass.** One of the most significant changes affecting travel patterns at UBC has been the student U-Pass, which was introduced in September 2003. The U-Pass is a universal transportation pass that is mandatory for students at a cost to students of $35 per month. The U-Pass offers students unlimited access to TransLink Bus, SkyTrain and SeaBus services (all zones), and discounted West Coast Express fares.
- **More transit service.** In conjunction with introduction of the student U-Pass, TransLink has substantially increased the level of transit service provided to UBC. The majority of the increase has been on the Route 99 B-Line. Other improvements since 1997 include new Route 33 on 16th Avenue, and several express routes, including Route 43 on 41st Avenue, Route 44 from downtown, Route 84 from the VCC-Clark SkyTrain station, and Route 480 from Richmond Centre.
- **Class start times were changed in September 2001.** In an effort to spread the transit demand in the morning peak period, UBC adjusted morning class start times. Previously, the first classes in the morning all began at 8:30 a.m. This was changed so that some students begin classes at 8:00 a.m., some at 8:30 a.m., and others at 9:00 a.m. Subsequent analysis showed that the desired spreading of morning peak demands was achieved, and that as a result, 12% more transit trips per day were accommodated on the same number of buses.

- **Parking supply and costs.** UBC has eliminated more than 3,000 commuter parking stalls on campus since 1997 — a reduction in the commuter parking supply of approximately 25%. At the same time, the price of parking on campus has increased (UBC does not provide any free parking spaces on campus for commuters). Daily parking rates in surface lots have quadrupled from $2.00 in 1997 to $8.00 in 2013, and prices for parking permits and other parking on campus have also increased. In addition, UBC has worked with other agencies to restrict parking in the neighbourhoods and roadways adjacent to UBC, particularly 16th Avenue and SW Marine Drive.
- **Bicycle facilities.** Since 1997, new bicycle lanes have been implemented on several roadways on campus and to / from campus. Most notable was the conversion of University Boulevard west of Blanca, from two lanes in each direction to one travel lane and one bicycle lane in each direction. Bicycle lanes were also added on SW Marine Drive, Wesbrook Mall, East Mall, Thunderbird Boulevard and 16th Avenue. All unrestricted roads on campus function as shared roadways that accommodate cyclists as well as motor vehicles. On campus bicycle racks are provided at each building, in addition to bike lockers, bike cages and numerous end of trip facilities.
- **Alternative modes of travel.** UBC has encouraged the use of non-single occupancy vehicle (SOV) modes of travel through a range of programs, including a comprehensive transportation demand management strategy that includes transit discount programs, carpooling, car sharing, cycling, on campus, shuttles, an emergency ride home program, and other sustainable transportation initiatives.
- **Campus development and land use.** UBC has developed and is continuing to develop additional housing on-campus, as a means of reducing the proportion of persons who travel to UBC from off-campus. This housing includes student housing, housing for staff and faculty, and market housing. At the same time, an increased number and range of commercial services are now available on campus and in the University Endowment Lands adjacent to campus.

1.4. Understanding the Data

The following terms and measures are used throughout this report to describe various characteristics of travel patterns and trends at UBC:

- A **screenline** is an imaginary line across which trips are recorded. At UBC, the screenline around the campus illustrated by the dotted blue line in ***Figure 1.1***. As shown, there are approximately five different entry and exit options.
- **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.
- 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 in **person trips.***
- The population at UBC — students, staff, faculty and residents —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 UBC during the weekday daytime. The number of persons is calculated as the student enrolment plus the number of staff and faculty (full and part time), as reported by UBC's Planning and Institutional Research department. Numbers of on-campus residents are not included in the population count, in many cases it could be a double count as a result of many staff, faculty and students living on campus.
- Substantial effort and cost are required to collect travel data at UBC. 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 UBC are collected over a period of one week using automatic counters placed on the roadway. 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 8 hours from the morning peak through the afternoon peak periods. Daily totals can be estimated by combining occupancy and classification data with the average daily traffic data.

- **Rolling average.** Observed travel patterns fluctuate from year to year, and consequently the results for any particular year should not be considered in isolation. A more meaningful picture of travel patterns is obtained by considering trends over time. To better illustrate trends and minimize the apparent variability from year to year, charts illustrating trips by mode for each year since 1997 include a trend line based on a three-year rolling average. Rolling averages are calculated as the average of a particular year plus the years before and after. This means that for 2006, for example, the rolling average is calculated as the average number of trips in 2005, 2006 and 2007.

1.5. More Information

The following resources provide additional information regarding travel patterns and trends at UBC, as well as transportation services and facilities. All this information can be found at UBC's Campus and Community Planning website:

- This Fall 2013 Transportation Status Report, along with several recent Transportation Status Reports.
- The 2005 Strategic Transportation Plan.
- A review of the first 18 months of the student U-Pass program and the results of the Community Transportation Pass (ComPASS) demonstration project.
- Information on other transportation facilities and services on campus.
- Information regarding campus plans and neighbourhood plans.

2. Summary of Transportation at UBC

The following sections present a general summary of transportation to and from UBC including person trips, trips per person, mode share, and vehicle occupancy. Details for each different mode of transportation are presented in ***Section 3.***

2.1. Person Trips

The average weekday person trips to and from UBC in fall 2013 was 142,300. A summary and comparison of daily person trips by mode from the fall of 1997 to the fall of 2013 are provided in ***Table 2.1*** and ***Figure 2.1***.

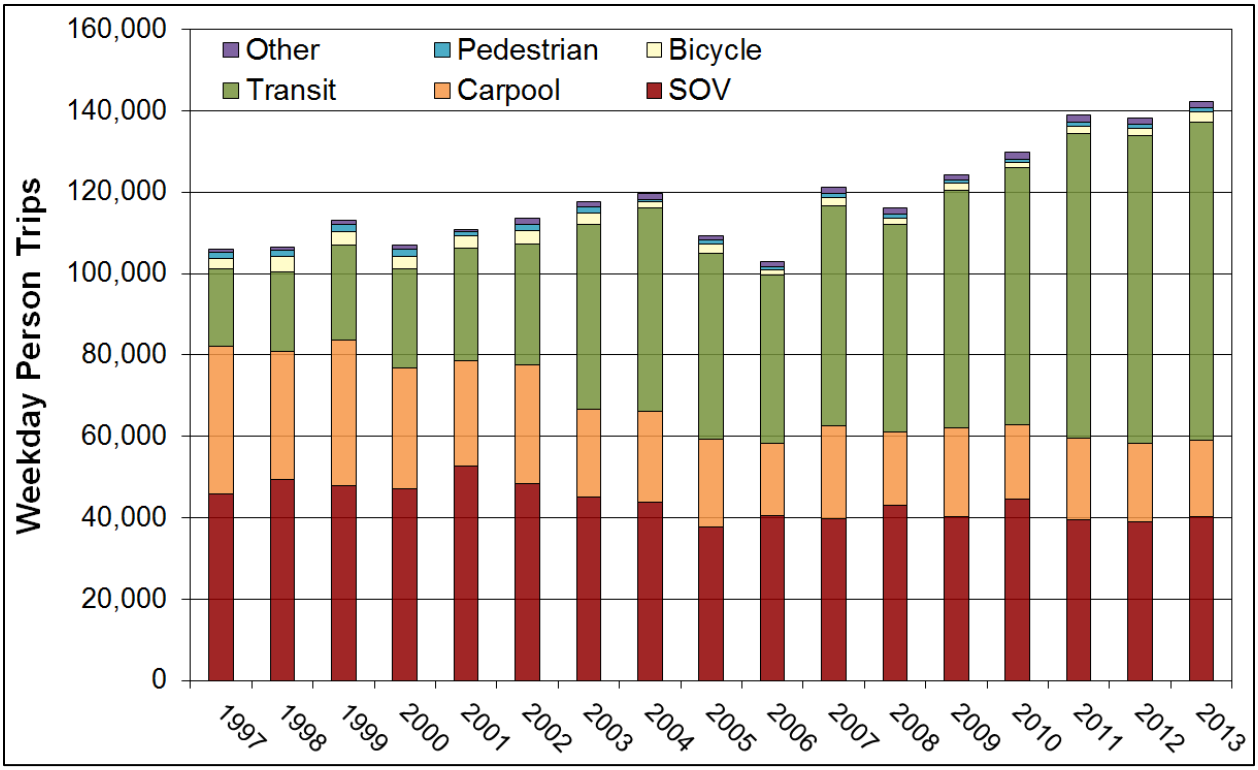
Table 2.1: Weekday Person Trips to / from UBC Vancouver, 1997 vs. 2013

Travel Mode Classification	Person Trips			
	Fall 1997	Fall 2013	Change (count / percentage)	
Single Occupant Vehicle (SOV)	46,000	40,200	–5,800	–13%
Carpool / Vanpool	36,100	18,800	–17,300	–48%
Transit	19,000	78,300	+59,300	+312%
Bicycle	2,700	2,400	–300	–11%
Pedestrian	1,400	1,000	–400	–29%
Truck & Motorcycle	900	1,600	+700	+78%
Totals	**106,100**	**142,300**	**+36,200**	**+34%**

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

- The proportion of SOV trips has decreased by 13% from 1997 to 2013.
- The proportion of HOV trips has decreased by 48% from 1997 to 2013.
- Trips by transit have more than quadrupled since 1997.
- Bicycle and pedestrian trips dropped significantly after the student u-pass program was implemented. Trips by bike account for 1.7% of all trips and trips by foot account for 0.7% of all person trips with an upward trend over the past few years.

Figure 2.1: Weekday Person Trips to / from UBC, 1997 – 2013



In order to compare travel patterns from year to year on a consistent basis, it is important to negate the effects of population / enrolment growth. To compare the Trips Per Person by mode the average weekday person trips by each mode is divided by the average weekday campus population. The average weekday campus population values include all full and part time students, staff and faculty.

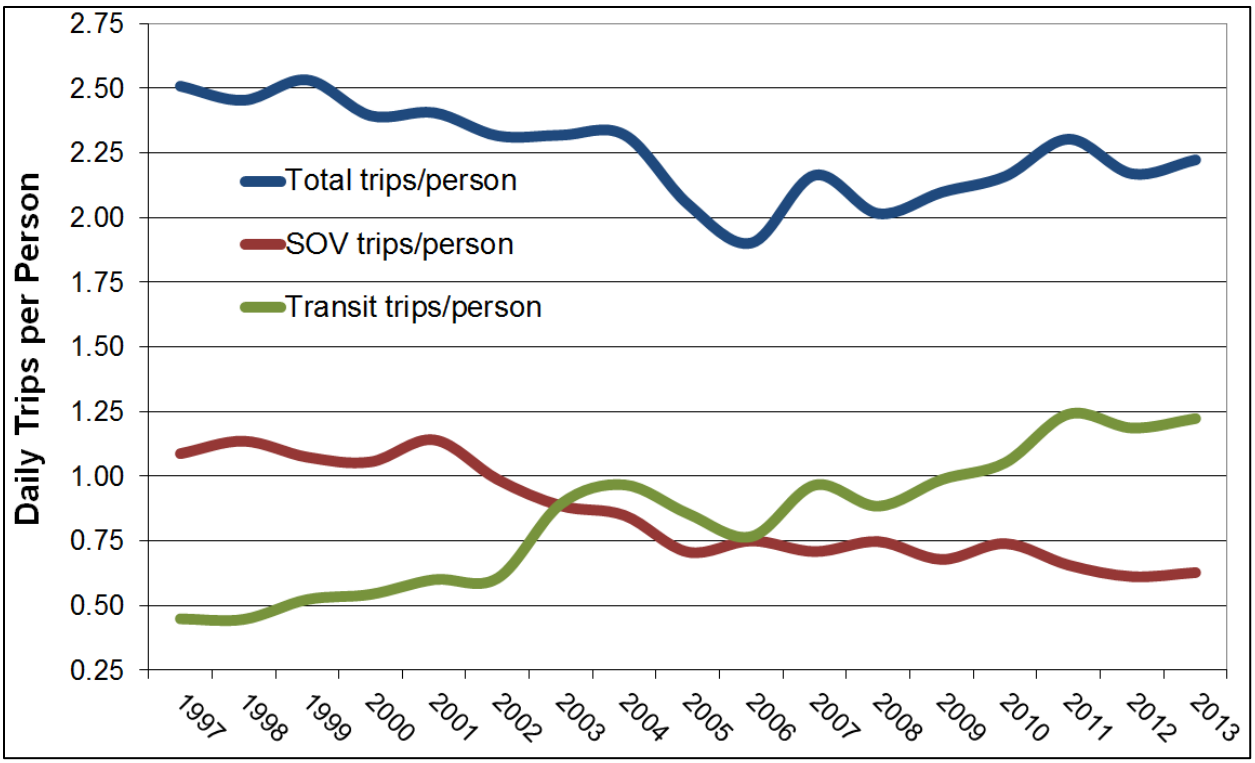
The campus population and trips per person to and from UBC from fall 1997 to fall 2013 are presented in ***Table 2.2*** and ***Figure 2.2***, respectively.

Table 2.2: Weekday Trips Per Person to / from UBC, 1997 – 2013

Travel Mode Classification	Trips Per Person			
	Fall 1997	Fall 2013	Change (count / percentage)	
Single Occupant Vehicle (SOV)	1.09	0.63	-0.46	-42.2%
Carpool / Vanpool	0.86	0.29	-0.56	-65.6%
Transit	0.45	1.22	+0.77	+172.4%
Bicycle	0.06	0.04	-0.03	-41.3%
Pedestrian	0.03	0.02	-0.02	-52.8%
Truck & Motorcycle	0.02	0.03	+0.00	+17.5%
Totals	**2.51**	**2.22**	**-0.28**	**-11.4%**
CAMPUS POPULATION*	***42,300***	***64,000***	***21,700***	***+51.3%***

**Population reported from fall attendance values.*

Figure 2.2: Weekday Trips Per Person to / From UBC, 1997 – 2013



The average number of trips per person in 2013 was 2.22 trips per day, which is an 11% decrease from 1997. Since 1997 the number of trips made by transit has increased while the number of trips by single occupant vehicles has decreased.

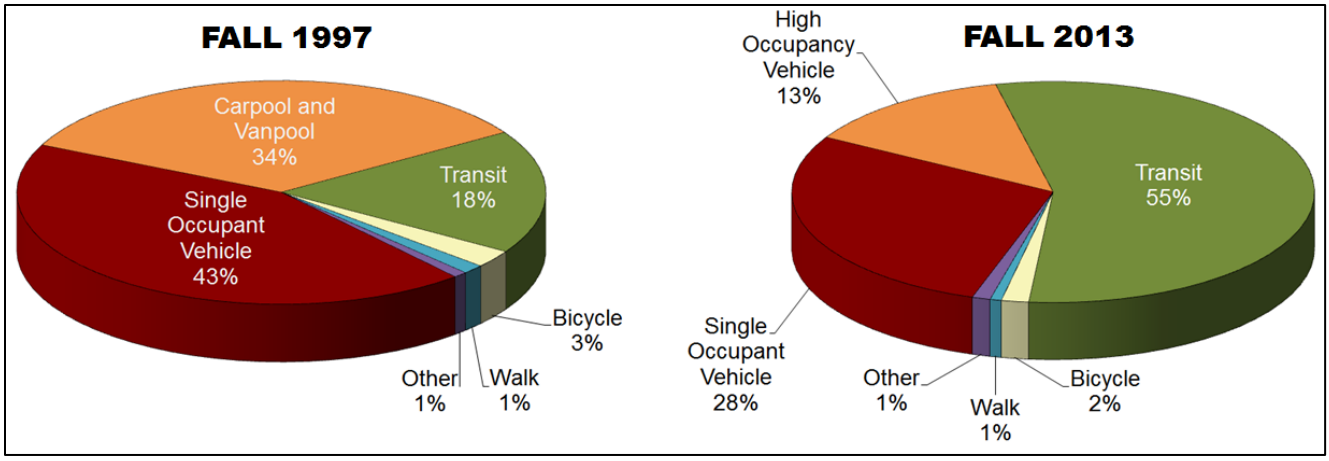
Possible reasons for the decrease in trips per person overall since 1997 are:

- More people are living, working and studying on campus.
- More services are available on campus, reducing the need for people to travel off campus for shopping and services.
- Distance education and internet access has reduced the need for some students and faculty to travel to campus each day.

2.2. Mode Share Summary

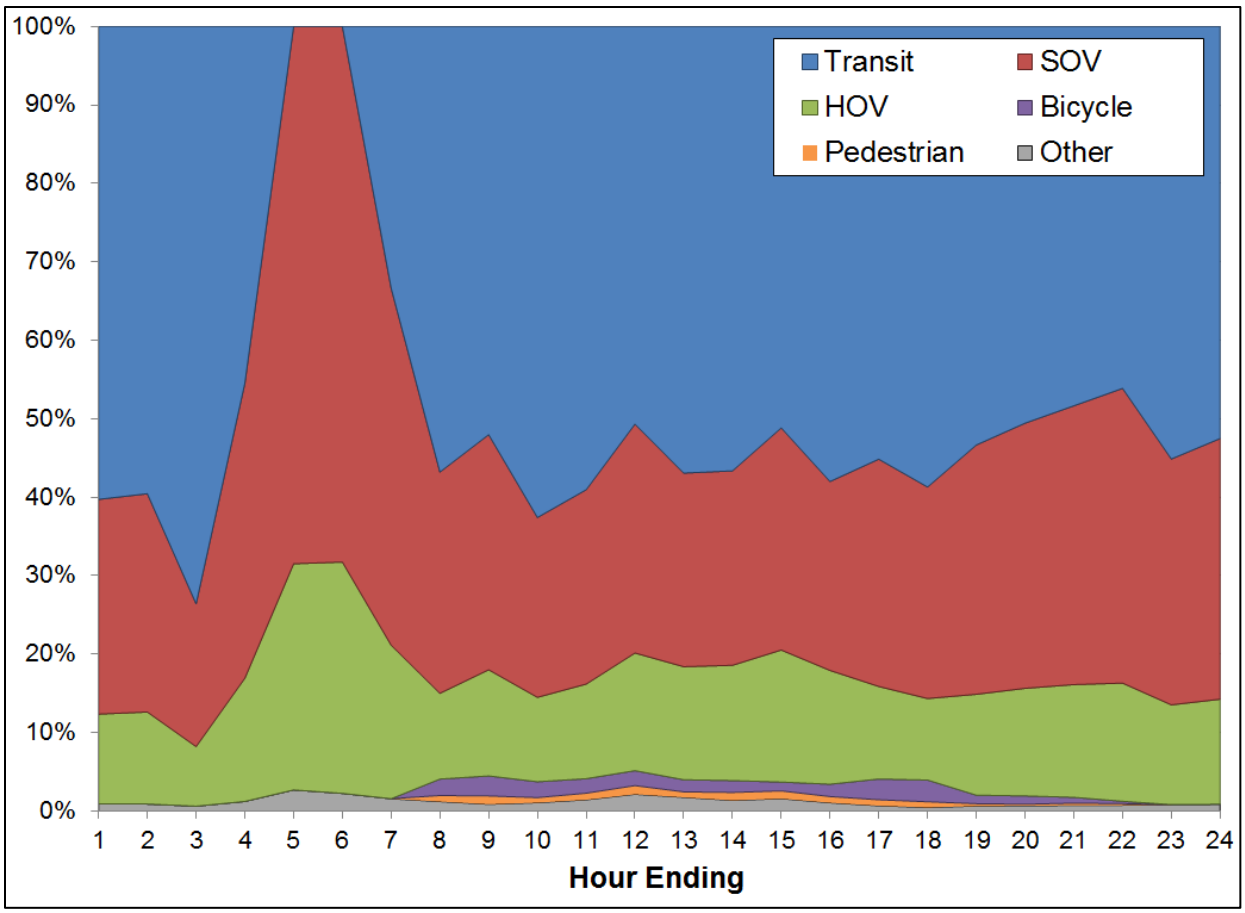
The mode share comparison for 1997 and 2013 are shown in ***Figure 2.3***. The significant change since 1997 has been the increase in the transit mode share, with trips by transit accounting for more than half of all trips to and from UBC.

Figure 2.3: Average Weekday Trips by Mode to / From UBC, 1997 vs.2013



The distribution of these trips throughout the day by mode is shown in ***Figure 2.4***. Aside from the early morning period when night buses are in operation, the transit mode share is highest during the morning from 9:00 to 10:00 a.m., and during the afternoon from 5:00 to 6:00 p.m. The single occupant vehicle and carpool mode shares are highest during the early morning hours when there is little or no transit service with other peaks from 9:00pm to 10:00pm and 8:00am to 9:00am.

Figure 2.4: Hourly Distribution of Average Weekday Trips by Mode to / From UBC, 2013



The weekday person trips in 1997 compared to 2013 is shown in ***Figure 2.5*** and the peak hour summary of trips by mode is summarized in ***Table 2.3***. Significant observations in the data include:

- Despite a 51% increase in campus population, the number of trips during the peak morning period have only increased 16%. This is as a result of the introduction of travel demand measurement tools such as shifting class start times.
- The number of trips during the peak evening period have increased 36% from 1997.
- The peak travel periods have spread out resulting in more trips throughout the day.

Figure 2.5: Distribution of Average Weekday Person Trips to / from UBC, 1997 vs. 2013

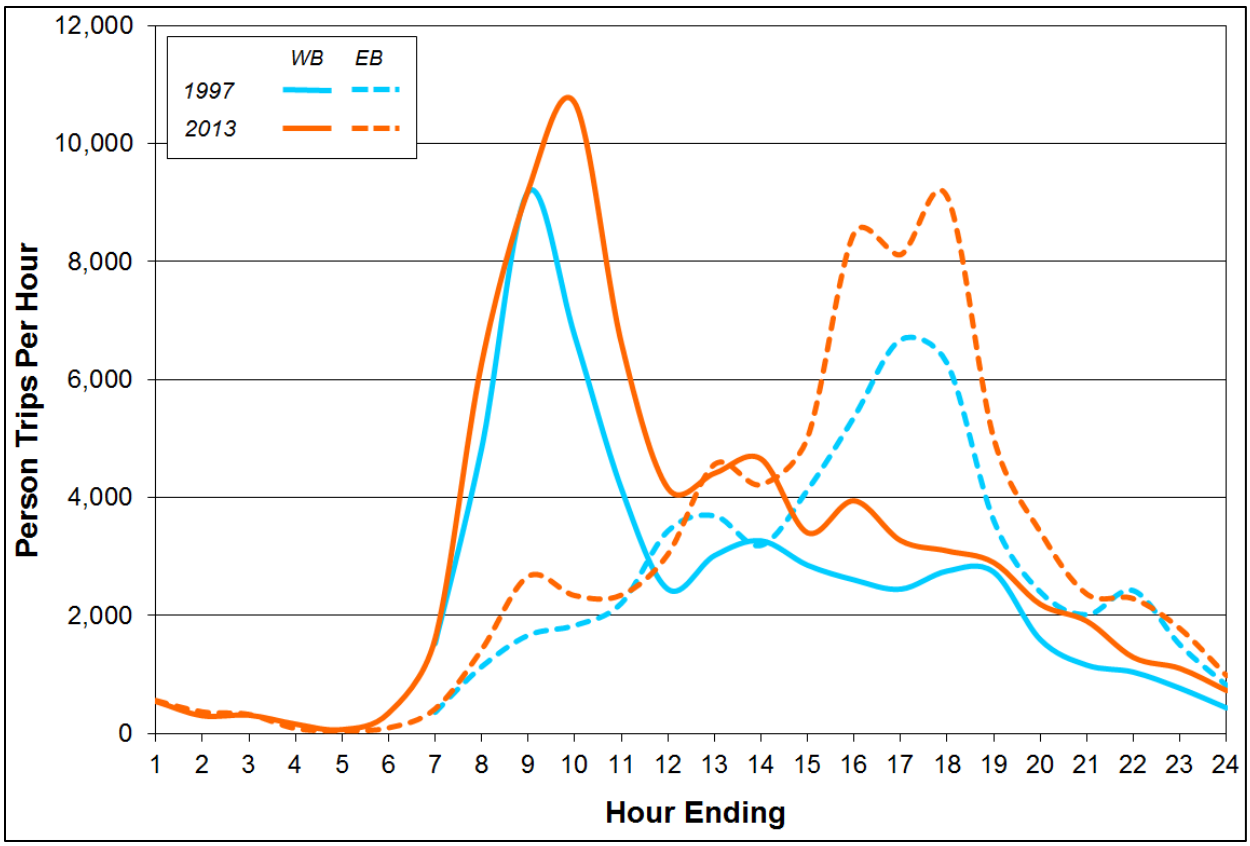


Table 2.3: Average Peak Hour Person Trips by Mode to/from UBC, 2013

Travel Mode Classification	AM Peak Hour 9:00am – 10:00am		PM Peak Hour 5:00pm – 6:00pm	
	Westbound	Eastbound	Westbound	Eastbound
Single Occupant Vehicle (SOV)	1,990	990	1,140	2,140
Carpool / Vanpool	980	420	520	750
Transit	7,330	830	1,340	5,820
Bicycle	240	20	50	290
Pedestrian	60	30	30	60
Truck & Motorcycle	90	50	20	40
Totals	**10,690**	**2,340**	**3,100**	**9,100**

2.3. Traffic Patterns and Vehicle Occupancy

Automobile traffic (single occupant and high occupant vehicles only) to and from UBC has decreased substantially from 62,400 automobiles per weekday in Fall 1997 to 49,100 automobiles per weekday in Fall 2013, as shown in ***Table 2.4***.

Table 2.4: Average Weekday SOV and HOV Traffic Volume to/from UBC, 1997 vs. 2013

Travel Mode Classification	Fall 1997	Fall 2013	Change (count / percentage)	
Single Occupant Vehicle (SOV)	46,000	40,200	–5,800	–13%
Carpool / Vanpool	16,400	8,900	–7,500	–46%
Totals	62,400	49,100	–13,300	–21%

The average weekday traffic volumes to / from UBC in a 24-hour period for both Fall 1997 and Fall 2013 are shown in ***Figure 2.6***. As shown, the traffic volumes have reduced throughout the entire day, not just at peak periods.

Figure 2.6: Distribution of Average Weekday Traffic Volumes to / from UBC, 1997 vs.2013

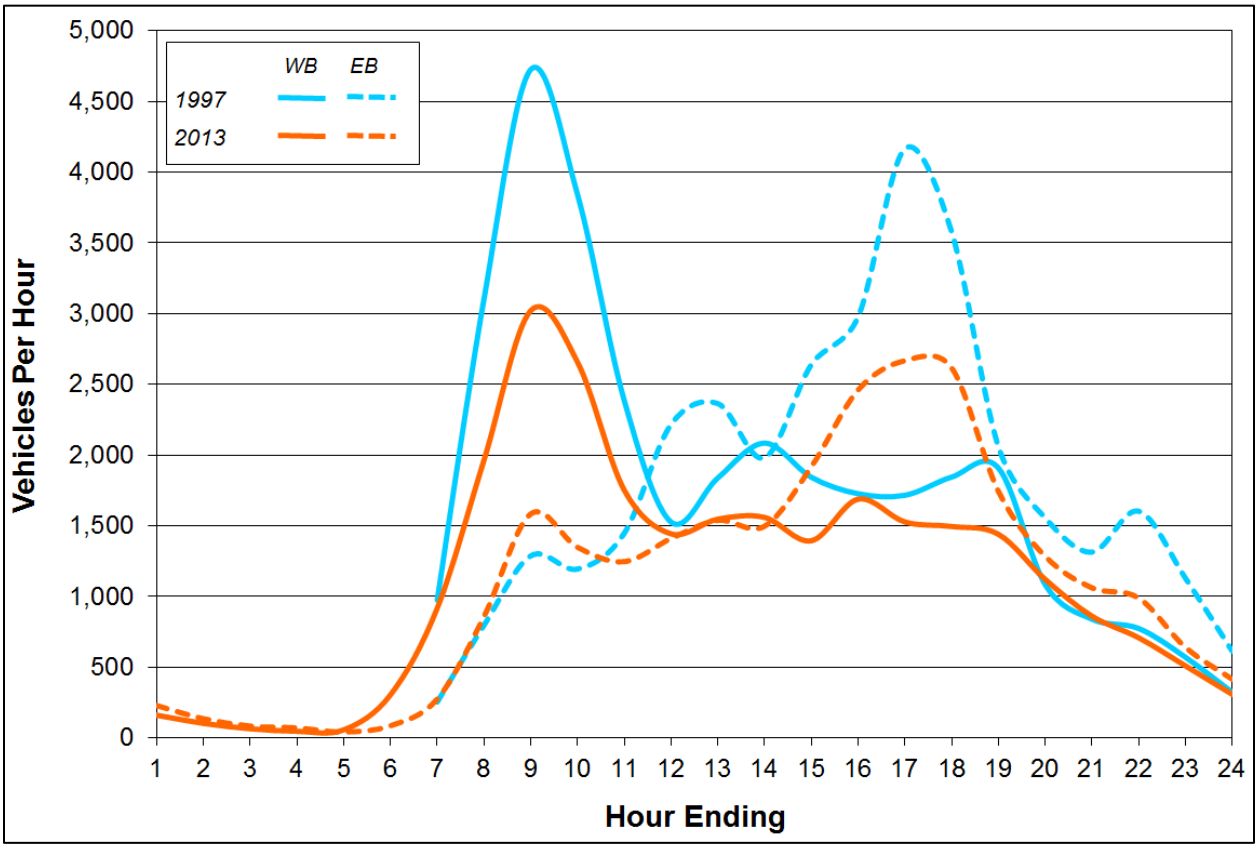


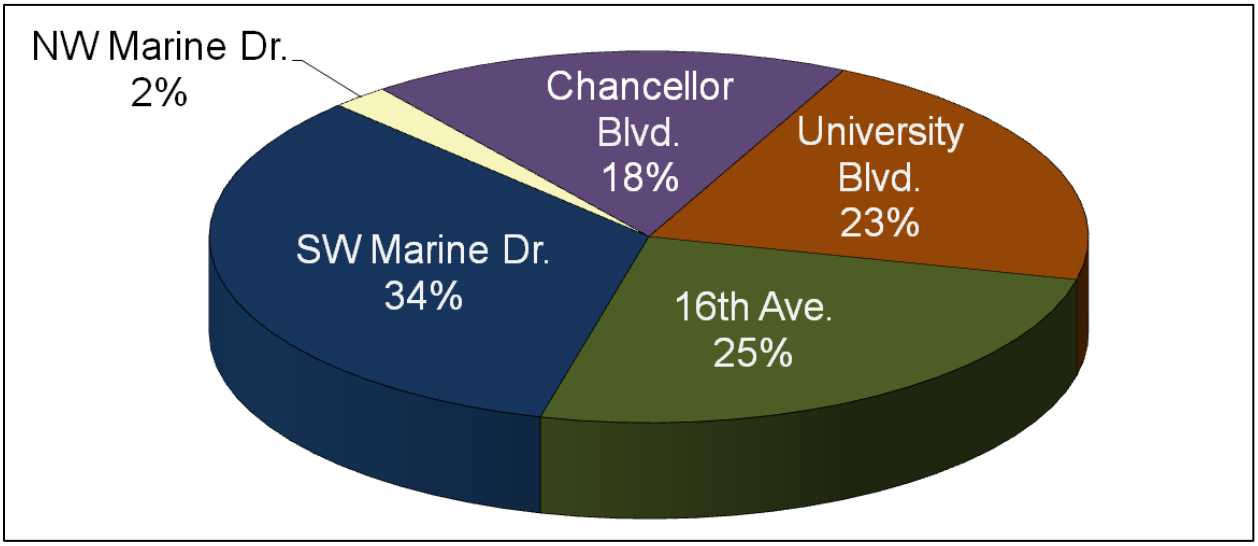
Table 2.5 summarizes the daily traffic volumes at each screenline location. It is important to note that these figures include trucks, buses and motorcycles, in addition to SOV's and HOV's. Overall, traffic volumes were 18% lower in Fall 2013 than in 1997 with a general decrease observed at all screenline locations with the exception of 16th Avenue where there has been a small increase.

Table 2.5: Summary of Average Weekday Traffic Volumes at Screenlines, 1997 vs.2013

Screenline	Average Daily Traffic Volume			
	Fall 1997	Fall 2013	Change (count / percentage)	
NW Marine Drive	2,040	1,120	–920	–45%
Chancellor Boulevard	11,660	9,350	–2,310	–20%
University Boulevard	14,610	11,310	–3,300	–23%
16th Avenue	12,880	13,340	+460	+4%
SW Marine Drive	23,410	17,720	–5,690	–24%
Totals	**64,600**	**52,800**	**–11,800**	**–18%**

The distribution of all traffic volumes to / from UBC by screenline is shown in ***Figure 2.7***. As shown, a majority of traffic uses SW Marine Drive followed by 16th Avenue and University Boulevard.

Figure 2.7: Distribution of Average Weekday Traffic to / from UBC by Screenline, 2013



Vehicle occupancy is a measure of the average number of people travelling per vehicle during a certain period of time. As shown in ***Table 2.6***, the average vehicle occupancy of all vehicles in 2013 was 1.20 persons per vehicle, down from 1.32 persons per vehicle in 1997. In addition, the average occupancy for high occupancy vehicles decreased 4% from 1997 to 2.11 in 2013, resulting from more vehicles carrying less than three people compared to 1997.

Table 2.6: Average Daily Vehicle Occupancy to / from UBC, 1997 vs. 2013

Travel Mode Classification	Fall 1997	Fall 2013	Change (count / percentage)	
Vehicles (SOV's + HOV's)	1.32	1.20	–0.12	–9%
HOV's (Carpools / Vanpools)	2.20	2.11	–0.09	–4%

Table 2.7 provides a summary of average automobile occupancies from 7:00 a.m. to 6:00 p.m. Automobile occupancies are highest midday, but overall vehicle occupancies are evenly distributed to and from UBC.

Table 2.7: Hourly Vehicle Occupancies to / from UBC, 2013

Hour Beginning	Westbound	Eastbound	Both Directions
7:00 a.m.	1.17	1.18	1.17
8:00 a.m.	1.19	1.21	1.20
9:00 a.m.	1.20	1.21	1.21
11:00 a.m.	1.22	1.22	1.22
12:00 p.m.	1.22	1.26	1.24
3:00 p.m.	1.25	1.24	1.25
4:00 p.m.	1.20	1.17	1.18
5:00 p.m.	1.19	1.15	1.17
8-Hour Average	**1.20**	**1.20**	**1.20**

3. Transportation To and From UBC

This section of the Transportation Status Report describes travel patterns and trends for trips to and from the UBC Vancouver campus for each mode of travel. Information regarding transportation conditions on campus is presented in ***Section 4***.

3.1. Transit

Transit ridership at UBC has increased considerably in 16 years. Since 1997 ridership has quadrupled, increasing 312% to a total of 78,300 weekday transit trips to and from UBC. This increase in ridership has equated to a 36% increase in transit mode since 1997 to 55% in 2013; more than half of all trips to and from UBC.

This ridership increase has been the result of the student U-Pass program, continued improvements in transit service, and a reduced supply of commuter parking and higher prices for parking on campus. ***Table 3.1*** provides a summary of the increase in transit trips and the transit mode share from Fall 1997 to Fall 2013, highlighting the change from 2002 to 2003 when the student U-Pass was introduced.

Table 3.1: Summary of Average Weekday Transit Trips to / from UBC, 1997 – 2013

Transit Trips	Before U-Pass		After U-Pass		Change 1997-2013 (count / percentage)	
	Fall 1997	Fall 2002	Fall 2003	Fall 2013		
Person Trips	19,000	29,700	45,400	78,300	+59,300	+312%
Trips Per Person	0.45	0.61	0.89	1.22	+0.77	+172%
Transit Mode Share	18%	26%	39%	55%	+37	+207%

Figure 3.1 illustrates the three year rolling average in transit ridership from year to year, illustrating the sharp peak in 2003 and a steady increase since. ***Table 3.2*** provides a summary of transit trips by corridor, ***Table 3.3*** provides a summary of transit trips by route and by time period, and ***Table 3.4*** provides a summary of peak hour trips by route.

Table 3.2: Average Weekday Transit Trips to / from UBC by Corridor, 2013

Corridor	AM Peak 6am to 9am	Midday 9am to 3pm	PM Peak 3pm to 6pm	Evening 6pm to Midnight	Night Midnight to 4:30am	Totals	
Chancellor Blvd.	2,151	5,165	3,213	1,442	0	11,971	15.2%
University Blvd.	4,237	13,069	8,966	8,318	1,554	36,144	46.2%
16th Avenue	1,415	3,898	3,077	1,602	5	9,997	12.7%
SW Marine Drive	3,427	9,408	5,388	1,884	75	20,182	25.9%
Totals	**11,230**	**31,540**	**20,644**	**13,246**	**1,634**	**78,294**	**100%**
	14.7%	**40.3%**	**26.3%**	**16.6%**	**2.1%**		

Figure 3.1: Average Weekday Transit Trips to / from UBC, 1997 – 2013

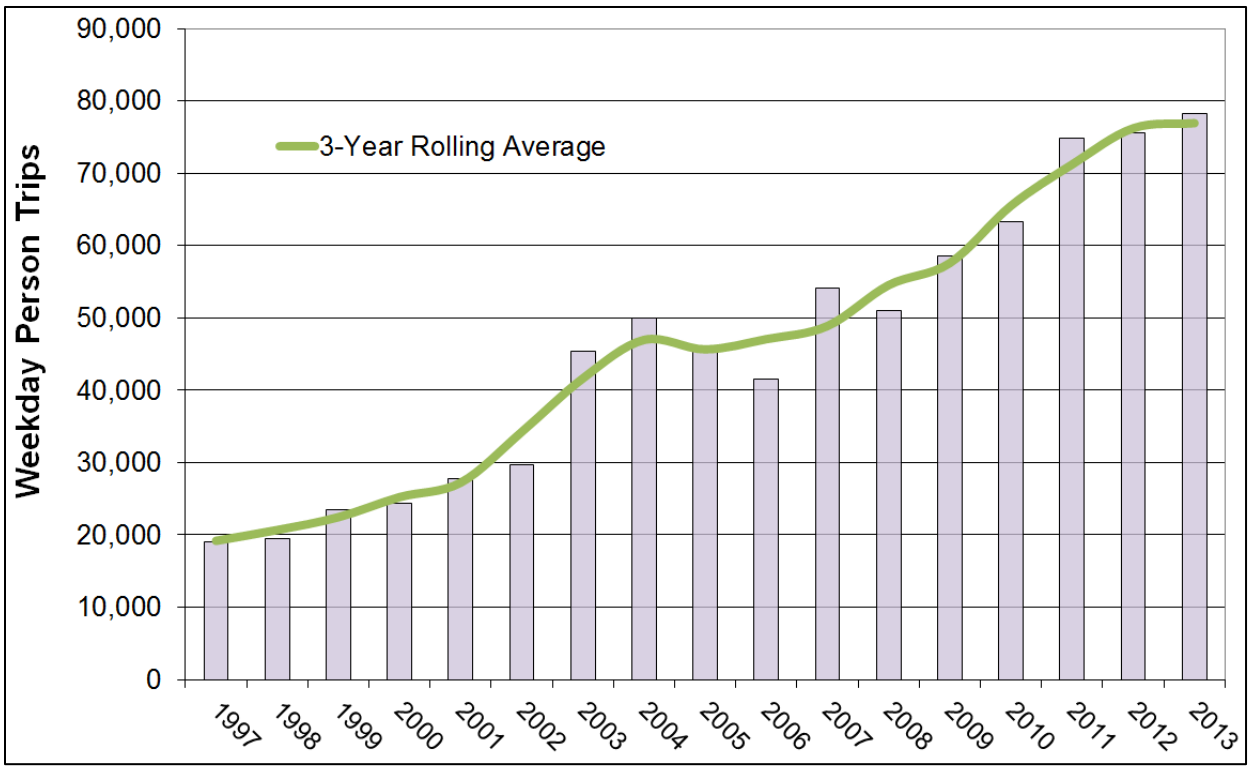


Table 3.3: Average Weekday Transit Trips to / from UBC by Route, 2013

Route		AM 6am to	Midday 9am to	PM Peak 3pm to	Evening 6pm to	Night Midnight	Totals	
4	4th Avenue	353	1,221	655	1,045	31	3,305	4.2%
9	Broadway	385	443	627	168	0	1,623	2.1%
14/N17	Broadway	434	1,668	949	1,389	665	5,105	6.5%
25	King Edward	986	2,364	1,718	967	5	6,040	7.7%
33	16th Avenue	429	1,534	1,359	635	0	3,957	5.1%
41	41st Avenue	821	3,885	1,497	780	75	7,058	9.0%
43	41st Ave Express	1,190	755	1,113	297	0	3,355	4.3%
44	4th Ave. Express	865	1,430	1,110	339	0	3,744	4.8%
49	49th Avenue	401	2,190	1,394	344	0	4,329	5.5%
84	4th Ave. Express	1,286	3,730	2,098	1,103	0	8,217	10.5%
99	Broadway B-Line	2,979	9,695	6,490	5,630	853	25,64	32.8%
258	North Shore	86	32	122	0	0	240	0.3%
480	Richmond Express	1,010	2,568	1,336	458	0	5,372	6.8%
NIS	Not In Service	5	25	176	91	5	302	0.4%
Totals		11,230	31,540	20,644	13,246	1,634	78,294	100%
		14.7%	40.3%	26.3%	16.6%	2.1%		

Table 3.4: Average Weekday Transit Trips to / from UBC by Route, 2013

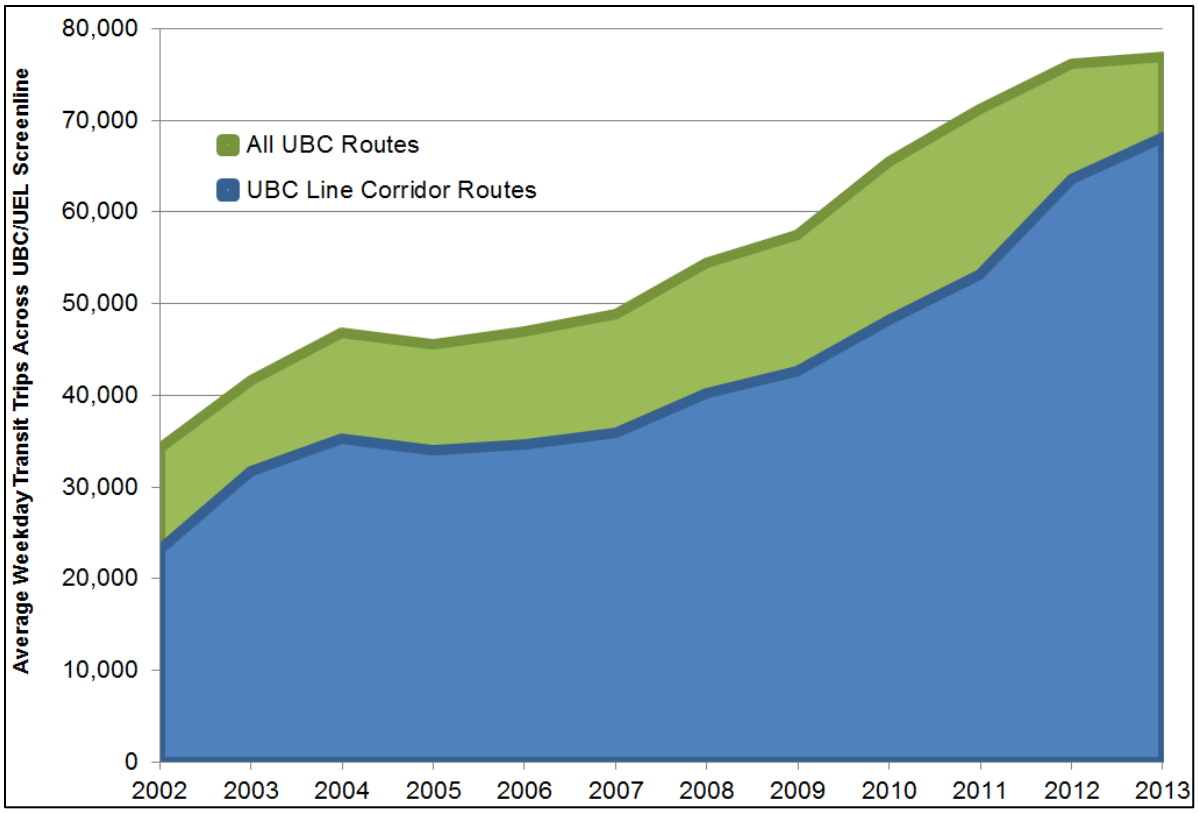
Route		AM Peak Hour Westbound 8:45am – 9:45am		PM Peak Hour Eastbound 5:00pm – 6:00pm	
4	4th Avenue	197	2.7%	185	3.2%
9	Broadway	273	3.7%	125	2.1%
14/N17	Broadway	343	4.6%	271	4.7%
25	King Edward	567	7.7%	435	7.5%
33	16th Avenue	283	3.8%	347	6.0%
41	41st Avenue	672	9.1%	400	6.9%
43	41st Ave.(limited stops)	654	8.9%	438	7.5%
44	4th Ave.(limited stops)	530	7.2%	236	4.1%
49	49th Avenue	405	5.5%	386	6.6%
84	4th Ave.(limited stops)	972	13.2%	564	9.7%
99	Broadway B-Line	1,706	23.1%	1,918	32.9%
258	North Shore Express	63	0.9%	75	1.3%
480	Richmond Express	712	9.6%	388	6.6%
NIS	Not In Service	0	0%	55	0.9%
Totals		**7,377**	**100%**	**4,470**	**100%**

Significant observations regarding transit trips include:

- Bus routes via University Boulevard (which includes the Route 99 B-Line service) account for 46% of all transit trips to and from UBC. Bus routes via 16th Avenue and Chancellor Boulevard account for 13% and 15%, respectively, which combined with ridership on University Boulevard means that ridership in the "UBC Line" corridor amounts to 74% of all transit trips. Bus routes via SW Marine Drive (the majority of which use 41st Avenue in the City of Vancouver) account for the remaining 26% of all transit trips.
- The Route 99 B-Line accounts for 33% of all transit trips. During the morning and afternoon peak hours it accounts for 23% and 33% of ridership, respectively. The lower share of peak period trips reflects the different ridership characteristics on Route 99 compared with other routes. The B-Line is well-used during all time periods, as compared with other routes where a higher proportion of ridership occurs during peak periods.
- Express bus services (Routes 43, 44, 84, 258 and 480) account for 27% of all transit trips to and from UBC. Adding the Route 99 B-Line increases this to 60% of all transit trips, indicating popularity for more rapid options to / from UBC.
- Trolley bus Routes 4, 9 and 17 account for 13% of all transit trips.

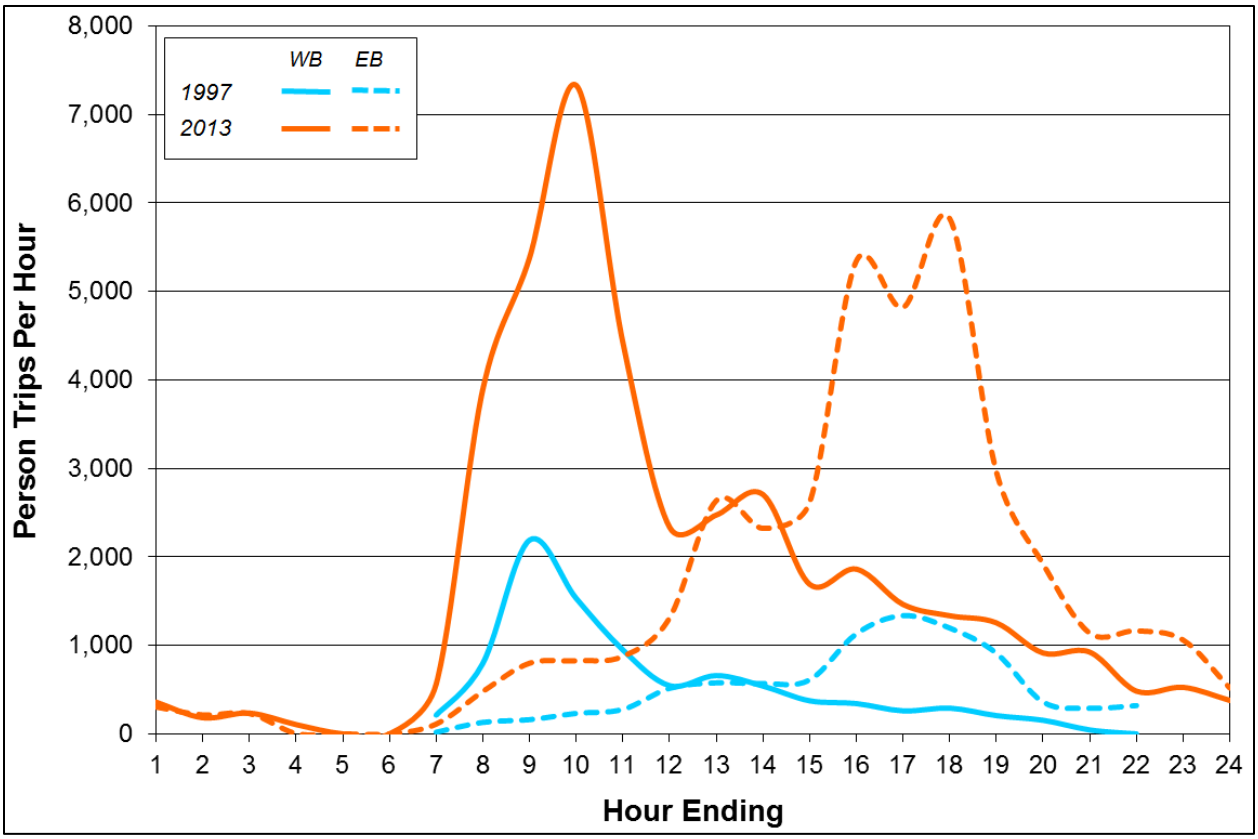
Figure 3.2 compares ridership on bus routes in the UBC Line corridor with total ridership on all routes.

Figure 3.2: Average Weekday Transit Trips to / from UBC by Route, 2013



The daily distribution of transit trips to and from UBC in 2013 is shown in ***Figure 3.3*** including a comparison with Fall 1997 transit trips. Not only does this illustrate the significant increase in transit ridership since 1997, but it also illustrates the shift of the morning peak hour from 8:00am - 9:00am in 1997 to 9:00am - 10:00am in 2013 (rounded to the hour) and a spread of the peak periods.

Figure 3.3: Distribution of Average Weekday Transit Trips to / from UBC, 1997 vs.2013



3.2. Motor Vehicles

The 2005 Strategic Transportation Plan identified a long-term policy to reduce daily single occupant vehicle (SOV) trips per person by 30% from 1997 levels. In Fall 2013, there was an average of 0.63 SOV trips per person. This represents a 46% decrease from the Fall 1997 level of 1.09 SOV trips per person, and exceeds the STP policy of at least a 30% decrease.

Table 3.5 provides a comparison of SOV travel in Fall 1997 and Fall 2013, and ***Figure 3.4*** provides a summary of year-by-year changes.

Table 3.5: Summary of SOV Trips to / from UBC, 1997 vs. 2013

Average Weekday SOV Trips	Fall 1997	Fall 2013	Change 1997-2013 (count / percentage)	
Person Trips	46,000	40,200	–5,800	–13%
Trips Per Person	1.09	0.63	-0.46	-42.2%
SOV Mode Share	43%	33%	–10	–24%

Figure 3.4: Average Weekday SOV Trips to / from UBC, 1997 - 2013

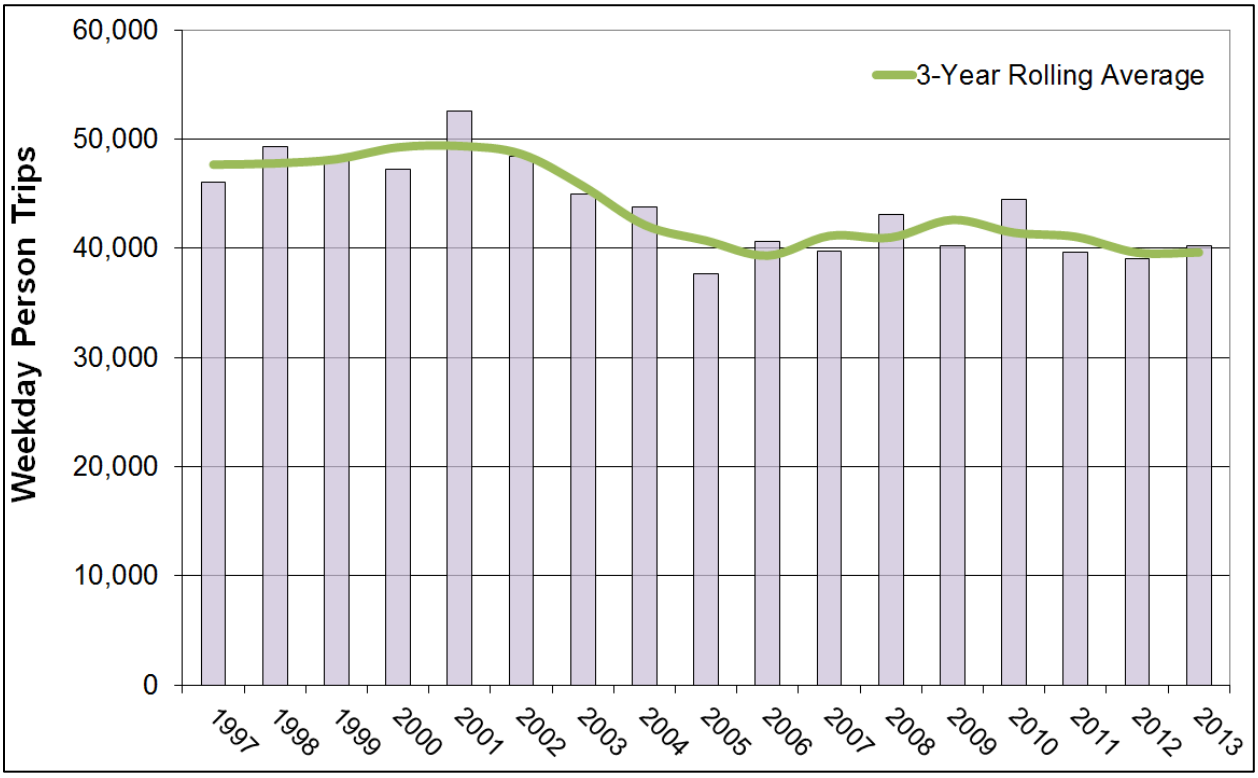
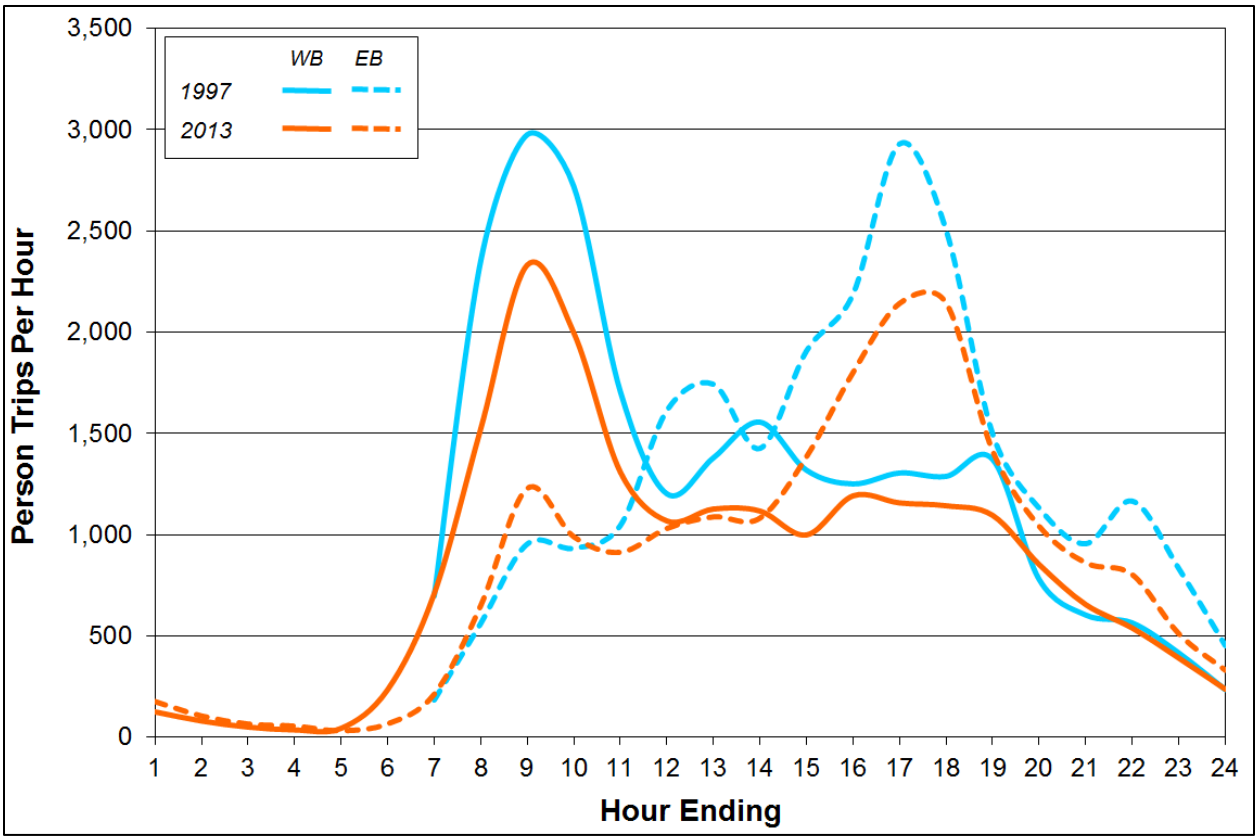


Figure 3.5 illustrates the arrival and departure patterns of SOV trips to and from UBC throughout the day, including a comparison with Fall 1997 SOV trips. The significant decreases in SOV trips are during peak periods in the peak directions — westbound in the morning and eastbound in the afternoon.

Figure 3.5: Distribution of Average Weekday SOV Trips to / from UBC, 1997 vs.2013



Carpooling, or high occupancy vehicle travel (HOV), has decreased substantially since 1997. Daily carpool and vanpool trips declined from 36,100 in Fall 1997 to 18,800 in Fall 2013, and the equivalent mode share decrease was from 34% to 13%. A summary of the trend in carpool and vanpool travel from Fall 1997 to Fall 2013 is provided in ***Table 3.6***, and a summary of year-by-year changes is provided in ***Figure 3.6***.

Table 3.6: Summary of HOV Trips to / from UBC, 1997 vs. 2013

Average Weekday HOV Trips	Fall 1997	Fall 2013	Change 1997-2013 (count / percentage)	
Person Trips	36,100	18,800	–17,300	–48%
Trips Per Person	0.86	0.27	–0.59	–69%
HOV Mode Share	34%	15%	–19 PP	–55%

Figure 3.6: Average Weekday HOV Trips to / from UBC, 1997 – 2013

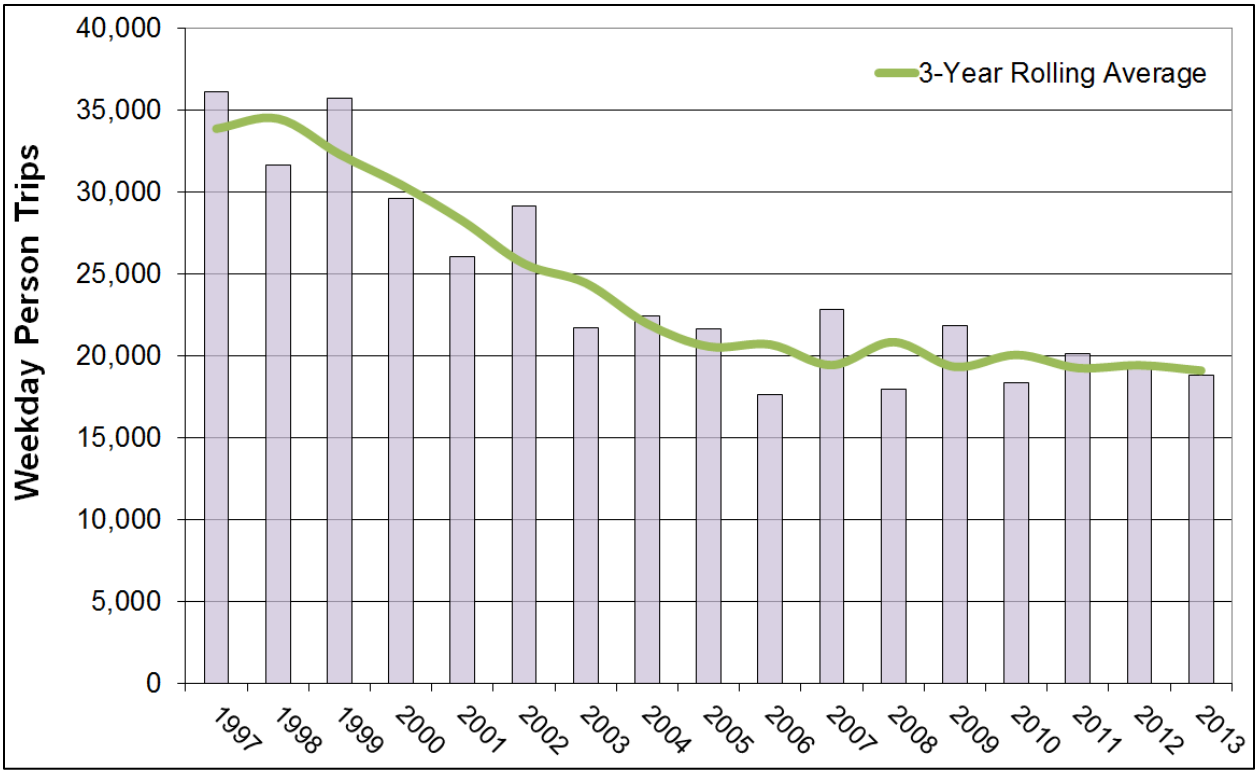
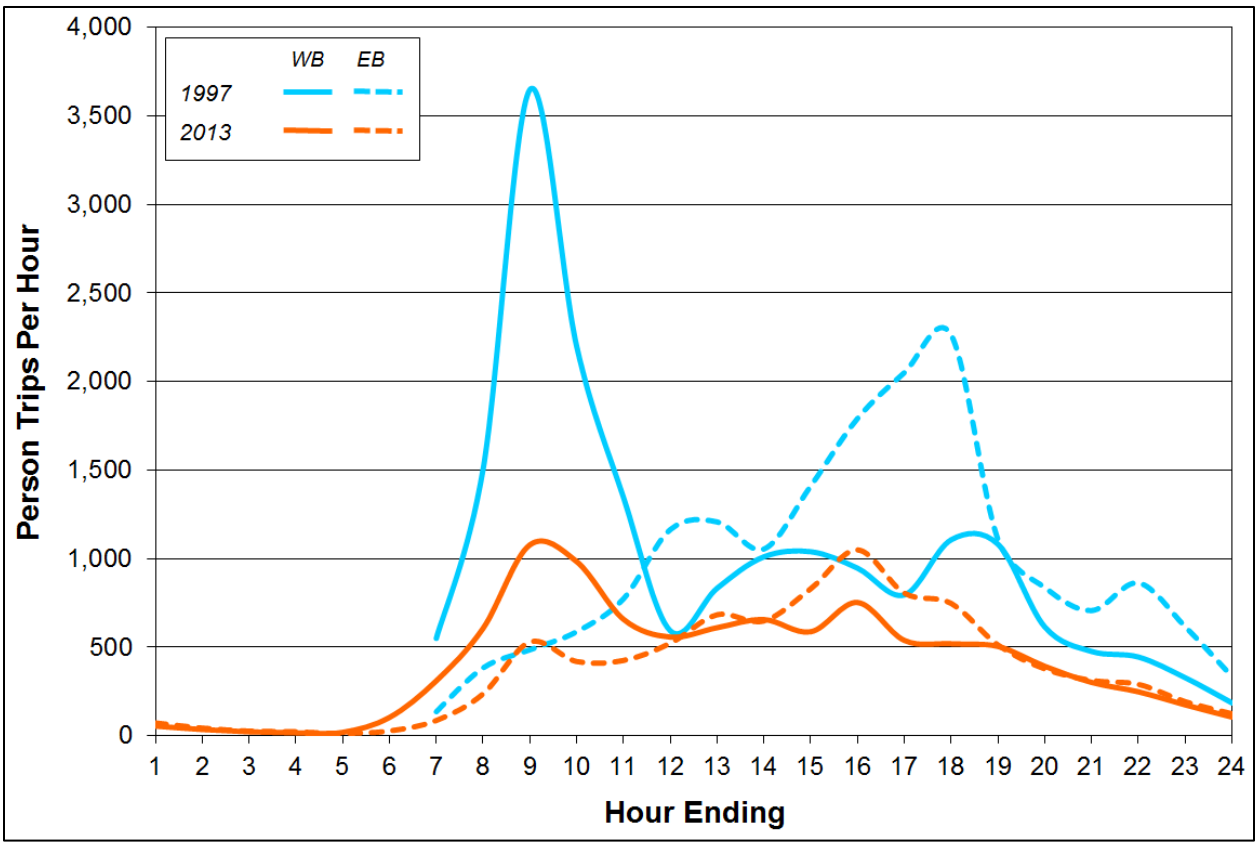


Figure 3.7 illustrates the arrival and departure patterns of HOV trips to and from UBC throughout the day, including a comparison with Fall 1997 HOV trips. As with SOV trips, the significant change with HOV trips is a decrease in peak period, peak direction trips — westbound in the morning and eastbound in the afternoon.

In response to declining carpool trips, UBC conducted a series of focus groups in 2002 with students, staff and faculty. The input from focus group participants clearly indicated that for current and former carpoolers, transit is a preferred mode of travel. Reasons why carpooling is not considered an attractive or practical mode of transportation for many people at UBC include:

- Variable work and school schedules are inconsistent with a fixed carpool schedule.
- Errands and commitments before and after work are not compatible with carpool trips.
- Unexpected work demands and emergencies that would mean missing a scheduled carpool trip.
- The time to pick up and drop off carpool partners adds significantly to commute times.
- Having to wait at work or school until the scheduled departure time, rather than being able to leave when ready.

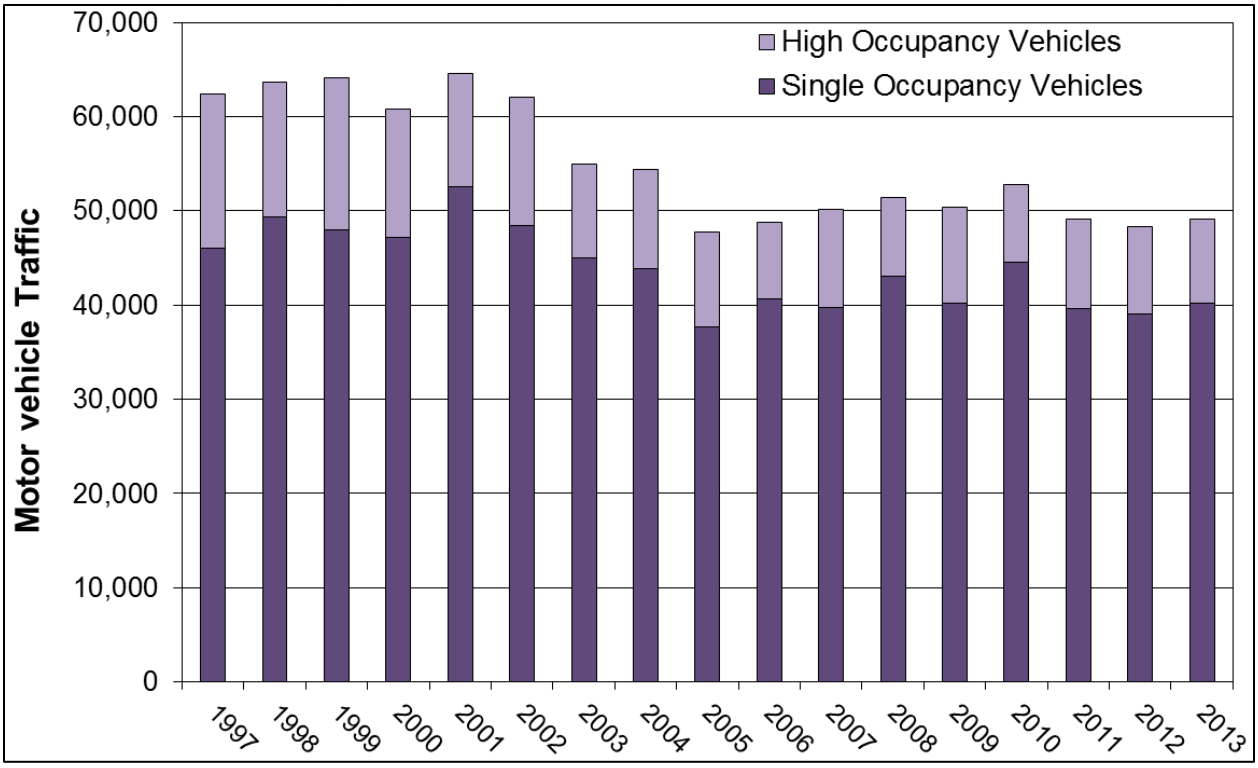
Figure 3.7: Distribution of Average Weekday HOV Trips to / from UBC, 1997 vs.2013



The Strategic Transportation Plan also includes a target for overall motor vehicle traffic. This target indicates that daily motor vehicle traffic will not exceed 1997 levels of 62,400 vehicles per day. Motor vehicles include all private vehicles — single occupant vehicles plus carpools and vanpools, but do not include buses, motorcycles and trucks.

In Fall 2013, daily motor vehicle traffic was 49,100 vehicles per day — 13,300 less than the 1997 level of 62,400 vehicles per day. ***Figure 3.8*** provides a summary of the trend in daily motor vehicle traffic volumes from 1997 to 2013.

Figure 3.8: Average Weekday Motor Vehicle Trips to / from UBC, 1997 – 2013



3.3. Bicycles and Pedestrians

Table 3.7 and ***Figure 3.9*** provide summaries of the trend in bicycle trips from Fall 1997 to Fall 2013. As shown, there was a significant decrease in trips by bike after the U-Pass program was introduced. However, there has been a steady increase in the number of bicycle trips, which are likely correlated with continued improvements to cycling infrastructure at UBC as well as in the City of Vancouver.

Table 3.7: Summary of Average Weekday Bicycle Trips to / from UBC, 1997 vs. 2013

Average Weekday Bicycle Trips	Before U-Pass		After U-Pass		Change 1997-2013 (count / percentage)	
	Fall 1997	Fall 2002	Fall 2004	Fall 2013		
Person Trips	2,700	3,300	1,600	2,400	–300	–11%
Trips Per Person	0.06	0.07	0.03	0.04	–0.03	–41%
Bicycle Mode Share	2.5%	2.9%	1.3%	1.7%	–0.9	–34%

Figure 3.10 illustrates the arrival and departure patterns of bicycle trips to and from UBC throughout the day, for 2013 and 1997 bicycle trips.

Figure 3.9: Average Weekday Bicycle Trips to / from UBC, 1997 – 2013

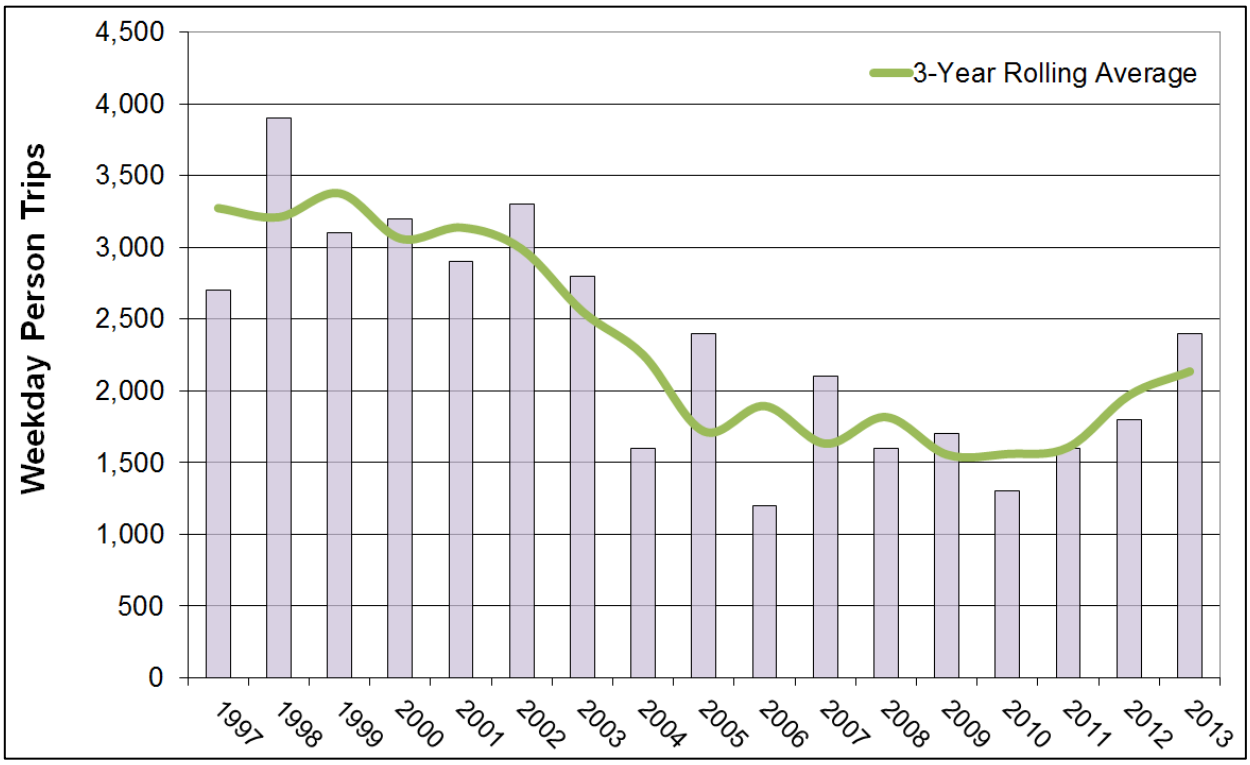
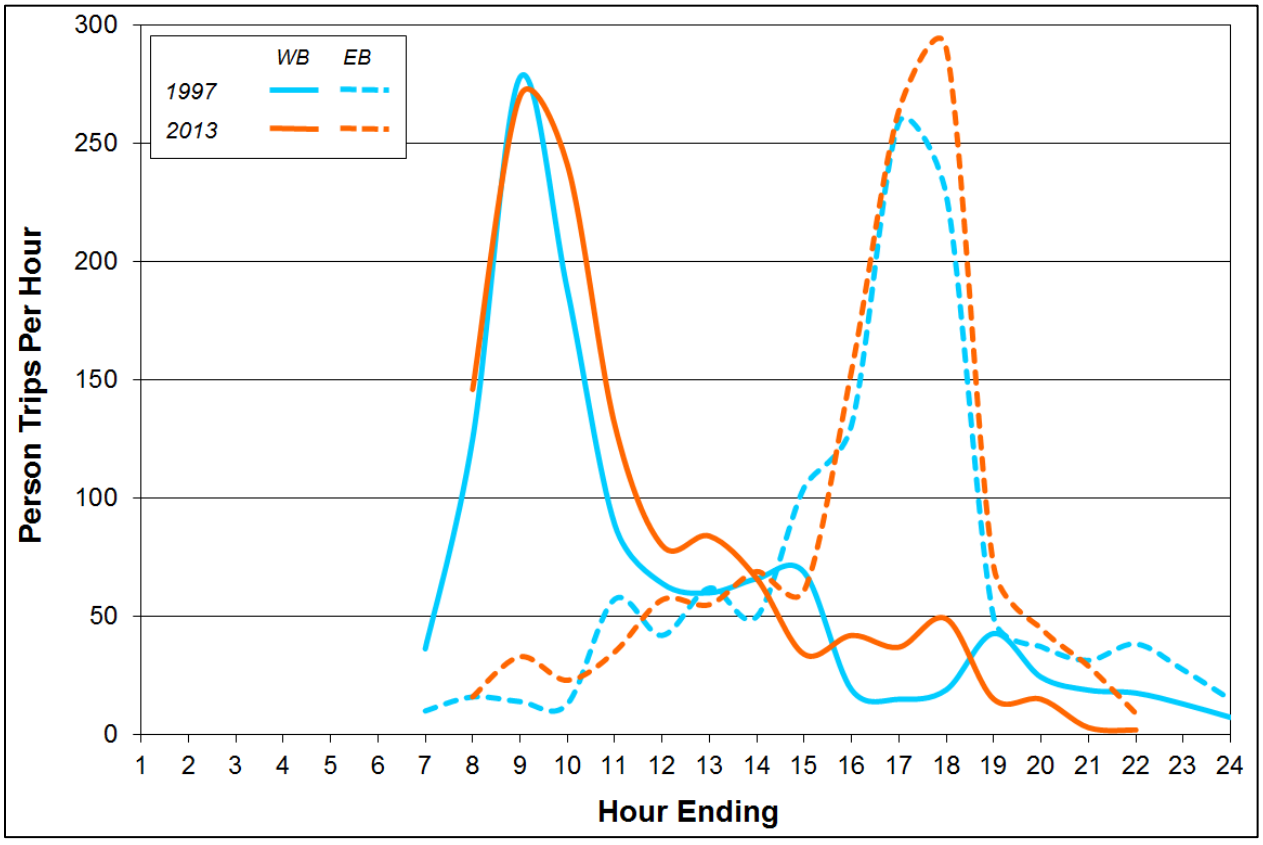


Figure 3.10: Distribution of Average Weekday Bicycle Trips to / from UBC, 1997 vs.2013



The main difference in bicycle trips throughout the day is an increase in eastbound trips during the PM peak period, possibly a result of multi modal trips composed of transit trips to campus in the morning and bicycling trips from campus in the afternoon and evening.

All buses operating on transit routes serving UBC are equipped with bicycle racks, each of which has space for two bicycles. In 2013, total of 234 bicycles were observed on buses in one day out of an available 4,214 racks on buses. This is an increase from 2012 when there were 201 bicycles counted and a capacity of 4,162. The most popular route for cyclists to travel with their bicycles was the 99 B-Line, followed by the 84 and 44 routes.

Table 3.8 provides a summary of the trend in pedestrian trips from Fall 1997 to Fall 2013, and ***Figure 3.11*** illustrates year-by-year changes. Similar to bicycle trips, pedestrian trips decreased significantly after U-Pass was introduced, but in general have been following an increasing trend since.

Table 3.8: Summary of Average Weekday Pedestrian Trips to / from UBC, 1997 vs. 2013

Average Weekday Pedestrian Trips	Before U-Pass		After U-Pass		Change 1997-2013 (count / percentage)	
	Fall 1997	Fall 2002	Fall 2004	Fall 2013		
Person Trips	1,400	1,600	600	1,000	–400	–29%
Trips Per Person	0.03	0.03	0.01	0.01	–0.02	–57%
Pedestrian Mode Share	1.3%	1.4%	0.5%	0.8%	–0.5	–38%

Figure 3.11: Average Weekday Pedestrian Trips to / from UBC, 1997 – 2013

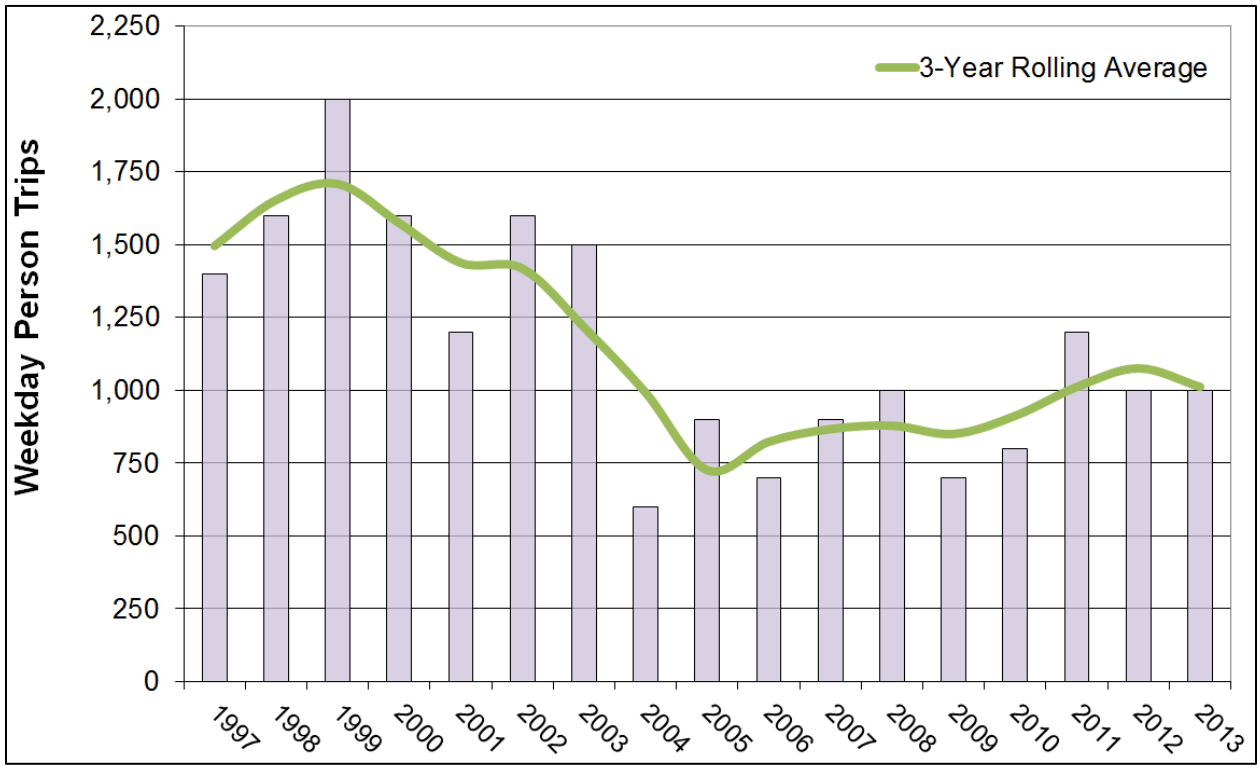
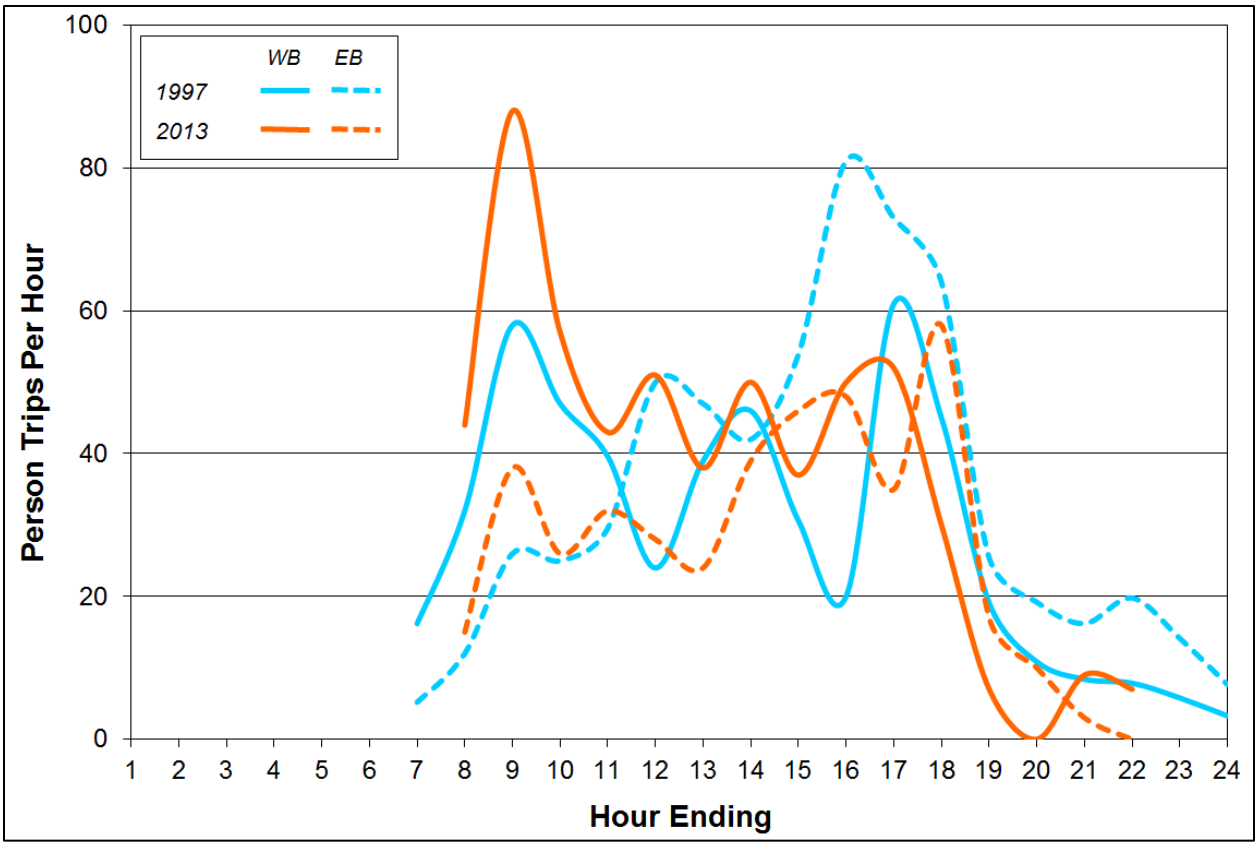


Figure 3.12 illustrates the arrival and departure patterns of pedestrian trips to and from UBC throughout the day, including a comparison with Fall 1997 pedestrian trips. There is an increase in trips to UBC in the morning peak hour compared to 1997, but otherwise there are fewer pedestrian trips throughout the day.

Figure 3.12: Distribution of Average Weekday Pedestrian Trips to / from UBC, 1997 vs.2013



3.4. Heavy Trucks

Construction activity at UBC and the day-to-day operations of the university generate truck traffic. The City of Vancouver — through which all trucks must travel to reach UBC — manages heavy truck traffic through a number of bylaws and regulations, which apply to all trucks with a gross vehicle weight (GVW) of more than 10,000 kg. Trucks with three or more axles exceed the 10,000 kg specified in the City of Vancouver's bylaws, and consequently for the purposes of monitoring travel patterns to and from UBC, heavy trucks are defined as vehicles with three or more axles. This simpler definition makes it easier to monitor heavy truck traffic, as it is only necessary to count the number of axles on a truck to determine whether it is a "heavy truck."

Counts of heavy truck traffic were undertaken on a quarterly basis during 2013; in March, June, September and December, which are summarized in ***Table 3.9. Figure 3.13*** illustrates numbers of trucks observed in each of the four quarterly counts.

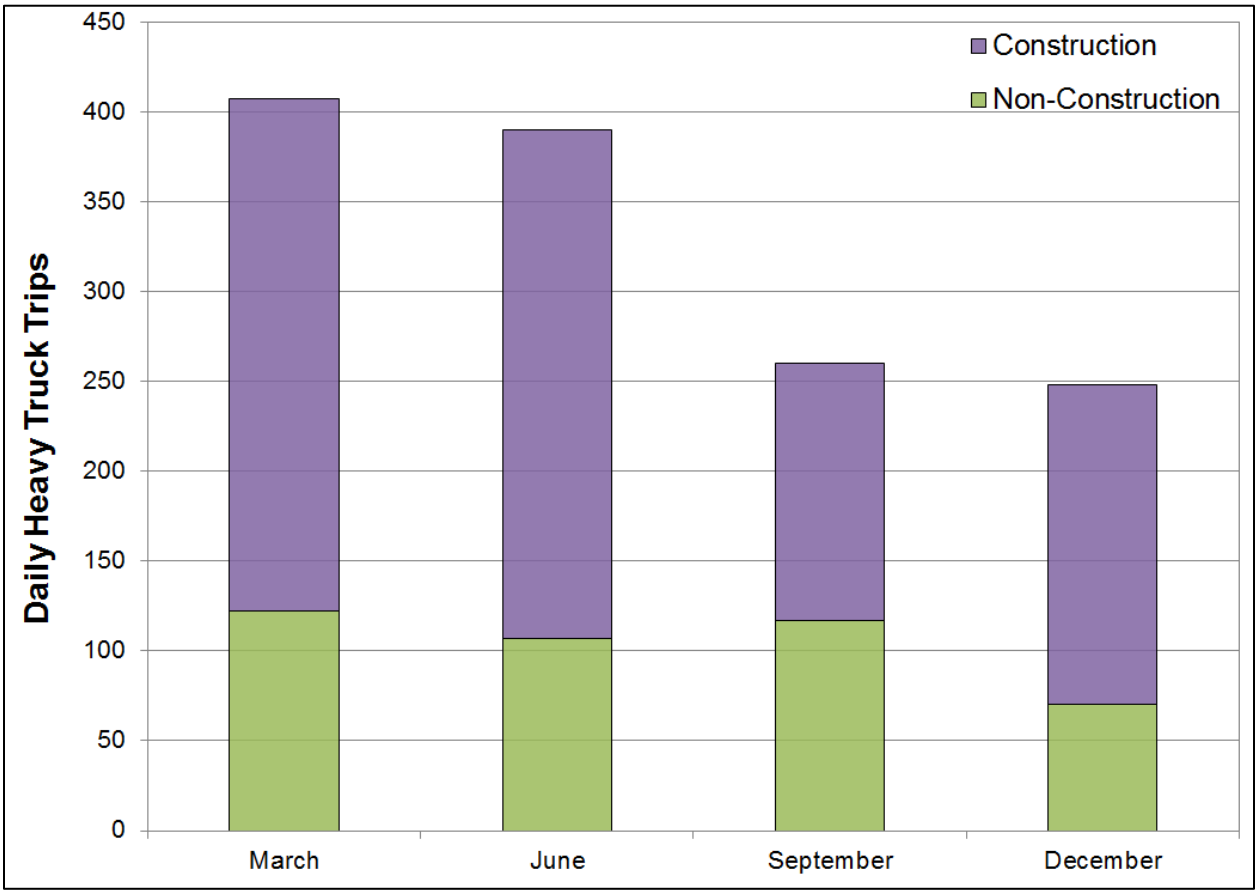
Table 3.9: Average Weekday Heavy Truck Trips to / from UBC, 2013

Route	Type of Truck		Totals
	Construction	Non-Construction	
Chancellor Boulevard	19.3 (9%)	10.7 (10%)	30.0 (9%)
University Boulevard	11.0 (5%)	21.5 (21%)	32.5 (10%)
16th Avenue	20.5 (9%)	16.8 (16%)	37.3 (11%)
SW Marine Drive and 41st Avenue	171.5 (77%)	55.0 (53%)	226.5 (69%)
Totals	**222.3**	**104.0**	**326.3**

As shown in the table, an average of 326 heavy truck trips per day were counted to / from UBC. This is a decrease from 472 counted in 2012. Of the 326 trips, 222 (68%) of them were construction related trips.

Of the four routes to / from UBC, SW Marine Drive carries 77% of construction related trips. The remaining trips are closely distributed to the other three routes.

Figure 3.13: Heavy Truck Trips to / from UBC, 2013



4. Traffic Conditions At UBC

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

4.1. Traffic Speeds

Traffic speeds were recorded over one week on campus using pneumatic tubes. The locations are identified in ***Figure 1.1***.

The 85th percentile speed is typically used for the purposes of representing travel speeds and represents the speed below which 85% of the traffic travels. The average 85th percentile speed data from 2008 to 2013 is summarized in ***Tables 4.1 and 4.2*** for eastbound / northbound traffic and westbound / southbound traffic, respectively.

Table 4.1: Average 85th Percentile Traffic Speeds (km/h) Eastbound / Northbound, 2008 – 2013

Location		Eastbound / Northbound					
		Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013
1	Wesbrook Mall s/o Gage	62.0	–	59.2	–	59.0	–
2	East Mall n/o Agronomy	–	40.6	–	37.8	–	–
3	Wesbrook Mall s/o University	59.2	–	53.6	–	55.5	47.1
4	Acadia Rd s/o Toronto	–	46.8	–	46.5	–	–
5	Thunderbird Blvd w/o	51.1	45.0	46.1	48.1	48.3	47.1
6	West Mall s/o Thunderbird	30.2	37.6	38.8	35.9	37.7	–
7	East Mall s/o Thunderbird	66.2	53.7	58.1	58.0	58.3	66.0
8	Wesbrook Mall n/of 16th Ave	58.8	57.0	56.8	57.7	50.9	49.0
9	Wesbrook Mall s/o 16th Ave.	–	–	36.0	36.0	36.7	37.5
10	Stadium Rd at Main Mall	–	–	–	–	37.2	–
11	16th Ave w/o East Mall	–	–	–	–	–	78.3
12	16th Ave w/o Wesbrook Mall	–	–	–	–	–	68.6
13	16th Ave e/o Wesbrook Mall	–	–	–	–	–	74.8
14	Chancellor e/o Western Pkwy	–	–	–	–	–	56.3
15	University e/o Toronto Rd	–	–	–	–	–	77.5

Table 4.2: Average 85th Percentile Traffic Speeds (km/h) Westbound / Southbound, 2008 – 2013

Location		Westbound / Southbound					
		Fall 2008	Fall 2009	Fall 2010	Fall 2011	Fall 2012	Fall 2013
1	Wesbrook Mall s/o Gage	57.2	–	54.2	–	54.3	–
2	East Mall n/o Agronomy	–	39.4	–	37.9	–	–
3	Wesbrook Mall s/o University	56.8	–	51.5	–	57.9	44.2
4	Acadia Rd s/o Toronto	–	43.5	–	44.5	–	–
5	Thunderbird Blvd w/o	48.3	38.8	44.1	54.1	46.7	44.2
6	West Mall s/o Thunderbird	37.4	38.5	38.0	41.0	38.5	–
7	East Mall s/o Thunderbird	67.6	59.5	58.9	65.1	65.6	56.6
8	Wesbrook Mall n/of 16th Ave	62.4	58.6	58.2	58.5	55.7	55.5
9	Wesbrook Mall s/o 16th Ave.	–	–	35.2	36.6	39.5	38.4
10	Stadium Rd at Main Mall	–	–	–	–	37.4	–
11	16th Ave w/o East Mall	–	–	–	–	–	72.6
12	16th Ave w/o Wesbrook Mall	–	–	–	–	–	60.1
13	16th Ave e/o Wesbrook Mall	–	–	–	–	–	73.9
14	Chancellor e/o Western Pkwy	–	–	–	–	–	71.2
15	University e/o Toronto Rd	–	–	–	–	–	58.7

Key observations regarding traffic speeds on campus include:

- Speed on East Mall exceeds the posted speed limit of 50km/h.
- Traffic speeds on BC Ministry of Transportation and Infrastructure roadways to and from campus exceed the posted speed limits (speed limits vary from 50km/h to 70km/h). This includes 16th Avenue, University Boulevard and Chancellor Boulevard.

These locations of excessive speeds will be shared with the RCMP to inform their speed enforcement program. In addition, the excessive speeds on Ministry roadways will be brought forward to the Ministry for consideration of reducing the speed limit to 50km/h.

4.2. Traffic Volumes

Peak hour traffic volumes collected over one day at key intersections on campus are illustrated in ***Figures 4.1 and 4.2***. The turning volumes are not intended to represent average daily traffic volumes or conditions, but provide a general overview of traffic patterns to / from and on campus during the AM and PM peak hours.

Figure 4.1: Morning Peak Hour Traffic Volumes at UBC, 2013

Figure 4.2: Afternoon / Evening Peak Hour Traffic Volumes at UBC, 2013