TORONTO

STAFF REPORT
ACTION REQUIRED

Permitting Motorcycles and Scooters Access to HOV Lanes: Follow-up Report

Date:	March 25, 2008
To:	Public Works and Infrastructure Committee
From:	General Manager, Transportation Services
Wards:	All Wards
Reference Number:	p:\2008\ClusterB\tra\tim\pw08007tim

SUMMARY

The Public Works and Infrastructure Committee (PWIC) at its meeting of November 28, 2007, in considering a staff report titled "Permitting Motorcycles and Scooters Access to HOV Lanes" heard from a number of speakers and interested stakeholders on this matter. At a subsequent meeting, the PWIC requested the General Manager, Transportation Services, to meet with these speakers and interested stakeholders and report back on these discussions.

Accordingly, a meeting was held on February 20, 2008 with these speakers to discuss the issues of motorcycle and scooter emissions and the safety of their operations in high occupancy vehicle (HOV) lanes. While it is recognized that motorcycles emit fewer greenhouse gases (GHG) that impact global climate change, they also emit more contaminants that have an immediate impact on local air quality, relative to automobiles and light trucks. As it relates to operating in HOV lanes, it is worth noting that on a per-person basis, the single-rider motorcycle loses its advantage with respect to GHG emissions when compared to automobiles or light trucks with three or more occupants. While an analysis of motor vehicle collisions does not suggest a concern for motorcyclists operating in any lane within an HOV corridor, the attendees, nevertheless, did express a strong preference to operating in the HOV lane located next to the curb for increased safety.

RECOMMENDATIONS

The General Manager, Transportation Services recommends that:

1. Plated motorcycles and scooters be permitted to use City of Toronto controlled High Occupancy Vehicle (HOV) Lanes.

2. City Council issue an advisory to other jurisdictions in Ontario respecting this change in the use of High Occupancy Vehicle Lanes in the City of Toronto.

3. HOV signs be altered during the normal maintenance schedule to ensure there is no additional cost to implement the policy to allow motorcycle and scooter use of HOV Lanes and, in the interim, the present signage be amended by the addition of stickers, until such time as the signage is replaced, and the cost of these stickers be funded from within the existing Transportation Services budget.

4. The Greater Toronto Transportation Authority (GTTA), in their review of HOV facilities throughout the Greater Toronto Area (GTA), as requested by City Council in considering the report, titled "Sustainable Transportation Initiatives: Short-Term Proposals", consider the use of HOV Lanes by motorcycles and scooters with one rider on a region-wide basis to ensure consistency and continuity.

5. That the Chief of Police be requested, through the Toronto Police Services Board, to conduct regular HOV Lane Enforcement.

FINANCIAL IMPACT

There are funds available within the Transportation Services Operating Budget.

The Deputy City Manager and Chief Financial Officer has reviewed this report and agrees with the financial impact information.

DECISION HISTORY

The Public Works and Infrastructure Committee on November 28, 2007, in considering a report dated November 9, 2007 from the General Manager, Transportation Services, recommended to Council that:

1. Plated motorcycles and scooters be permitted to use City of Toronto controlled High Occupancy Vehicle (HOV) Lanes.

2. City Council issue an advisory to other jurisdictions in Ontario respecting this change in the use of High Occupancy Vehicle Lanes in the City of Toronto.

3. HOV signs be altered during the normal maintenance schedule to ensure there is no additional cost to implement the policy to allow motorcycle and scooter use of HOV Lanes.

4. The Greater Toronto Transportation Authority (GTTA), in their review of HOV facilities throughout the Greater Toronto Area (GTA), as requested by City Council in considering the report, titled "Sustainable Transportation Initiatives: Short-Term Proposals", consider the use of HOV Lanes by motorcycles and scooters with one rider on a region-wide basis to ensure consistency and continuity.

The City Clerk, in a letter dated December 17, 2007, advised that City Council on December 11, 12 and 13, 2007, referred Item PW11.8 "Permitting Motorcycles and Scooters Access to High Occupancy Vehicle (HOV) Lanes (Ward: All)" back to the Public Works and Infrastructure Committee, with the following additional motions moved on this Item:

Moved by Councillor Moscoe:

That Recommendation 3 of the Public Works and Infrastructure Committee be amended by adding the words "and, in the interim, the present signage be amended by the addition of stickers, until such time as the signage is replaced, and the cost of these stickers be funded from within the existing Public Works and Infrastructure budget", so that Recommendation 3 now reads as follows:

"3. HOV signs be altered during the normal maintenance schedule to ensure there is no additional cost to implement the policy to allow motorcycle and scooter use of HOV Lanes and, in the interim, the present signage be amended by the addition of stickers, until such time as the signage is replaced, and the cost of these stickers be funded from within the existing Public Works and Infrastructure budget."

Moved by Councillor Thompson:

That the Chief of Police be requested, through the Toronto Police Services Board, to conduct regular HOV Lane Enforcement.

At its meeting of January 9, 2008, the Public Works and Infrastructure Committee, in considering the December 17, 2007 letter from the City Clerk, made the following decision:

> *"The Public Works and Infrastructure Committee referred the letter from the City Clerk to the General Manager, Transportation Services, with a request that he meet with the speakers who appeared at the November 28, 2007 meeting of the Committee, and other interested stakeholders, and report on this matter to the meeting of the Public Works and Infrastructure Committee to be held on April 9, 2008."*

COMMENTS

On February 20, 2008 Transportation Services staff hosted a meeting with the speakers and interested stakeholders who appeared before the November 28, 2007 meeting of the Public Works and Infrastructure Committee (PWIC) on this matter. The attendees included a representative from each of the Motorcyclist Confederation of Canada, The Motorcycle & Moped Industry Council, GTA Motorcycle, and The Canadian Vintage Motorcycle Group. Staff in attendance included representatives from Council Ootes' offices, the Toronto Environment Office and Transportation Services.

This meeting provided the opportunity for all attendees to share and discuss information pertaining to the operation of motorcycles and scooters in HOV lanes. The primary focus of the meeting was on the motorcycle and scooter emissions and air quality impacts, and safety, as outlined below.

Motorcycle Greenhouse Gas (GHG) and Air Quality Emissions

Motorcycles (as well as scooters) are among the most fuel efficient vehicles on the road, using fewer litres of fuel per kilometre than automobiles and light trucks. As shown in Table 1 below, motorcycles use about three-quarters of the fuel of a typical automobile and about two-fifths the fuel of light trucks. Also, because of the direct relationship between the amount of fossil fuel consumed and the weight of GHG emissions produced, motorcycles emit fewer GHGs per vehicle-kilometre travelled than either automobile or light trucks, in roughly the same proportions as fuel consumed. This fact that motorcycles emit fewer GHGs than either a typical automobile or light truck is consistent with statements on emissions made by some deputants at the November 28, 2007 meeting of the PWIC, which staff do not dispute.

Table 1

Fuel Efficiency and GHG Emissions of Vehicles		
Vehicle Type	**Fuel Efficiency[1] (L/100 vehicle-kilometres travelled))**	**GHGs or eCO_2 Emissions[2] (kilograms per 100 vehicle-kilometres travelled)**
Motorcycles	6.7	16.0
Passenger Cars (gas)	9.1	22.2
Light Trucks (incl SUVs)	16.7	41.6

Notes:

[1] ICF International, "Greenhouse Gases and Air Pollutants in the City of Toronto", June 2007 adopted by City Council in July, 2007 (Table 9: Assumed Disaggregation of Toronto Vehicle-Kilometres of Travel).

[2] eCO_2 is equivalent CO_2 (i.e. Carbon Dioxide) emissions comprised of the combination of CO_2, CH_4 (i.e. Methane) and N_2O (i.e. Nitrous Oxide) factored to account for their equivalent contributions to GHG production in the atmosphere. It is represented by the following formula: $\{eCO_2 = [CO_2 + (CH_4 \times 21) + (N_2O \times 310]\}$. Information and factors taken from Environment Canada "National Inventory Report, 1990-2004 - Greenhouse Gas Sources and Sinks in Canada" (Annex 13: Emission Factors), and IPCC Guidelines for National Greenhouse Gas Inventories – 2nd Assessment Report (1996).

While motorcycles have favourable GHG emission outputs (i.e., those emissions that impact global climate change), they are not as favourable when it comes to emissions contributing to local air quality contaminant concentrations (i.e., those concentrations that have a more immediate local air quality impact), when compared to other vehicles on the road. The November 9, 2007 staff report considered at the November 28, 2007 meeting of the PWIC identifying the negative impacts of motorcycle emissions relative to automobiles and light trucks was with respect to the impacts associated with the resultant air quality contaminant concentrations, not GHG emissions.

The principal contaminants that are referenced in the literature when air quality is discussed include NOx (oxides of nitrogen), PM_{10} (particulate matter less than 10 microns in diameter), VOC (volatile organic compounds), CO (carbon monoxide) and SO_2 (sulphur dioxide). Table 2 below shows the quantity of each of these five contaminants emitted, by vehicle type (motorcycle, passenger car and light truck) per vehicle-kilometre travelled. In particular, when compared to the average car motorcycles emit more NOx (75% more), PM_{10} (50% more), VOCs (465% more), CO (28% more) but less SO_2 (43% less). When compared to light trucks, motorcycles emit more NOx (53% more) and VOC (381% more), less PM_{10} (75% less) and SO_2 (56% less) and about the same CO.

Table 2

Air Quality Contaminant Emissions of Vehicles					
Vehicle Type	**Air Quality Contaminants[3] (grams per vehicle-kilometre travelled)**				
	NOx	**PM_{10}**	**VOC**	**CO**	**SO_2**
Motorcycles	0.880	0.024	2.660	10.610	0.004
Passenger Cars (gas)	0.502	0.016	0.471	8.287	0.007
Light Trucks (incl SUVs)	0.576	0.080	0.553	10.674	0.009

Note:

[3] ICF International, "Greenhouse Gases and Air Pollutants in the City of Toronto", June 2007 adopted by City Council in July, 2007 (Table 4: Emission factors for Vehicles)

In Toronto, emissions of NOx and PM_{10} are noted to be more significant problem, while CO and SO_2 are considered less significant. VOC, while contributing to the problem, have impacts that are not as clearly understood.

Principal among those reasons why motorcycle air quality pollutants are high relative to other typically larger and heavier vehicles on the road has to do with a number of factors. Given that there are so few motorcycles on the road relative to automobiles and light trucks, government regulators have long focused on that segment of the market which would have the greatest impact with respect to emissions. As a result, regulations for new motorcycles have lagged behind those of other vehicles. Another reason is that pollution control devices (i.e., catalytic converters) and associated electronics for motorcycles are not as sophisticated and substantial as those required for cars and light trucks. While the latest federal government emissions regulations are in effect for 2006 motorcycle model year and beyond, and while motorcycle manufacturers have responded with engine designs with emissions that meet and exceed these regulations, improvements have also been made to automobiles and light trucks.

As it relates to HOV lanes, it is worth noting that on a per-person basis the single-rider motorcycle loses its advantage with respect to GHG emissions when compared to automobiles or light trucks with three or more occupants.

Safety of Motorcycles Operating in HOV lanes

The issue of safety was not dealt with in the November 9, 2007 report on this matter, as this was not cited in the original motion as a concern. However, the deputants appearing before the November 28, 2007 meeting of PWIC did express some safety advantage for motorcyclists and scooter operators using the HOV lane and staff do not refute these claims.

There have been eleven reported collisions involving motorcycles in Toronto's HOV corridors during the peak rush hours over a five year period (see Table 3 below). Of these eleven, ten involved other vehicles turning into the path of, sideswiping or bumping into the motorcycle while the remaining one, was the result of a motorcycle hitting the rear of a stopped vehicle. Considering that these eleven collisions in the HOV corridors were amongst more than thirteen hundred that occurred City-wide involving motorcycles during the same time period, there is nothing to suggest that motorcycles traveling in HOV corridors pose a particular problem or require specific consideration, nor would they be safer operating outside of HOV corridors.

Table 3

Analysis of Motor Vehicle Accidents (MVA) involving Motorcycles in HOV Corridors for the Years 2002-2006 during Peak Hours (7-10 am & 3-7 pm)

Corridor Location	Year					Total
	2002	2003	2004	2005	2006	
Allen Rd. / Dufferin St.	0	0	0	0	0	**0**
Don Mills Rd./ Overlea Blvd./Pape Ave.	0	2	1	1	0	**4**
Dundas St. W.	1	0	0	1	0	**2**
Eglinton Ave. E.	0	0	2	0	1	**3**
Yonge St.	0	1	0	0	1	**2**
Total	**1**	**3**	**3**	**2**	**2**	**11**

At the February 20, 2008 meeting, when the question was posed to those representing the motorcycle industry and riders as to which lane in the HOV corridor that most motorcyclists would be most comfortable operating, the answer was clearly the right-most curb lane. This included the peak periods when HOV lanes were in-effect and the operating speeds of the right-most lane were relatively higher than the adjacent lanes.

The reasons cited for this preference included motorcyclists recognized vulnerability given their relatively small footprint as compared to other vehicles on the road. It was felt that the HOV lane would provide increased visibility to other motorists traveling in the corridor and hence provide the motorcyclist or scooter rider an 'out', if required, by situating them next to the curb and allowing them not to be 'caught' in the middle lanes. Also, it is felt that by permitting the use of the right-most lane by motorcycles and scooters promoted a consistency of travel amongst various users within these corridors with the expectation that these two-wheeled riders generally operate in the curb lane. In effect this would appear to be a benefit for all-users with respect to safety.

CONTACT

Nazzareno A. Capano, P. Eng.
Manager,
Operational Planning and Policy
Tel: 416-392-7766
Fax: 416-392-4808
E-mail: ncapano@toronto.ca

Paul A. Sabo, P. Eng.
Senior Engineer,
Operational Planning and Policy
Tel: 416 - 392-7775
Fax: 416 - 392-4808
E-mail: psabo@toronto.ca

SIGNATURE

_____

Gary Welsh, P. Eng.
General Manager, Transportation Services

PAS/cs