

TORONTO TRANSIT COMMISSION REPORT NO.

MEETING DATE December 6, 2007

SUBJECT TTC ENVIRONMENTAL PLAN –
INITIATIVES AND IMPLEMENTATION

RECOMMENDATION

It is recommended that the Commission:

- a) endorse the environmental initiatives and implementation strategy outlined in the report, noting that the TTC:
- provides an alternative to car travel in the City of Toronto replacing on average more than 1 million vehicle-trips daily;
 - is implementing the *Ridership Growth Strategy* which is a longer-term initiative of improving quality-of-service standards to encourage greater transit use in the City in support of the City's Official Plan;
 - has developed the *Toronto Transit City - Light Rail Plan*, to expand its service across all parts of the City which will contribute significantly to achieving the City of Toronto's climate change and air quality targets;
 - currently operates 150 diesel/electric hybrid buses, with plans to operate up to 230 by year end, and with 334 being added to the fleet by 2008, which will result in one third of the fleet being hybrids, and with 45% of the fleet being hybrids by 2010;
 - uses B5 bio-diesel fuel for all buses and non-revenue vehicles when fuelled on property, which is the largest bio-diesel hybrid bus fleet in Canada;
 - has continuously improved its solid waste diversion rate from 18% in 2000 to 73% in 2006 and plans to achieve an 80% diversion rate by 2010;
 - has reduced the use of hazardous materials by 55%;
 - has Pilot Projects for both a Green Roof and a Cool Roof which were approved by the Commission in June 2007; and
 - is purchasing, and intends to purchase, new subway and streetcar vehicles that include developments specifically targeted at improving energy efficiency, reducing hazardous

materials and identifying end-of-life recycling plans.

- b) direct staff to prepare a Green Fleet Plan in 2008 consistent with the City of Toronto's Green Fleet Plan;
- c) direct staff to work with Toronto Hydro Energy Services Inc. to study and implement the use of alternative energy sources, and further electrical energy conservation, efficiency and demand management strategies through Capital and Operating projects;
- d) direct staff to continue the Lighting Replacement Program in order to achieve further efficiencies and to continue the study of Light-Emitting Diode (LED) technology for possible use by the TTC;
- e) direct staff to purchase 25% of its electricity from renewable or sustainable sources by 2012, subject to approval of the funds required;
- f) direct staff to continue reducing the use of hazardous materials and report in 2008 on the plan to achieve further reductions;
- g) direct staff to continue reducing the amount of solid waste produced and to report in 2008 on the plan to manage organic waste using green bins and to achieve an 80% diversion rate by 2010;
- h) direct staff to submit a Green Procurement Policy for approval in 2008 in order to make environmental improvements to purchasing practices;
- i) direct staff to use Pilot Projects to study and establish the design standards required for the Toronto Green Development Standard, and to submit a report on the Pilot Projects necessary to implement the Toronto Green Development Standard in 2008; and
- j) approve funds in the amount of \$200,000 in the 2008 Operating Budget for a study to establish the TTC's baseline measures and key environmental priorities in order to meet Toronto City Council's established targets for greenhouse gas emissions and smog causing pollutants.

FUNDING

This report requests approval of funds in the amount of \$200,000 be included in the 2008 TTC Operating Budget. There is no funding identified for environmental initiatives in the 2008 - 2012 Capital Program; however, projects including: Energy Conservation, Efficiency and Demand Management; Green Standards; and Green Roofs have been included below-the-line. Additional funding for environmental initiatives will be identified and approvals will be sought on a case by case basis.

BACKGROUND

The City of Toronto has approved important environmental initiatives including the *Climate Change, Clean Air and Sustainable Energy Action Plan* which aim to significantly reduce the release of greenhouse gases to the atmosphere and make substantive improvements to local air quality. In addition, the City has a number of environmental initiatives which include the development of a Sustainable Transportation Implementation Strategy and a 70% Solid Waste Diversion Plan. On July 16-19, 2007, City Council adopted reduction targets for greenhouse gas emissions, from the 1990 levels, of 6% by 2012, 30% by 2020 and 80% by 2050. The City also has adopted a 20% reduction target for locally generated smog causing pollutants from 2004 levels for the Toronto urban area. Achieving these targets will contribute to the City's ability to meet climate change and air quality objectives.

The Commission has made numerous requests to staff to report on the status of the TTC's environmental initiatives, including future plans for improved environmental performance. This report responds to those requests.

DISCUSSION

The TTC is proud of its environmental record and strives for continual improvement through cost-effective innovation and self-assessment. The TTC's green initiatives include, but are not limited to: petroleum conservation; the use of alternative fuels and renewable energy; energy efficiency; hazardous materials reduction; environmentally responsible procurement; pollution prevention, waste reduction and recycling; and building and facility performance. The TTC requires that its employees devote their best efforts and attention to managing environmental resources for the benefit and enjoyment of both current and future generations. The TTC has a Corporate Environmental Policy in which it commits to reduce the environmental impact from its facility and vehicle operations and commits to comply with all legal and applicable requirements. This policy requires the development and implementation of an Environmental Management System (EMS) consistent with ISO 14001.

In order to ensure further environmental progress, it is recommended that a \$200,000 study be undertaken to establish the TTC's baseline use of products that emit greenhouse gases and smog causing pollutants. This baseline will establish, where feasible, the amount of diesel fuel, gasoline, natural gas and electricity consumed by the TTC in 1990, 2004 and 2006. Once these amounts have been identified, the proposed study will recommend goals, measurement systems and next steps with the aim of reducing greenhouse gas emissions and smog causing pollutants without a reduction in transit service. In addition, once the baselines and goals have been established, a reporting process will be proposed. A similar quality management system was used successfully by the TTC to reduce the amount of solid waste sent to landfill, and this measurement based approach is the appropriate next step to address the City's air quality targets.

TTC staff will continue to participate with the City's Environmental Committees and Work Groups, as requested, and is actively participating on the following:

- Executive Environment Team
- Steering Committee: Cost Benefit Analysis of Green Development Standard
- Renewable Energy Action Plan Working Group
- City Power Purchase Working Group
- Executive Fleet Management Co-ordination Committee
- City Waste Diversion Team
- City Corporate Smog Team

At present, TTC environmental initiatives are woven into its day-to-day operations as follows:

Provision of Transit Services

The provision of effective transit services in the City of Toronto is fundamental to achieving the City's air quality and emissions targets. Many studies and initiatives intended to address the growing crisis of global warming and climate change world-wide have identified the need for increased use of public transit, instead of private vehicles, as one of the most practical, achievable, and effective means of reducing harmful emissions and greenhouse gases resulting from transportation in big cities. A recent study on the sources of greenhouse gases and air pollutants in the City of Toronto indicates that close to 40% of greenhouse gas emissions originate from the transportation sector. The vast majority of these emissions are from cars and trucks. Encouraging residents to choose alternatives to the automobile for as many trips as possible must be a vital part of any action plan to reduce harmful emissions and address climate change.

The City of Toronto's Official Plan is strongly supportive of increased transit use as population and employment is expected to grow 20% to 30% over the next 25 years with no additional road capacity being constructed. Non-auto travel modes will be encouraged with a particular emphasis on increased transit use. In response to the City's Official Plan, the TTC established a long-term *Ridership Growth Strategy* in 2003 to progressively improve quality-of-service standards. Major improvements in off peak services on major routes have been implemented along with a range of fare strategies. Initiatives to improve peak period services and expanded hours of operation on smaller routes are included in the TTC's 2008 Operating Budget. Residents of Toronto have responded to growing environmental concerns and transit improvement initiatives by increasingly turning to transit for their travel needs. Between 2004 and 2006, ridership on the TTC grew by 27 million riders, from 418 million per year to 445 million per year, and ridership is continuing to increase at a steady rate.

In March 2007, national concern over worsening traffic congestion and environmental damage culminated in the Government of Canada announcing its intention to provide significant federal funding in support of public transit including an extension of the TTC's University-Spadina subway eight kilometres north, providing improved transit connections between York Region and Toronto. This is one of a range of federally-funded

transit-improvement initiatives in the Greater Toronto Area (GTA) that will serve to strengthen the long-established co-ordinated inter-regional transit services within the GTA.

Provincially, on June 15, 2007, the Premier of Ontario announced the *MoveOntario 2020* vision to fund the construction of a number of rapid transit projects in the GTA including the City of Toronto's *Toronto Transit City - Light Rail Plan* network with an estimated cost of \$8.3B over the next 12 years. The City of Toronto has a goal of being a world leader in combating climate change and global warming. The establishment of a network of fast, reliable, electric light-rail transport lines, to attract people out of their cars and onto environmentally-friendly public transport, is fundamental to this goal of improving the livability and environmental sustainability of the City.

The Service Planning Department continuously reviews passenger loads and adjusts service to optimize the allocation of service resources to encourage greater transit use. On average, one bus replaces 50 cars, one Light Rail Transit (LRT) vehicle replaces 70 cars, one Articulated LRT vehicle replaces 100 cars, one 4-car Scarborough Rapid Transit train replaces 200 cars and one subway train replaces 900 cars at peak times on most routes in the TTC system.

The foremost environmental success of the TTC is the transit service it provides. Ridership increased in 2006 by 3% and continuing increases are forecast. In 2007, the TTC carries approximately 1.5 million passengers each weekday which is more than 1 million vehicle-trips off the road daily resulting in significantly less air pollution and traffic congestion.

The TTC's network of transportation systems is well integrated into the City's planning objectives which further promotes and sustains transit-oriented development and transit use. TTC staff also supports and encourages the use of other non-auto travel modes in the City through initiatives such as the installation of bike racks on buses, bicycle storage lockers at subway stations and is working with City staff and the community on the establishment of a network of bicycle routes throughout the City. By 2010, all TTC buses will have bike racks installed.

Diesel and Gasoline Fuels – Efficiency of Use and Conservation

Bus Fleet:

TTC has taken major steps in recent years to procure large quantities of new buses with the best available technology to address environmental concerns. In 2006, 150 diesel-hybrid buses were delivered. Further commitments were made by the Commission to procure 224 diesel-hybrids in 2007, and 190 in 2008. At the time of writing, bids are being processed for another 210 diesel-hybrid buses, or an equivalent number of articulated-hybrid buses, with delivery required in 2009 and 2010. By 2008, one third of the bus fleet will be hybrids, with 40% of the fleet being hybrids in 2009 and 45% in 2010. Diesel-hybrid buses, in combination with the use of ultra low sulphur fuel and bio-diesel, allow for both a reduction in fuel usage by 20% to 30% compared to standard diesel buses and a significant reduction in the pollutants contained in diesel exhaust. The recent addition of diesel particulate traps to the last 100 standard diesel buses purchased by TTC in 2006, and the 414 diesel-hybrid

buses scheduled for delivery in 2007 and 2008 will reduce the emission of diesel particulate matter by up to 99%, as compared to older diesel engines, without traps.

To further reduce fuel usage and related exhaust emissions, consideration will be given to increasing the set temperatures in vehicles to reduce air conditioning compressor operating periods, resulting in lower power demands on the diesel engines.

Staff expect that the purchase of diesel-hybrid buses will continue into the future, assuming adequate funding will be available to cover the hybrid premium, until a more effective service-proven technology emerges. The rapid retirement of old buses with antiquated engines will make a large contribution to reducing the hydrocarbon based pollutants in the City's urban environment.

Bio-Diesel Fuel:

The Commission currently uses a B5 bio-diesel blend for all of its buses consisting of 95% ultra low sulphur diesel and 5% renewable bio-fuel (based on 100% soya bean oil). This has been in use in the entire conventional system and Wheel-Trans bus fleets since September 2006. Bio-diesel also is used to operate miscellaneous equipment and the Commission's Non-Revenue vehicles, when fuelled on TTC property.

Non-Revenue Vehicles:

The TTC has implemented actions for its Non-Revenue Fleet that are consistent with the City's Green Fleet Transition Plan. In 2008, a Green Fleet Plan will be developed that is consistent with that of the City.

The means of addressing environmental issues related to the operation of cars and trucks used by the TTC in the Non-Revenue Fleet are limited by the technology available for purchase. In addition to the use of bio-diesel fuel, a conscious effort has been made to utilize gasoline engines, instead of diesels, where possible, to mitigate the impact of exhaust emissions on the environment. To further support efforts to reduce exhaust emissions and fuel use, four hybrid sedans are being purchased, and a request for quotes has been released for the purchase of an additional four.

As driving techniques have an impact on exhaust emissions and fuel usage, recommendations were issued to vehicle operators to encourage a reduction in idle and engine warm-up time, as well as smooth use of engine power. All diesel powered vehicle purchases in 2007, and beyond, will include diesel particulate filters on the exhaust system to reduce particulate matter, unburned hydrocarbons and oxides of nitrogen, all of which contribute to ground-borne ozone, and smog. To further reduce the use of fuel, consideration is being given to increasing tire pressures slightly to reduce vehicle rolling resistance and to improve fuel economy.

In 2010, further reductions in exhaust emissions are anticipated with the introduction of new regulations for diesel engines. The cost for this new technology is not known at this time.

Electricity – Efficiency of Use and Conservation

Existing Subway Fleet:

Ninety-four percent of subway vehicles within the existing fleet have regenerative braking that delivers electrical power back into the third rail, which can be used by nearby trains for acceleration. By 2010, the entire subway fleet will have regenerative braking.

New Subway Train – The Toronto Rocket:

In the design of the new subway train, called the Toronto Rocket, many features have been incorporated in order to conserve electricity use. Automatic train operation has been provided for in the design, and when utilized, will save an estimated 8-10% of traction power electricity use.

An improved propulsion controller has been specified which performs the same duties as the current design, but with four fewer traction motors per train, which will result in a significant weight reduction and energy savings for the vehicle. The upgraded propulsion system is approximately 50% lighter than the traditional oil-cooled version, and is 55% more energy efficient. In addition, parallel drive gear which has a higher efficiency rate than the existing right-angle design will be utilized to improve the levels of regeneration during braking.

The Heating Ventilating and Air Conditioning (HVAC) system for the vehicles will be aluminium and designed to optimize the function without significant weight increase. The refrigerant to be used in the HVAC system is R407C which is recognized as being environmentally acceptable.

New Streetcar Purchase - Low Floor Light Rail Vehicle:

On the Low Floor Light Rail Vehicle (LFLRV) project, stringent requirements and an aggressive plan for a more environmentally friendly vehicle design have been included in the vehicle procurement specification, including vehicle weight reduction, increased capacity, and energy efficiency.

An aggressive weight reduction plan includes changing the philosophy of a “tank-like” carbody structure to a crash energy management design, much like the design evolution in the automobile industry. This will contribute to a safer vehicle for the operator and the passengers, while reducing energy consumption. With increased capacity compared to existing LRT vehicles, the LFLRVs will deliver a reduction in energy use of approximately 20% per passenger at peak loads.

An optimal energy recovery scheme will take full advantage of the frequent stop spacings in city operation. This will be accomplished through advanced propulsion and braking control of an alternating current propulsion system to recover a higher amount of kinetic energy and convert it back to the power grid. This design will be more effective than the highly efficient direct current “chopper” control system currently used. Today all streetcar/LRT vehicles have a regenerative braking system.

It is intended that only two-thirds of the axles will be motored on Transit City vehicles. This will result in a significant reduction of energy consumption while maintaining the performance typically required of a right-of-way LRT operation in which station stops

are located farther apart than those on the existing streetcar network. Other measures to reduce energy consumption include LED exterior lighting, carbody insulation, coated glazing, and optimized HVAC equipment design.

Other Energy Management Measures:

Recent research has demonstrated that energy storage technology can be used to manage traction energy regenerated by electric vehicles. Staff will explore this state-of-the-art technology and how the TTC might benefit from it, including opportunities for wayside energy storage.

Facility Energy Audits:

The TTC has awarded a contract to Toronto Hydro Energy Services Inc. (THESI) to develop a detailed energy management action plan for its facilities. A kick-off meeting with THESI representatives has taken place. The scope of work includes detailed facility audits of six selected locations and identification of other potential energy conservation, efficiency and demand management opportunities. The corresponding THESI report will be available by the end of this year or early next year. More THESI preliminary energy assessments in six additional TTC facilities will be carried out by the end of this year.

Staff will continue to work with THESI to identify other energy conservation and efficiency opportunities such as HVAC upgrades, lighting retrofits, and motor replacements, as part of the detailed facility audits. Staff has submitted requests for dedicated energy conservation, efficiency and demand management funding in the 2008 TTC Operating Budget (under Energy Audits, Conservation/Efficiency) and Capital Program under other recommended projects, pending further approval.

Demand Management Studies:

Staff will work with THESI staff to carry out a feasibility study and a cost/benefit analysis on demand management measures that are applicable to the TTC. Any identified work will be part of the City Demand Response Program. Potential opportunities to be investigated include existing emergency generator gas conversion, building automation and controls, Peak Saver, and power factor correction capacitors. Any recommendations will be put forward as part of future capital project submissions.

Lighting Replacement Program:

Energy efficient fluorescent lamps will continue to be installed in new and existing locations as part of Capital and on-going maintenance Programs. Prototype LED lamps have been installed in various subway Emergency Alarm Stations to replace incandescent light bulbs. This pilot project enables staff to evaluate any safety and operating issues that may arise prior to a Commission wide installation. Staff will continue to study the LED industry to determine if any emerging LED technology can be utilized by the TTC.

Renewable Energy:

The TTC has installed 40W solar panels to supply electricity to 18 remote Communication Information System (CIS) microwave transmitters. Solar panels are now the standard for future and relocated CIS transmitters.

Staff has met with a major solar panel manufacturer to explore its potential to supply electrical power to TTC facilities. Due to the current payback period of well over 10 years, it is concluded that it is not practical to install solar panels at the present time to supply electricity to large electrical loads. Staff will continue to work with THESI to study and implement the use of alternative energy sources when they are financially and technically justified.

Green Electricity:

Staff was requested to report to the Commission on the opportunities to purchase up to 25% of its energy from green sources. Staff reviewed three options to achieve this goal; green sourced electricity included in the current and future provincial supply mix, opportunities to reduce the use of electricity, and the premium cost to purchase green sourced electricity. The TTC has an annual power cost of approximately \$45 Million.

The Province's electricity supply mix currently includes about 3% green power and through various initiatives, that amount is to be increased to approximately 5% by the end of 2007 and to 10% by 2010. As a result of these planned increases, the Commission will automatically increase its purchase of green power to 10% by 2010 at market rates, without a specific premium for green power.

Regarding opportunities to reduce either the demand or shift the demand to off peak hours when prices may be lower, the Commission has limited opportunities. Approximately 75% of the Commission's electricity usage is for traction power and peak transit usage occurs in the morning and afternoon rush hours during the peak electricity supply hours. As a result, it is not possible to shift traction power demand to off peak electricity hours.

Due to planned expansion of the transit system, it is not expected that overall consumption of electricity by the Commission will reduce in the long term. In order to achieve the 25% goal for green power, the Commission would need to purchase up to 15% of its electricity from green sources. The additional cost to purchase green electricity currently ranges from \$0.025 to \$0.04 per kilo-watt-hour (kWh), although the price of green power is expected to drop in the longer term with greater availability and improvements in technology.

Currently the premium to purchase 15% of the Commission's electricity usage from green sources would range between \$1.6M and \$2.6M annually, based on 436 million kWh of electricity use. There is currently a limited supply of green sourced electricity and as a result, the purchase of green power would need to be introduced gradually over several years as it becomes available. The TTC plans to purchase 25% green electricity by 2012. In future budget submissions, a premium for the incremental purchase of green power will be included, subject to funding availability.

Energy Conservation Staff Resource:

Interviews with potential candidates were conducted for the new staff position of Electrical Design Engineer - Energy Conservation. The successful candidate commenced work with the TTC in November 2007.

Natural Gas - Efficiency of Use and Conservation

Natural Gas Consumption Reduction Program:

The Plant Maintenance Department has reduced natural gas consumption at bus garages by approximately 9.5% or 125,000 m³ per year per location through the implementation of a temperature setback control program. Computerized Building Management Systems were installed at various facilities to enable remote monitoring and control of ventilation and heating equipment. Temperature settings for bus garage storage bays have been reviewed and reduced where the work environment allows. Typically, internal bus storage bay temperatures have been reset from 21° to 15° Celsius.

The temperature setback control program will be expanded to other facilities such as bus repair bays, overhaul and repair shops and subway carhouses beginning in 2008. Upon completion, this is anticipated to reduce annual natural gas consumption by an additional 5% to 7% per location.

Using the same Computerized Building Management Systems, large overhead doors at these facilities will be monitored as to their open / close position and reports will be issued. This reporting feature will allow facility supervisors to manage the door operation and ensure they remain closed to reduce energy consumption, when not required, during the heating season.

Pollution Prevention, Hazardous Materials Management, Waste Reduction and Recycling

Pollution Prevention:

Industrial and hazardous waste generation at facilities is closely monitored by the TTC. The Safety Department evaluates, classifies and registers waste streams to ensure proper disposal to appropriate licensed facilities. The TTC completes and retains manifests, pays required fees, ensures waste is handled by properly trained staff and continues to look for waste reduction opportunities and other improvements.

The TTC has implemented a Corporate Spills Response Program to minimize impacts to the environment during unexpected releases. It describes the roles and responsibilities of those involved, and the steps to be taken to minimize impacts to the natural environment. It also outlines the legal obligations that the TTC has to communicate with the appropriate authorities. In addition, regular training is conducted to promote corporate environmental awareness and to familiarize staff with the TTC's environmental programs and policies, such as spills response.

The TTC has made a commitment to phase out all underground storage tanks and now mandates above-ground storage tanks as part of TTC design standards. Advanced electronic monitoring and fuelling systems for these tanks are installed to further minimize potential impact on the environment.

The TTC is in the process of seeking Comprehensive Certificates of Approval (Air) for three of its largest facilities – Hillcrest Complex, Greenwood Complex and Wilson Complex in order to better manage compliance to Air Regulations. The future plan is to obtain these certificates for all applicable TTC facilities.

Noise and vibration can result from subway and streetcar operation; the source can vary from rail to wheel defects. A poor interface between the vehicle wheel and rail can result in noise or wheel squeal and vibration, which can be transmitted through the earth to adjacent structures. To counter wheel defects, the TTC has a 33 day inspection cycle. Where significant defects are identified, the wheels are turned on a wheel lathe to repair the defects prior to reintroduction into revenue service. An automatic wheel monitoring system has been recently prototyped and a new design of brake pad that removes small wheel defects is being tested. For rail installations, lubrication is employed to reduce the impact of audible noise. Specialized rail grinding is being used to recondition the rail surface when rail corrugation occurs and to improve the contact shape by re-profiling. Since the design of the Spadina Subway Extension, subway track has been installed using isolated concrete double ties which have measurably reduced the noise and vibration from subway operation on the newer lines. Also, recent streetcar track installations have incorporated a resilient boot around the rail to mitigate noise and vibration from streetcar operation.

Hazardous Materials Management:

A Hazardous Materials Management Program has been established to minimize the use of hazardous chemical products, to select the least hazardous products available for each specific use, and to establish controls ensuring compliance with legislation, corporate policies and standards. To date, 1,094 products have been reviewed and 599 phased out for a reduction of 55%. When procuring chemicals, the TTC will continue to assess health and safety, environmental impact and performance, in addition to cost in order to further reduce the use of hazardous materials.

Recycling and Disposal of Surplus Assets:

The TTC recycles a vast number of materials and has recycling contracts in place. The metals that are recycled include: rail, reinforcing steel, metal shavings, stainless steel, aluminium, copper, power cable, and brass. Scrap wood, sawdust, cardboard and paper are also recycled. The types of batteries recycled include: subway vehicle, streetcar vehicle, bus, non-revenue vehicle, and small scale disposable. Tires and lamps are also recycled. The toner cartridges recycled include those for printers, photocopiers, and facsimile machines. Solvents used for vehicle maintenance and cleaning are recycled, in addition to waste oil, grease, used oil filters, antifreeze and refrigerants.

Also, at the end of their useful life, revenue and non-revenue vehicles are sold to bidders either for scrap or for further use.

Solid Waste Diversion:

In 2006, the TTC diverted 73% of its solid waste from landfill and plans to divert 80% by 2010. This waste is generated by various operating departments and TTC customers.

This level of diversion has been achieved through waste management and recycling measures that have been implemented and progressively improved upon over the past five years.

Significant achievements include the redevelopment of the Hillcrest “Waste Transfer” facility in 2005, the conversion of waste receptacles to recycling centres in the subway system, and the implementation of a vehicle clean recycling program which includes source separation and capture of recyclable materials from revenue vehicles. The general waste and single stream recyclable material that is picked up from subway stations and various operating facilities by TTC packer trucks is transported to Turtle Island Recycling Corporation for segregation and disposal.

The Plant Maintenance Department’s initiatives have been strongly supported by a public awareness campaign promoting the use of station recycling containers using station announcements, text messaging on platform information boards and posters in subway vehicles. A “how to reduce, reuse and recycle at the TTC” brochure for TTC employees is under development, and duplex printing and copying is actively promoted to reduce paper consumption. The conversion of paper to on-line reporting systems is being pursued.

The Commission has significantly exceeded the City of Toronto’s waste diversion target of 60% for 2007. In order to achieve the 80% waste diversion target for 2010, a plan will be developed in 2008 which will include the management of organic waste. Other future waste management initiatives include: the creation of a “Green Team” to allow for localized promotion; the development and participation in various programs; the expansion of the no waste office program; paper towel recovery; electronics recycling programs; co-ordinated efforts with other departments to reduce excessive packaging for supplies; consolidation of waste disposal and recycling contracts; introduction of an organics recycling pilot program including the use of green bins; and a waste audit in 2008 to identify further opportunities for waste reduction and diversion.

Responsible Purchasing

In August 2007 as a result of a competitive procurement, the TTC retained the services of a consultant (Canadian Centre for Pollution Prevention) to facilitate the creation and implementation of a Green Procurement Policy, which will cover all aspects of environmentally responsible procurement.

The consultant has completed an analysis of the current activity level within the TTC related to environmentally responsible procurement and has identified the additional processes and initiatives that will need to be undertaken to achieve the goal. Based on the consultant’s preliminary schedule, the policy should be drafted for approval by the end of 2007, with a report to the Commission in 2008.

Green Design and Buildings

Subway and LRT Vehicle Design:

Both the Toronto Rocket and the new Low Floor Light Rail Vehicle designs incorporate features to reduce environmental impact. These features include: improved noise and vibration characteristics; prohibiting and restricting the use of hazardous materials; requiring end-of-life recycling plans, and specifying air conditioning refrigerants that meet the Montréal Protocol on Substances that Deplete the Ozone Layer.

Facility Performance and Design Standards:

Subway design in Toronto, from its inception, has included the use of materials that are durable and easily maintained. Terrazzo floors, masonry walls, glazed block and ceramic tile wall finishes, and concrete structures have provided subway facilities with a long service life. With the recent increased awareness of the benefits of sustainable design, transit facility standard materials and products have been revised. Some examples of recent changes are the use of T5 and T8 fixtures to replace T12 fluorescent fixtures; the selection of double-glazed, argon-filled, low-e coated windows for tempered spaces; the use of CFC/HCFC free materials; and the selection of low volatile organic compound paints, adhesives, and floorings for renovated and new facilities. Ongoing investigations and improvements are planned in numerous areas of facility design standards, including cool roofs, green roofs, low maintenance landscaping, shade control, heat recovery and room lighting sensors.

Green and Cool Roofs:

The TTC completed a green roof feasibility report which was presented to the Commission in June 2007. In summary, a phased approach was used to evaluate the study sites. The phases included a structural assessment, a review of accessibility for the sites including social and urban context, and life cycle cost analysis. As a result, the TTC will be proceeding with two Pilot Projects; a green roof at the Victoria Park Subway Station Redevelopment Project and a cool roof at the Wilson Carhouse Addition Project. The results of these Pilot Projects will be used in the development of applicable green/cool roofing standards.

Toronto Green Development Standard:

The TTC has a broad range of buildings from unheated subway stations and electric substations to large repair facilities, office buildings and commuter parking lots. Due to the unique nature of these facilities, it may not be possible to meet all minimum targets of the Toronto Green Development Standard (TGDS). Where the core requirements of the TGDS exceed the TTC Design Standard, a new approach is required. It is proposed that new standards will be developed using Pilot Projects. This will allow for the identification of best practices, assessment of the impact on levels of service, and training to be in place prior to large scale adoption, as was recently proposed for the green and cool roof projects. These new standards and Pilot Projects will be implemented on the next new large buildings or facilities scheduled in the Capital Program, prior to full scale adoption. A report will be made to the Commission in 2008 on the Pilot Projects required to implement the TGDS. Attached Appendix A identifies where the existing design standards meet the

TGDS requirements and where further development and study is required in order for the TTC to adopt the core requirements of the TGDS for new construction, where feasible.

JUSTIFICATION

The Toronto Transit Commission commits to reduce the environmental impacts from its facility and vehicle operations and to comply with all legal and applicable requirements.

September 26, 2007
80-2-1
1114038

Attachment: Appendix A