



Ulli S. Watkiss
City Clerk

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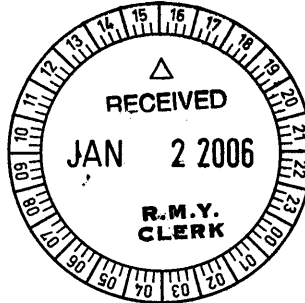
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**In reply please quote:
Ref.: 05-PT&WC#2(1)**

December 15, 2005



Mr. Denis Kelly
Regional Clerk
Regional Municipality of York
P. O. Box 147
17250 Yonge Street
Newmarket, Ontario
L3Y 6Z1

Dear Mr. Kelly:

**Subject: Planning and Transportation Committee and Works Committee Joint
Report 2, Clause 1
Spadina Subway Extension Environmental Assessment Study**

City Council on December 5, 6 and 7, 2005, considered this Clause, and a copy is attached for your information or appropriate action.

Yours truly,

for City Clerk

M. Toft/gc

Attachment

Sent to: Minister of State (Infrastructure and Communities), Environment Canada
 Minister of Public Infrastructure Renewal, Province of Ontario
 Chief Planner and Executive Director, City Planning
 General Manager, Transportation Services
 Chief Corporate Officer
 Chief General Manager, Toronto Transit Commission
 Managing Director, GO Transit
 Chief Administrative Officer/Secretary-Treasurer,
 Toronto and Region Conservation Authority
 Regional Clerk, Regional Municipality of York
 Regional Chair, Regional Municipality of York
 City Clerk, City of Vaughan
 Mayor Michael Di Biase, City of Vaughan
 Mayor Rob Hamilton, City of Barrie
 All Interested Parties

- c. Deputy City Manager Fareed Amin
 Deputy City Manager and Chief Financial Officer
 Acting General Manager, Toronto Water
 Executive Director, Technical Services

Consolidated Clause in Planning and Transportation Committee and Works Committee Joint Report 2, which was considered by City Council on December 5, 6 and 7, 2005.

1

**Spadina Subway Extension
Environmental Assessment Study**

City Council on December 5, 6 and 7, 2005, amended this Clause by adding the following:

"That Council adopt the following staff recommendation contained in the Recommendation Section of the supplementary report (December 5, 2005) from the Chief Planner and Executive Director, City Planning:

'It is recommended that City Council direct the Chief Planner and Executive Director, City Planning, in consultation with the Chief General Manager of the Toronto Transit Commission (TTC), to report further to Council on the order of magnitude costs associated with expanding the City's transit system including subways, streetcars and buses.' "

This Clause, as amended, was adopted by City Council.

Council also considered additional material, which is noted at the end of this Clause.

The Planning and Transportation Committee and the Works Committee recommend that City Council:

- (A) adopt the staff recommendations in the Recommendations Section of the report (November 8, 2005) from the Chief Planner and Executive Director, City Planning, the General Manager, Transportation Services, and the Chief General Manager, Toronto Transit Commission, as follows:**

"It is recommended that City Council:

- (1) approve the 6.2 kilometre extension of the Spadina Subway along the preferred north-westerly alignment with four new stations at:**
- (i) the interchange with the GO Bradford Rail Line;**
 - (ii) the intersection of Keele Street and Finch Avenue West;**
 - (iii) at the York University Campus; and**
 - (iv) on Steeles Avenue West between Keele and Jane Streets,**

as more fully described in the attached Executive Summary report of the Spadina Subway Extension Environmental Assessment Draft Report;

- (2) authorize the Chief General Manager of the Toronto Transit Commission to submit the complete Environmental Assessment Report to the Minister of the Environment for approval;
 - (3) forward this report to the Regional Municipality of York, the City of Vaughan, GO Transit and the Ministry of Public Infrastructure Renewal for Ontario, for information; and
 - (4) the appropriate City officials be authorized and directed to take the necessary actions to give effect thereto.”;
- (B) endorse the following ancillary motions (1) to (8) approved by the Toronto Transit Commission at its meeting on November 28, 2005:
- “(1) that staff review the feasibility of making minor adjustments to the route and consider construction methods that will minimize the disruption to industrial properties in the Kodiak industrial subdivision;
 - (2) that staff work with business owners and the administration of Downsview Park to assist with the relocation of these businesses on the nearby Downsview lands, and that this be part of the negotiations with the Park regarding the locating of a station on the Downsview Park lands;
 - (3) that staff convene a meeting of the business owners and the Downsview Park administration including the local councillor and local MP to negotiate a possible relocation package that will assist businesses being displaced to relocate to Downsview lands currently designated industrial or such other locations that can prove to be mutually beneficial;
 - (4) that staff report on the possibility of building Fire Station #141 into the Finch West Subway Station;
 - (5) that staff consult with Toronto Water and Technical Services and develop plans for the completion of the trunk sewer north from Sheppard towards Grandravine in conjunction with the construction of this subway;
 - (6) that staff report on possible alternative names for the Finch West Station (Keele North Station) and Sheppard West Station (Park Station);
 - (7) that staff report back on the rationale of the three-track system versus the two-track system; and

- (8) WHEREAS it is important to continue with property investigations and related engineering support to further define property interests, and respond to more detailed enquiries in response to EA recommendations;**

WHEREAS it is important to commence geotechnical and environmental investigations along the recommended alignment and station locations; and

WHEREAS it is important to establish a terms of reference for the Federal Environmental Screening Report in the event that the Canadian Environmental Assessment Act (CEAA) requirements are triggered by federal contributions to the Spadina Subway Extension project;

THEREFORE BE IT RESOLVED THAT:

- (i) the Commission recommend approval for an increase of \$1.3 million to the Toronto Transit Commission's Preliminary 2006-2010 Capital Budget to reflect reallocation of expenditures from the "below the line" Spadina Subway Extension project found in the TTC 2006-2010 Capital Program submission to allow TTC staff to:**
 - (a) continue with property investigations and related engineering support to further define property interests and to respond to more detailed enquiries in response to the EA recommendations;**
 - (b) commence geotechnical and environmental investigations along the recommended alignment and station locations; and**
 - (c) establish a terms of reference for the Federal Environmental Screening Report in the event that the Canadian Environmental Assessment Act (CEAA) requirements are triggered by Federal contributions to the Spadina Subway Extension project; and**
- (ii) the Ontario Ministry of Public Infrastructure Renewal, the Regional Municipality of York and all other participating stakeholders recognize these costs as part of the formal cost-share agreement to be developed respecting the Spadina Subway Extension project";**
- (C) require that all emergency exit buildings for the Spadina Subway Extension project be subject to site plan control;**
- (D) request the Toronto Transit Commission to ask the Chief General Manager, Toronto Transit Commission to submit a report to the February 2006 meeting of the Commission on the feasibility of relocating the three-track structure from under the affected businesses on Kodiak Crescent and Sheppard Avenue West;**

- (E) request the Federal Government to invest \$10 billion in the Greater Toronto Area over the next five years for subway(rail) expansion; and
- (F) in future, the appropriate staff send Registered Letters to all property owners and tenants where there is a possibility of expropriation of property.

Action taken by the Committees:

The Planning and Transportation Committee and the Works Committee:

- (1) requested the Chief Planner and Executive Director, City Planning, in consultation with the Chief General Manager, Toronto Transit Commission, to report directly to Council for its meeting on December 5, 2005, on the need and order of priority for subway extensions on Sheppard Avenue, Eglinton Avenue, Yonge Street, the Bloor Street westerly extension, and replacement of the Scarborough LRT; and
- (2) requested the General Manager, Transportation Services, to submit a report to the Works Committee on the feasibility of a further northbound extension of Tangiers Road, in order to provide a northern access to the commuter parking via a public street along the north side of the Hydro Corridor.

The Planning and Transportation Committee and the Works Committee submit the report (November 8, 2005) from the Chief Planner and Executive Director, City Planning, General Manager, Transportation Services, and the Chief General Manager, Toronto Transit Commission.

Purpose:

To provide the results of the Spadina Subway Extension Environmental Assessment Study, request approval of the preferred alignment, station and commuter facility locations, and direct staff to continue with the Environmental Assessment approvals process.

Financial Implications and Impact Statement:

There are no financial implications arising from this report. However, sufficient funds have been included for work related to the Environmental Assessment in Project 3.9, under Environmental Assessment for Spadina Subway Extension to Steeles, as set out on pages 871 to 874 - Category Expansion, in the TTC 2005-2009 Capital Program as approved by City Council on February 23, 2005. The Environmental Assessment is jointly funded by the Province of Ontario, Toronto Transit Commission and the Regional Municipality of York.

Recommendations:

It is recommended that City Council:

- (1) approve the 6.2 kilometre extension of the Spadina Subway along the preferred north-westerly alignment with four new stations at:

- (i) the interchange with the GO Bradford Rail Line;
- (ii) the intersection of Keele Street and Finch Avenue West;
- (iii) at the York University Campus; and
- (iv) on Steeles Avenue West between Keele and Jane Streets,

as more fully described in the attached Executive Summary report of the Spadina Subway Extension Environmental Assessment Draft Report;

- (2) authorize the Chief General Manager of the Toronto Transit Commission to submit the complete Environmental Assessment Report to the Minister of the Environment for approval;
- (3) forward this report to the Regional Municipality of York, the City of Vaughan, GO Transit and the Ministry of Public Infrastructure Renewal for Ontario, for information; and
- (4) the appropriate City officials be authorized and directed to take the necessary actions to give effect thereto.

Background:

Upon completion of the 1994 Environmental Assessment Report for the Yonge-Spadina Loop Project, the Minister of the Environment and Energy authorized the extension of the Spadina Subway from Downsview Station to York University only. Since this time, several important policy changes, planning initiatives, transit improvement projects, land development decisions and property acquisition activities have occurred. These changes require that a new Environmental Assessment study be undertaken for the extension of the Spadina Subway.

Consequently, the City of Toronto and the Toronto Transit Commission are joint proponents for a new Individual Environmental Assessment (EA) (in accordance with the requirements of the Ontario Environmental Assessment Act), for a 6.2 kilometre, four-station underground extension of the Spadina Subway from Downsview Station to Steeles Avenue, with related commuter facilities (bus terminals, passenger pick-up and drop-off and commuter parking).

The TTC and the City prepared a Terms of Reference (TOR), as required by the Environmental Assessment Act (EAA) for an Individual EA. The TOR phase included consultation with key stakeholders and the public and was approved by the Minister of the Environment in September 2004.

URS Canada Inc. was retained in October 2004 to conduct the Environmental Assessment Study. The Environmental Assessment Study was conducted in three phases, as follows:

- (1) Phase One – Development of alternative subway routes and evaluation criteria.
- (2) Phase Two – Analysis/evaluation and selection of the preferred subway route and development of alternative subway alignments.

- (3) Phase Three – Selection and detailed Environmental Assessment of the preferred alignment and study recommendations and conclusions.

Public and key stakeholder agency consultation was held during each of the three Study phases.

Comments:

A copy of the Executive Summary for the Spadina Subway Extension Environmental Assessment Study Draft Report is attached. If authorized by Council, the complete EA Report will be submitted to the Minister of the Environment and will be available for public review and comment.

The purpose of the EA Study is to develop and analyze alternative alignments and station locations for the 1994 Approved EA to extend the Spadina Subway from Downsview Station to York University and to study a further extension to a terminal station at Steeles Avenue.

Consistent with the 1994 Approved EA, the objectives of the Spadina Subway Extension are to:

- (1) provide subway service to the Keele/Finch area, York University and a new inter-regional transit gateway and commuter parking facility at Steeles Avenue;
- (2) provide improved connections between the TTC subway system and GO Transit, York Region Transit and other inter-regional transit services;
- (3) support local population and employment growth up to 2031, in accordance with the land use and transportation policies of the new City of Toronto Official Plan and York Region Official Plan;
- (4) minimize any negative environmental impacts; and
- (5) extend the subway in the most cost-effective manner.

The Executive Summary recommends the Spadina Subway Extension alignment shown in the attached Exhibit 1, with subway stations located:

- (1) at an interchange with the GO Bradford Rail Line (Sheppard West Station) (Exhibit 2);
- (2) in the vicinity of Keele Street and Finch Avenue West (Finch West Station) (Exhibit 3);
- (3) on the York University campus (York University Station) (Exhibit 4); and
- (4) at Steeles Avenue West (between Keele and Jane Streets) (Steeles West Station) (Exhibit 5).

The alignment at the Steeles West Station will also protect for the long-term extension of the Spadina Subway to Vaughan Corporate Centre.

Property Requirements:

During the EA Study, the following property requirements have been identified:

- (1) full acquisition, (including demolition of buildings and relocation of existing businesses) on 9 properties (including Toronto Fire Services Station #141);
- (2) acquisitions on Parc Downsview Park and York University lands; and
- (3) partial acquisitions on 16 other properties.

TTC and the City of Toronto will:

- (1) proceed with a Property Protection Study during the design of the Spadina Subway Extension, which will determine detailed property requirements, including temporary construction easements;
- (2) continue with property negotiations with York University for property required for the Subway Extension, in accordance with the commitments made by the University during the 1994 EA and reflecting more recent discussions on detailed property acquisition principles;
- (3) initiate discussions with Parc Downsview Park, in accordance with direction received by Toronto City Council at its September 30, 2005, meeting;
- (4) continue discussions with Toronto Fire Services for proposed relocation of Station #141; and
- (5) for all other properties, at the appropriate time, the City of Toronto will acquire property by negotiation or expropriation as required.

Project Costs and Schedule:

The order-of-magnitude cost estimate for the 6.2 kilometre subway extension, including design and construction costs, property, yard improvements and vehicles, is \$1.4 billion in 2005 dollars. Design, construction, and testing and commissioning will take approximately seven years. Implementation of the Project would be subject to Environment Assessment approval and funding.

Next Steps:

Upon approval by the Toronto City Council, the Environmental Assessment Report will be finalized and submitted to the Ministry of the Environment. In accordance with the Environmental Assessment Act, a Decision by the Minister of the Environment will be made within 30 weeks following submittal of the EA Report. This 30-week review period includes a 30-day period for the public and the Government Review Team (consisting of key stakeholder agencies) to review and comment on the EA Report.

Conclusions:

The recommendations of the Spadina Subway Extension Environmental Assessment have been developed in consultation with a wide range of community and institutional stakeholders and in accordance with the Environmental Assessment Act. The study recommends an updated alignment for a radial extension of the Spadina Line with stations at Sheppard Avenue/GO Bradford Line, Keele Street/Finch Avenue West, the York University Commons and at Steeles Avenue West between Keele and Jane Streets.

Contact:

Rod McPhail, Director
Transportation Planning, City Planning Division
Telephone: 416-392-8100
Fax: 416-392-3821
e-mail: rmcphail@toronto.ca

List of Attachments:

Exhibits 1 to 5; and Spadina Subway Extension Environmental Assessment Draft Report – Executive Summary

(A copy of each of Exhibits 1 to 5 and the “Spadina Subway Extension Environmental Assessment Report Executive Summary” referred to the report was forwarded to all Members of Council with the agenda for the joint meeting of the Planning and Transportation Committee and the Works Committee on November 30, 2005, and a copy is on file in the office of the City Clerk’s, City Hall.)

The Planning and Transportation Committee and the Works Committee also submit the following communication (November 29, 2005) from the General Secretary, Toronto Transit Commission.

At its meeting on Monday, November 28, 2005, the Commission considered the attached report entitled, “Spadina Subway Extension Environmental Assessment Study Final Recommendations.”

The Commission approved the Recommendation contained in the report, as listed below:

“It is recommended that the Commission:

- (1) approve the Spadina Subway Extension alignment, stations and related commuter facilities, as described in the attached “Spadina Subway Extension Environmental Assessment Draft Report Executive Summary”;
- (2) forward this report to the City of Toronto Council (through Planning and Transportation Committee and Works Committee) for approval;

- (3) subject to City of Toronto Council approval, authorize the Chief General Manager to submit the complete Environmental Assessment Report to the Ministry of the Environment for approval; and
- (4) forward this report to the Regional Municipality of York, the City of Vaughan, GO Transit and the Ministry of Public Infrastructure Renewal for Ontario, for information.”

The Commission also approved the following ancillary motions:

- (1) that staff review the feasibility of making minor adjustments to the route and consider construction methods that will minimize the disruption to industrial properties in the Kodiak industrial subdivision;
- (2) that staff work with business owners and the administration of Downsview Park to assist with the relocation of these businesses on the nearby Downsview lands, and that this be part of the negotiations with the Park regarding the locating of a station on the Downsview Park lands;
- (3) that staff convene a meeting of the business owners and the Downsview Park administration including the local councillor and local MP to negotiate a possible relocation package that will assist businesses being displaced to relocate to Downsview lands currently designated industrial or such other locations that can prove to be mutually beneficial;
- (4) that staff report on the possibility of building Fire Station #141 into the Finch West Subway Station;
- (5) that staff consult with Toronto Water and Technical Services and develop plans for the completion of the trunk sewer north from Sheppard towards Grandravine in conjunction with the construction of this subway;
- (6) that staff report on possible alternative names for the Finch West Station (Keele North Station) and Sheppard West Station (Park Station);
- (7) that staff report back on the rational of the three-track system versus the two-track system; and
- (8) Whereas it is important to continue with property investigations and related engineering support to further define property interests, and respond to more detailed enquiries in response to EA recommendations;

Whereas it is important to commence geotechnical and environmental investigations along the recommended alignment and station locations; and

Whereas it is important to establish a terms of reference for the Federal Environmental Screening Report in the event that the Canadian Environmental Assessment Act (CEAA) requirements are triggered by federal contributions to the Spadina Subway Extension project;

Therefore be it resolved that:

- (1) the Commission recommend approval for an increase of \$1.3 million to the Toronto Transit Commission's Preliminary 2006-2010 Capital Budget to reflect reallocation of expenditures from the "below the line" Spadina Subway Extension project found in the TTC 2006-2010 Capital Program submission to allow TTC staff to:
 - (a) continue with property investigations and related engineering support to further define property interests and to respond to more detailed enquiries in response to the EA recommendations;
 - (b) commence geotechnical and environmental investigations along the recommended alignment and station locations; and
 - (c) establish a terms of reference for the Federal Environmental Screening Report in the event that the Canadian Environmental Assessment Act (CEAA) requirements are triggered by Federal contributions to the Spadina Subway Extension project; and
- (2) the Ontario Ministry of Public Infrastructure Renewal, the Regional Municipality of York and all other participating stakeholders recognize these costs as part of the formal cost share agreement to be developed respecting the Spadina Subway Extension project.

The foregoing is forwarded to City of Toronto Council, through the joint meeting of the Planning and Transportation Committee and Works Committee for approval of the Spadina Subway Extension alignment, stations and related commuter facilities, as described in the attached "Spadina Subway Extension Environmental Assessment Draft Report Executive Summary."

(Report dated November 10, 2005, addressed to the
Toronto Transit Commission from the
Chief General Manager)

Recommendations:

It is recommended that the Commission:

- (1) approve the Spadina Subway Extension alignment, stations and related commuter facilities, as described in the attached "Spadina Subway Extension Environmental Assessment Draft Report Executive Summary";

- (2) forward this report to the City of Toronto Council (through Planning and Transportation Committee and Works Committee) for approval;
- (3) subject to City of Toronto Council approval, authorize the Chief General Manager to submit the complete Environmental Assessment Report to the Ministry of the Environment for approval; and
- (4) forward this report to the Regional Municipality of York, the City of Vaughan, GO Transit and the Ministry of Public Infrastructure Renewal for Ontario, for information.

Funding:

While there is no funding implication associated with this report, sufficient funds have been included for work related to the Environmental Assessment in Project 3.9, under Environmental Assessment for Spadina Subway Extension to Steeles, as set out on pages 871 to 874 - Category Expansion, in the TTC 2005-2009 Capital Program as approved by City Council on February 23, 2005. The Environmental Assessment is jointly funded by the Province of Ontario, the City of Toronto and the Regional Municipality of York.

Background:

The City of Toronto and the Toronto Transit Commission are joint proponents for an Individual Environmental Assessment (EA) (in accordance with the requirements of the Ontario Environmental Assessment Act), for a 6.2 kilometre, four-station underground extension of the Spadina Subway from Downsview Station to Steeles Avenue, with related commuter facilities (bus terminals, passenger pick-up and drop-off and commuter parking).

The TTC and City prepared a Terms of Reference, as required by the Environmental Assessment Act for an Individual EA. The Terms of Reference included consultation with key stakeholders and the public and was approved by the Minister of the Environment in September 2004.

URS Canada Inc. was retained at the October 20, 2004, Commission Meeting to conduct the Environmental Assessment Study. The Environmental Assessment Study was conducted in three phases, as follows:

- (1) Phase One – Development of alternative subway routes and evaluation criteria.
- (2) Phase Two – Analysis/evaluation and selection of the preferred subway route and development of alternative subway alignments.
- (3) Phase Three – Selection and detailed Environmental Assessment of the preferred alignment and study recommendations and conclusions.

Public and key stakeholder agency consultation was held during each of the three Study phases.

Discussion:

A copy of the Executive Summary for the Spadina Subway Extension Environmental Assessment Draft Report is attached. A copy of the EA Draft Report will be available with the General Secretary on November 28, 2005. The final EA Report will be submitted to the Minister of the Environment and will be available for public review and comment.

The purpose of the EA Study is to develop and analyze alternative alignments and station locations for the 1994 Approved EA to extend the Spadina Subway from Downsview Station to York University and to study a further extension to a terminal station at Steeles Avenue.

Consistent with the 1994 Approved EA, the objectives of the Spadina Subway Extension are to:

- (1) provide subway service to the Keele/Finch area, York University and a new inter-regional transit gateway and commuter parking facility at Steeles Avenue;
- (2) provide improved connections between the TTC subway system and GO Transit, York Region Transit and other inter-regional transit services;
- (3) support local population and employment growth up to 2031, in accordance with the land use and transportation policies of the new City of Toronto Official Plan and the York Region Official Plan;
- (4) minimize any negative environmental impacts; and
- (5) achieve reasonable capital and operating costs.

The Executive Summary recommends the Spadina Subway Extension alignment shown in the attached Exhibit 1, with subway stations located:

- (1) at an interchange with the GO Bradford Rail Line (Sheppard West Station) (Exhibit 2);
- (2) in the vicinity of Keele and Finch (Finch West Station) (Exhibit 3);
- (3) on the York University campus (York University Station) (Exhibit 4); and
- (4) at Steeles Avenue (between Keele and Jane Streets) (Steeles West Station) (Exhibit 5).

The alignment at the Steeles West Station will also protect for the long-term extension of the Spadina Subway to Vaughan Corporate Centre.

Property Requirements:

During the EA Study, the following property requirements have been identified:

- (1) full acquisition, (including demolition of buildings and relocation of existing businesses) on nine properties (including Toronto Fire Services Station #141);

- (2) significant takings on Parc Downsview Park and York University lands; and
- (3) partial takings on 16 other properties.

TTC and the City of Toronto will:

- (1) proceed with a Property Protection Study during the design of the Spadina Subway Extension, which will determine detailed property requirements, including temporary construction easements;
- (2) continue with property negotiations with York University for property required for the Subway Extension, in accordance with the commitments made by the University during the 1994 EA and reflecting more recent discussions on detailed property acquisition principles;
- (3) initiate discussions with Parc Downsview Park, in accordance with direction received by Toronto City Council at its September 30, 2005, meeting;
- (4) continue discussions with Toronto Fire Services for proposed relocation of Station #141; and
- (5) for all other properties, at the appropriate time, the City of Toronto will acquire property by negotiation or expropriation as required.

Project Costs and Schedule:

The order-of-magnitude cost estimate for the Project, including design and construction, property, subway yard improvement and vehicles, is \$1.4 billion in 2005 dollars.

Design, construction, and testing and commissioning would be approximately seven years. Implementation of the Project would be subject to Environmental Assessment approval and funding.

Next Steps:

Because TTC and the City of Toronto are joint proponents for the Environmental Assessment, the attached Executive Summary will be submitted for approval to:

- (1) Planning and Transportation Committee and Works Committee (joint meeting to be held on November 30, 2005); and
- (2) Toronto City Council (December 5-7, 2005 meeting).

Upon approval by the Commission and Toronto City Council, the draft Environmental Assessment Report will be finalized and submitted to the Ministry of the Environment. In accordance with the Environmental Assessment Act, a Decision by the Minister of the Environment will be made within 30 weeks following submittal of the EA Report. This 30-week review period includes a 30-day period for the public and the Government Review Team (consisting of key stakeholder agencies) to review and comment on the EA Report.

Justification:

Toronto Transit Commission and Toronto City Council approval of the Environmental Assessment Study recommendations is required prior to submission of the Environmental Assessment Report to the Ministry of the Environment.

The Planning and Transportation Committee and the Works Committee also considered communications from the following:

- (November 30, 2005) from Brian Shifman, Executive Director, Smart Commute – North Toronto, Vaughan, in support of the Environmental Assessment recommendations for the Spadina Subway Extension; and
- (November 30, 2005) from T. W. Bermingham, Blake, Cassels & Graydon LLP, representing Quontlan Realty Inc. (UPS).

The following persons appeared before the Planning and Transportation Committee and the Works Committee:

- Tom Middlebrook, Chief Engineer, Engineering Department, Toronto Transit Commission, and gave a presentation on the Spadina Subway Extension Environmental Assessment Study;
- Stephen D'Agostino, Solicitor, Thomson Rogers, representing a tenant and property owner on Kodiak Crescent, and filed a map of the proposed subway stations;
- Andrew Merceles;
- Brian Shifman, Executive Director and Niki Popper, Program Manager, Smart Commute - North Toronto, Vaughan;
- Dr. Ted Spence, Senior Policy Advisor, Office of the President, and Chris Wong, York University, and filed a submission;
- Councillor Sandra Yeung Racco, Ward 4, City of Vaughan, and Chair of the Spadina York Subway Extension Committee, and filed a submission;

- Tony Genco, President and CEO, Parc Downsview Park Inc., and filed a submission, together with a copy of their Annual Report 2004-2005, and various pamphlets on Parc Downsview Park;
- Courtney Jewell, representing Prudent Financial at 1150 Sheppard Avenue West, and filed a submission;
- Ronald Klausz, representing owners and businesses at 40 Kodiak Crescent;
- Vic Caldana, Vice-President, Downsview Chrysler and Downsview KIA, and filed a submission;
- Councillor Peter Li Preti, Ward 8, York West; and
- Councillor Frances Nunziata, Ward 11, York South-Weston.

City Council – December 5, 6 and 7, 2005

Council also considered the following:

- *Report (December 5, 2005) from the Chief Planner and Executive Director, City Planning [Communication 28(c)].*

Subject: Future Subway Expansion

Purpose:

To respond to a request from the joint Planning and Transportation and Works Committee that the Chief Planner and Executive Director, City Planning, report to City Council on the City's priorities for future subway expansion.

Financial Implications and Impact Statement:

There are no financial implications arising from this report.

Recommendations:

It is recommended that City Council direct the Chief Planner, in consultation with the Chief General Manager of the Toronto Transit Commission (TTC), report further to Council on the order of magnitude costs associated with expanding the City's transit system including subways, streetcars and buses.

Background:

The joint Planning and Transportation and Works Committee at its meeting of November 30, 2005, recommended to City Council that the recommendations in the staff report (November 8, 2005) entitled "Spadina Subway Extension Environmental Assessment Study" be approved. In addition, the joint Committee requested that "the Chief Planner and Executive Director, City Planning, in consultation with the Chief General Manager, Toronto Transit Commission, to report directly to Council for its meeting on December 5, 2005, on the need and order of priority for subway extensions on Sheppard Avenue, Eglinton Avenue, Yonge Street, the Bloor Street westerly extension, and replacement of the Scarborough LRT."

History of the Subway Construction:

One of the City's greatest accomplishments during the 1950's, 1960's and 1970's was the aggressive subway construction program. This construction program kept pace with and accommodated the rapid growth taking place in the City. Subways were built at an average rate of 2 kilometres per year for 30 years until 1980. Since then, only 8 kilometres of subway have been built (over the past 25 year period).

As can be seen on the following table, 90% of the City's subway system was constructed prior to 1980. If Toronto is to continue to prosper and be the economic engine of the nation, we must return to the pre-1980's aggressive subway construction program complimented by an improved and expanded network of streetcars and buses.

<u>Decade</u>	<u>Subway Construction Completed</u>	<u>Length (km.)</u>
1950's	Yonge-Union Eglinton	7.3
1960's	University-Union to St. George	3.8
	Bloor-Danforth-Keele to Woodbine	13.0
	Bloor-Danforth east to Warden	4.4
	Bloor-Danforth west to Islington	<u>5.5</u>
		26.7 km.
1970	Yonge ext. to York Mills	4.3
	Yonge ext. to Finch	4.4
	Spadina to Wilson	9.9
	Bloor-Danforth east to Kennedy	2.8
	Bloor-Danforth west to Kipling	<u>1.5</u>
		22.9 km.
1980	Scarborough RT	7 km.
1990	Spadina ext. to Downsview	1.6 km.
2000	Sheppard - Yonge to Don Mills	6.4 km.

Comments:

Priorities for the expansion of the rapid transit system were established by City Council in 2002. Specifically, Council at its meeting of April 16, 17 and 18, 2002, adopted Clause No. 3 of Report No. 4 of the Planning and Transportation Committee, entitled "Toronto Transit Commission - Rapid Transit Expansion Study and Spadina-York Subway Extension: A Business Case from the Spadina-York Subway Extension Committee".

The Rapid Transit Extension Study (RTES) was completed by the TTC in August 2001 and adopted by the Toronto Transit Commission on August 29, 2001. The purpose of the RTES was to examine the needs and priorities for expansion of the TTC's rapid transit system to support the anticipated levels of growth envisaged in the City of Toronto's new Official Plan and to respond to predicted growth trends in the larger Greater Toronto Area (GTA). The projects studied were the extensions to the Sheppard Subway; Scarborough RT; Eglinton subway; Bloor subway; Spadina subway; and Yonge subway.

The RTES concluded that the TTC's highest priority for rapid transit expansion would be the northerly extension of the Spadina Subway to York University/Steeles Avenue and an easterly extension of the Sheppard Subway to Victoria Park Avenue, CN/CP mainline or the Scarborough Civic Center. Each of the options studied are included in Map 4, Higher Order Transit Corridors, of the new Official Plan for the City of Toronto.

The staff report to Planning and Transportation Committee from the Commissioner of Urban Development Services (February 28, 2002) respecting the TTC Rapid Transit Expansion Study recommended that Council, among other things, endorse the findings of the RTES and direct that the appropriate City of Toronto and Toronto Transit Commission officials "commence an updated Environmental Assessment study to amend the Yonge-Spadina Subway EA to examine the alternate alignments for the extension of the Spadina subway line between Downsview subway station and Steeles Avenue and work with the Region of York to co-ordinate the respective jurisdictions' EA Studies in this corridor."

The Environmental Assessments (EA) for the Spadina Subway Extension and Sheppard Subway Extension were approved by the Minister of the Environment on April 27, 1994 and March 24, 1994 respectively. The preferred route of the Spadina Subway studied in RTES varies substantially from the approved EA and therefore required an updated EA. The staff report (November 8, 2005) entitled "Spadina Subway Extension Environmental Assessment Study" now before Council provides the results of the updated EA. The proposed alignment of the Sheppard Subway Extension does not significantly vary from the approved EA and would likely be subject to only minor modifications.

In February, 2005 City Council, while dealing with the Bus-Only Lanes from Downsview Subway Station to York University, re-affirmed that the extension of the Spadina/University subway to Steeles Avenue is the City's top priority for subway expansion. The Minister of Finance and the Government of Ontario were so advised.

In addition to the EA for the Spadina Subway Extension, the TTC has begun the Strategic Plan for the Future of the Scarborough RT. This study is examining options for dealing with the need to replace the existing Scarborough RT cars by 2015. The study is examining a full range of options from buying new RT cars to replacing the RT with Bus Rapid Transit, streetcars, or a subway. The Strategic Plan for the Future of the Scarborough RT is not yet completed. It is expected that the results of this study will be available by the summer of 2006.

Conclusions:

The extension of the subway system, supported and complimented by an improved surface transit network, of streetcars and buses must be a priority of City Council over the next 20 years if the City is to solve the mobility challenges both current and future. City and TTC staff produced a document "Building a Transit City" and presented this to the Commission earlier this year. This transit plan for the City incorporates the strategies of the new Official Plan and the Ridership Growth Study prepared by TTC.

Near term priorities for the expansion of the rapid transit system were established by City Council in 2002 through their endorsement of the recommendations surrounding the RTES. The conclusion of the RTES was that the near term priorities for rapid transit expansion in the City of Toronto are the extensions of the Spadina and Sheppard subways. Based on the direction from City Council and the Toronto Transit Commission, the City and TTC have completed the Spadina Subway Extension Environmental Assessment Study. Those recommendations have been endorsed by the Toronto Transit Commission and the Planning and Transportation and Works Committees and are now before City Council. Once the TTC's Strategic Plan for the Future of the Scarborough RT study has been completed, City Council will be in a better position to deliberate on priorities for future rapid transit expansion in the city.

City and TTC staff should report to City Council, following the completion of the current Scarborough RT study, on the expansion to the Transit System including subways, streetcars and buses and the associated order of magnitude costs.

The Chief General Manager, Toronto Transit Commission, has been consulted in the preparation of this report.

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Communications:

- *(December 2, 2005) from Mayor Michael Di Biase, City of Vaughan [Communication 28(a)];*
- *(December 2, 2005) from the Chief Administrative Officer, Toronto and Region Conservation Authority [Communication 28(b)];*
- *(December 5, 2005) from Brian Shifman, Executive Director, Smart Commute - North Toronto, Vaughan [Communication 28(d)];*
- *(November 29, 2005) from Tony Genco, President and CEO, Parc Downsview Park Inc. [Communication 28(e)];*
- *(December 5, 2005) from Mayor Rob Hamilton, City of Barrie [Communication 28(f)]; and*
- *(December 6, 2005) from Bill Fisch, Regional Chair and CEO, The Regional Municipality of York [Communication 28(g)].*

STEELES WEST STATION

- PEDESTRIAN ENTRANCES
- TTC, YRT/VIVA, GO BUS TERMINAL
- PASSENGER PICK-UP/DROP-OFF
- COMMUTER PARKING IN HYDRO CORRIDOR

STEELES AVE.

YORK UNIVERSITY

- PEDESTRIAN ENTRANCES
- YRT/VIVA AND GO BUSES IN VICINITY
- ON STREET TTC BUS TRANSFER

YORK UNIVERSITY

KEELE ST.

CN/GO BRADFORD LINE

DUFFERIN ST.

FINCH AVE.

FINCH WEST STATION

- PEDESTRIAN ENTRANCES
- TTC BUS TERMINAL
- PASSENGER PICK-UP / DROP-OFF
- COMMUTER PARKING IN HYDRO CORRIDOR

SHEPPARD WEST STATION

- PEDESTRIAN ENTRANCES
- ON STREET TTC BUS TRANSFER
- GO RAIL CONNECTION

DOWNSVIEW PARK

SHEPPARD AVE.

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

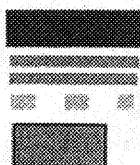
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RECOMMENDED
SPADINA SUBWAY EXTENSION
ALIGNMENT

EXHIBIT 1



Legend



STATION PLATFORM
SUBWAY LINE
UNDERGROUND WALKWAY
SUBSTATION



MAIN ENTRANCE
AUTOMATIC ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



TORONTO

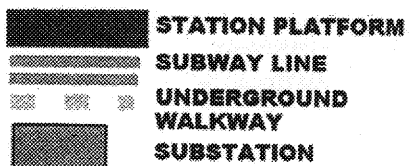
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RECOMMENDED SHEPPARD
 WEST STATION CONCEPT

EXHIBIT 2



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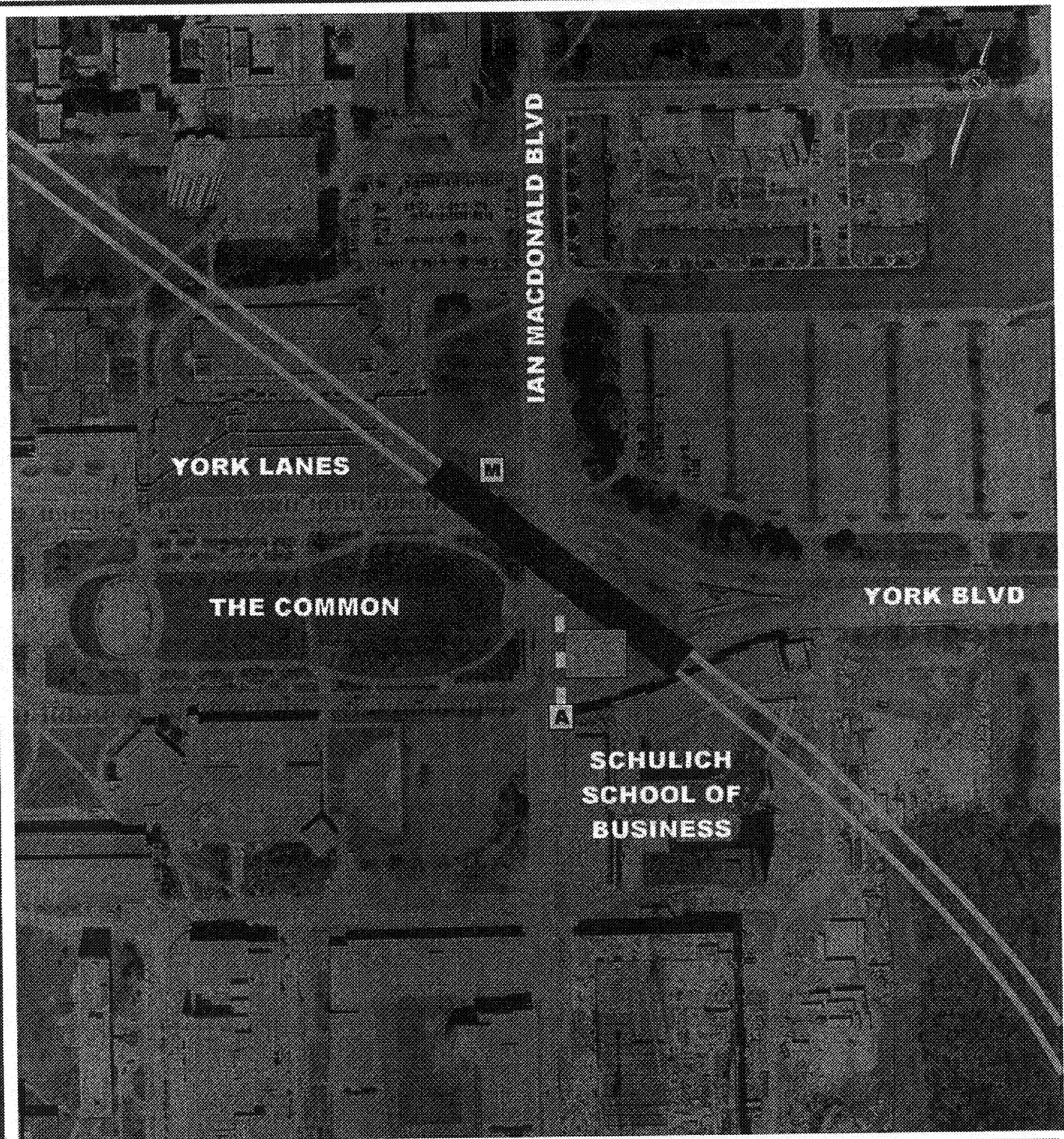


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

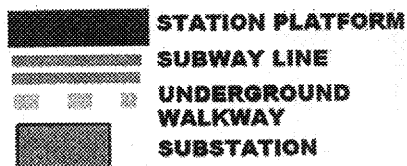


RECOMMENDED FINCH WEST
STATION CONCEPT

EXHIBIT 3



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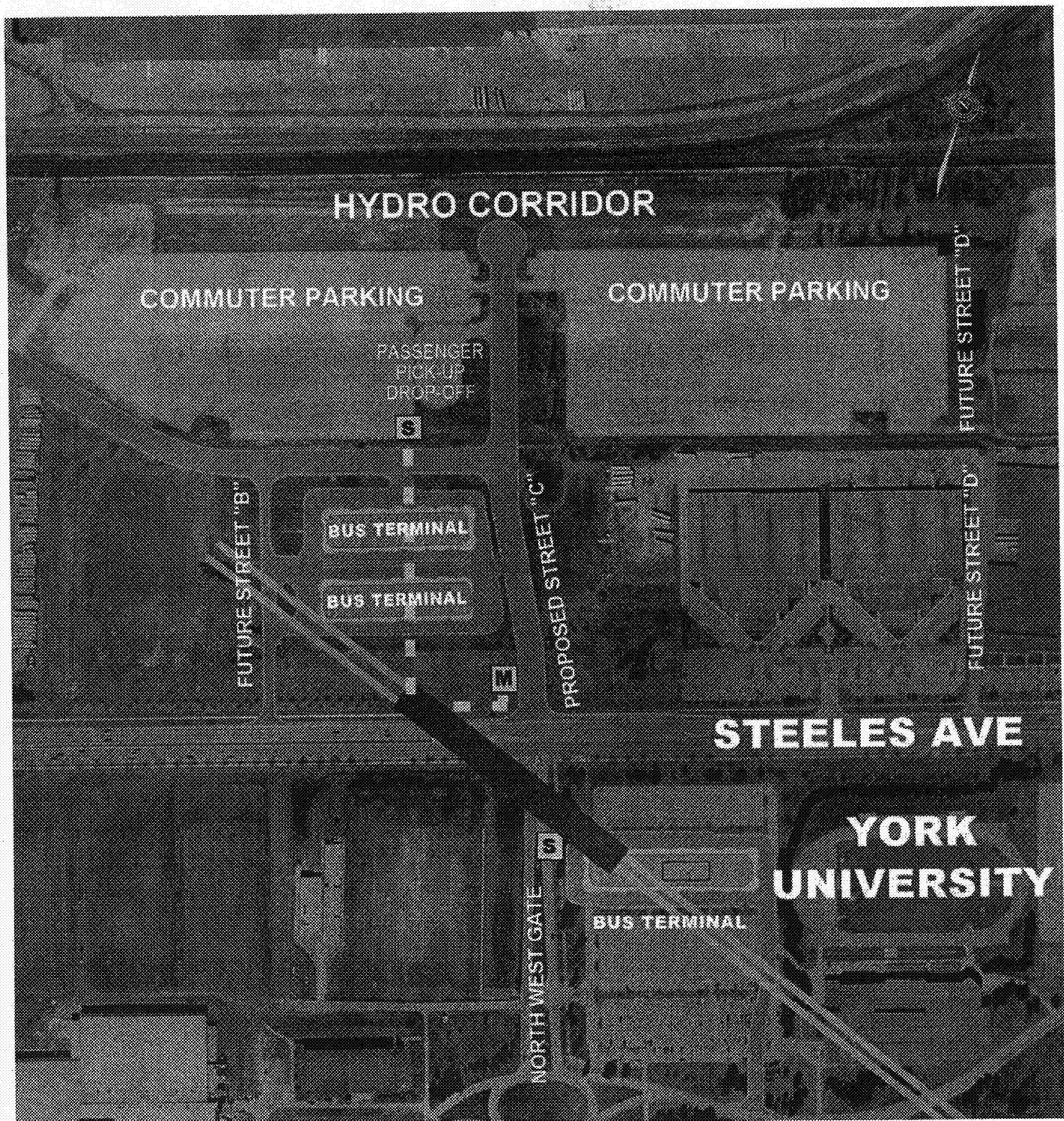


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

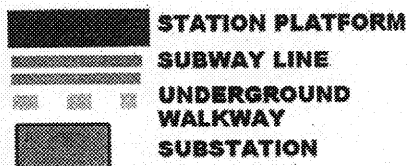


RECOMMENDED YORK
UNIVERSITY STATION CONCEPT

EXHIBIT 4



Legend



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

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RECOMMENDED STEELES WEST
STATION CONCEPT

EXHIBIT 5



SPADINA SUBWAY EXTENSION

*Environmental Assessment Draft Report
Executive Summary*



TORONTO TRANSIT COMMISSION



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1 INTRODUCTION

The City of Toronto and the Toronto Transit Commission have conducted an Individual Environmental Assessment (EA) (in accordance with the requirements of the Ontario Environmental Assessment Act), for a 6.2 kilometre, 4-station underground extension of the Spadina Subway from Downsview Station to Steeles Avenue, with related commuter facilities (bus terminals, passenger pick-up and drop-off and commuter parking).

This report provides a summary of the EA Study, including the following:

- 1) Background and context for the current Study,
- 2) Purpose and objectives of the EA Study and the Project,
- 3) Overview of the EA Study process, including public and stakeholder agency consultation,
- 4) Key study findings and recommendations,
- 5) Commitments to future work, and
- 6) Proposed EA amending procedures.

1.1 BACKGROUND AND CONTEXT

1.1.1 Approved Yonge-Spadina Loop Environmental Assessment

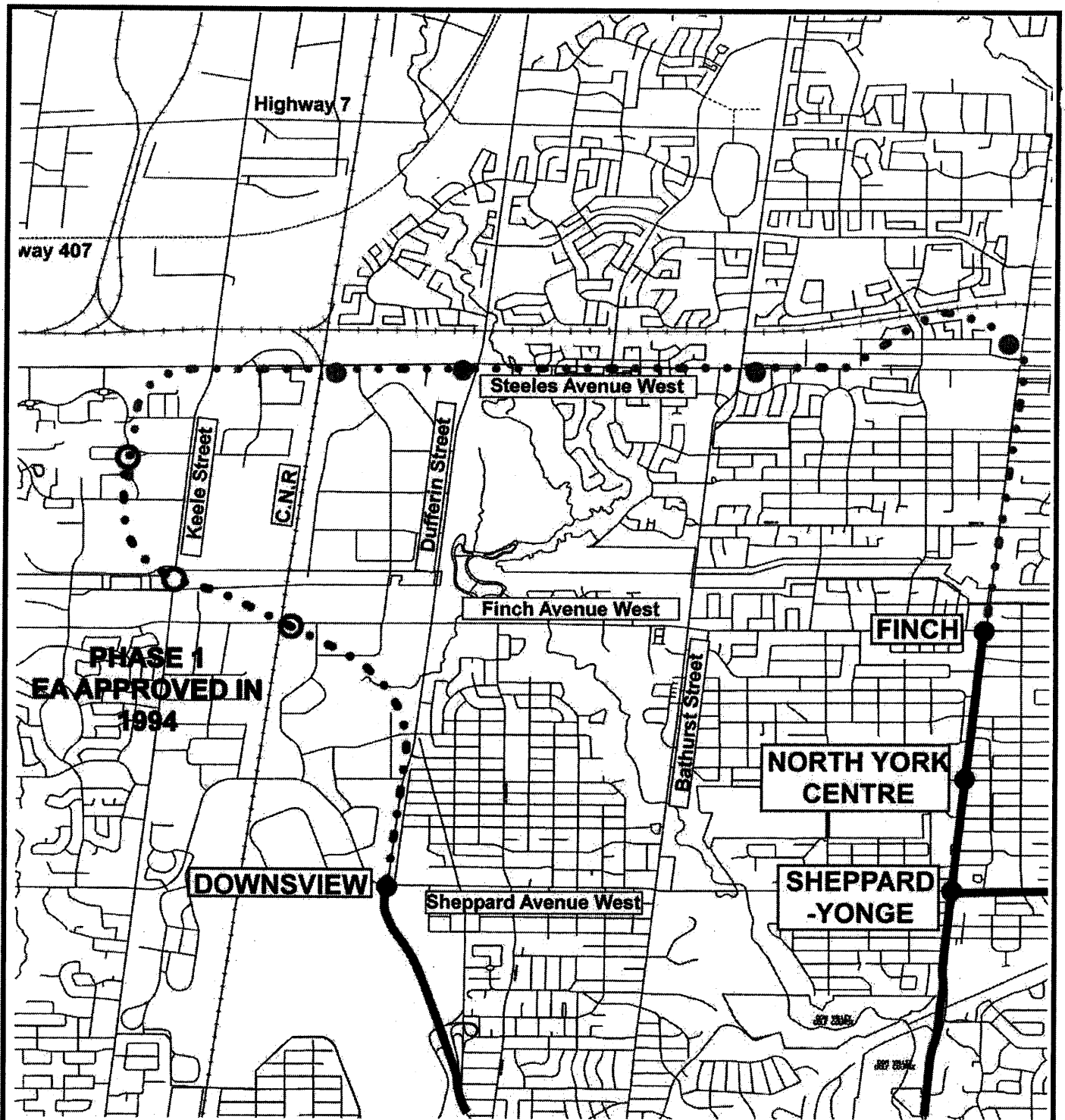
In 1993, TTC and the former Metropolitan Toronto completed an Environmental Assessment Report for the Yonge-Spadina Loop Project. The EA established the need and justification for transportation improvements in northwest Toronto. The Study determined that extending and connecting the north ends of the Yonge and Spadina Subway lines across Steeles Avenue was the preferred alternative. This recommendation was based on several alternatives including "doing nothing", roadway improvements, alternative technologies and modifications to the existing subway system. The Project became known as the Yonge-Spadina Loop.

In 1994, upon review of the TTC/Metro Toronto Environmental Assessment Report, the Minister of Environment and Energy authorized the extension of the Spadina Subway from Downsview Station to York University only (see Exhibit ES-1). At that time, it was anticipated that completion of the entire "Loop" from York University to Finch Station (via Steeles) would be many years into the future.

Design and construction of the approved extension of the Spadina Subway did not proceed due to lack of funding.

1.1.2 Need For a New EA Study

During the time since the original EA study was conducted, several important policy changes, planning initiatives, transit improvement projects, land development decisions and property acquisition activities have occurred. These key changes are listed below and are illustrated in Exhibit ES-2.



Legend

— EXISTING SUBWAY LINE

- - - INITIAL STAGE OF IMPLEMENTATION
(1994 MOE APPROVED UNDERTAKING)

- . - . -

TO BE REASSESSED PRIOR TO IMPLEMENTATION
(NO MOE APPROVAL)



PROPOSED STATION



POSSIBLE STATION

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

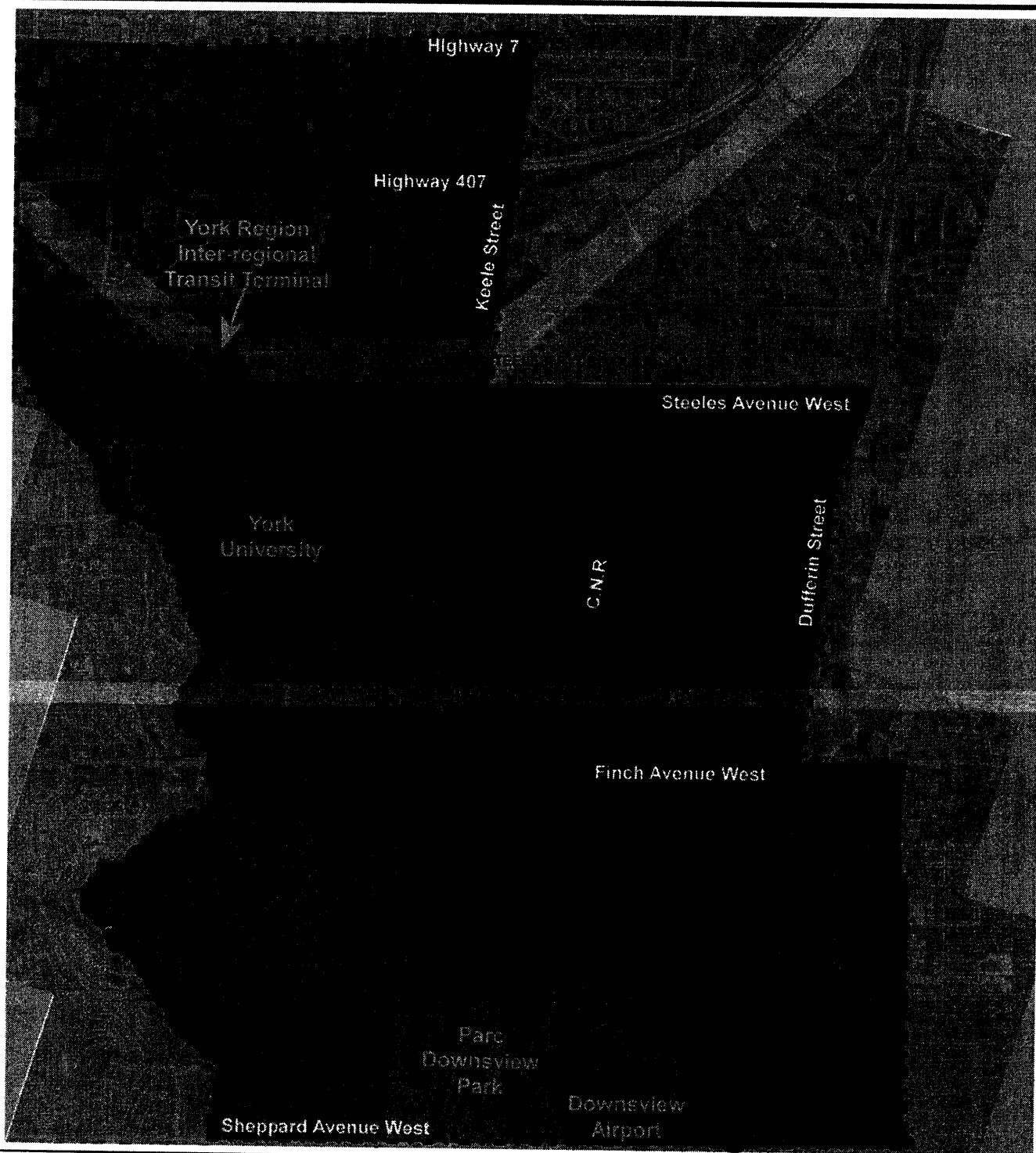


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YONGE-SPADINA SUBWAY LOOP
ENVIRONMENTAL ASSESSMENT
RECOMMENDATIONS

ES-1



Legend

	CITY OF TORONTO "HIGHER ORDER TRANSIT CORRIDOR"		DOWNSVIEW AREA SECONDARY PLAN
	STUDY AREA		STABLE RESIDENTIAL AREA
	YORK UNIVERSITY SECONDARY PLAN		GAS/OIL TANK STORAGE AND DISTRIBUTION
			KEELE INDUSTRIAL AREA

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



LAND USE AND
TRANSPORTATION PLANNING
CONTEXT

ES-2

- 1) The 2001 Rapid Transit Expansion Study (RTES) concluded that a future subway "loop" along Steeles Avenue is no longer needed and that alternatively a "radial" extension via York University to a terminal station at Steeles Avenue is preferred.
- 2) The City of Toronto and York Region Official Plans support "Higher Order Transit Corridor" services to York University and the new Vaughan Corporate Centre (Highway 7 and Jane Street). Both Plans call for improved transit reliability and capacity in the short term and subway expansion in the long term. Specifically, the new City of Toronto Official Plan includes a Higher Order Transit Corridor following the route proposed in the Rapid Transit Expansion Study.
- 3) Special planning studies, Secondary Plans and Official Plan Amendments support transit-oriented land development (at Allen/Sheppard, along Keele Street, within the Downsview area and the York University lands) and protect for a future subway.
- 4) The Downsview lands (south of Sheppard Avenue West and east of Keele Street) have changed from a Canadian Forces Base to Parc Downsview Park (to consist of parkland, a future technology park and housing). As a result, there will be more people on the site who need better public transit access.
- 5) As a result of the RTES initiative, York University's new buildings protect for an alternative subway alignment, which is more central within the campus than the original EA alignment approved in 1994.
- 6) York Region has acquired property for an inter-regional transit terminal at Steeles Avenue, between Jane Street and Keele Street.

Although the 1994 EA Approval remains in effect, its amending formula does not accommodate:

- 1) The consideration of alternative subway alignments and station locations,
- 2) A station at Steeles Avenue; and
- 3) The ultimate radial extension of the subway into York Region instead of a loop along Steeles Avenue to Yonge Street.

Therefore, a new EA has been undertaken to develop, review and analyze potential changes to the 1994 Approved EA. The new EA represents an opportunity to consider a subway extension that will better serve the Keele Street area (City of Toronto), York University, GTA commuters from southwestern York Region (City of Vaughan) and Bradford GO Rail Line passengers.

1.2 STUDY PURPOSE AND OBJECTIVES

The purpose of the EA Study is to develop and analyze alternative alignments and station locations for the 1994 Approved EA to extend the Spadina Subway from Downsview Station to York University and to study a further radial extension to a terminal station at Steeles Avenue. The EA Study has also determined environmental impacts and has developed mitigation measures to minimize any negative impacts.

Consistent with the 1994 Approved EA, the objectives of the Spadina Subway Extension are to:

- 1) Provide subway service to the Keele/Finch area, York University and a new inter-regional transit gateway and commuter parking facility at Steeles Avenue;
- 2) Provide improved connections between the TTC subway system and GO Transit, York Region Transit and other inter-regional transit services;

- 3) Support local population and employment growth up to 2031, in accordance with the land use and transportation policies of the new City of Toronto Official Plan and the York Region Official Plan;
- 4) Minimize any negative environmental impacts; and
- 5) Achieve reasonable capital and operating costs.

The Spadina Subway Extension shall include the construction, operation and maintenance of underground subway tunnels from Downsview Station to Steeles Avenue, with subway stations (and related commuter facilities) (see Exhibit ES-3) located:

- 1) At an interchange with the GO Bradford Rail Line;
- 2) In the vicinity of Keele and Finch;
- 3) On the York University campus; and
- 4) At Steeles Avenue (between Keele and Jane Streets).

The alignment at the Steeles Avenue Station will also protect for the long-term extension of the Spadina Subway to Vaughan Corporate Centre.

1.3 EA STUDY PROCESS

1.3.1 Ontario Environmental Assessment Act

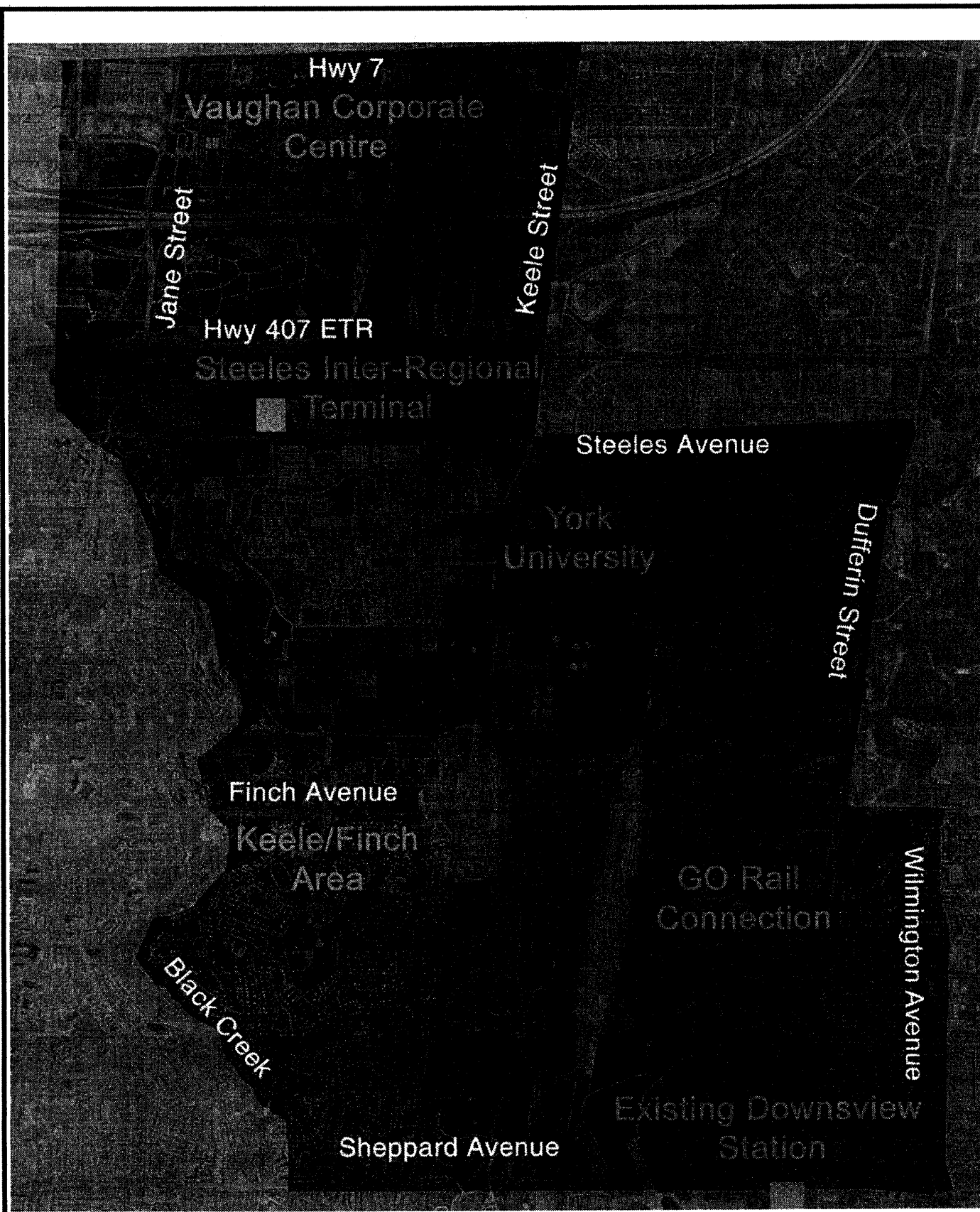
The Ontario Environmental Assessment Act requires the preparation and approval of a Terms of Reference as a prerequisite to the commencement of the Environmental Assessment Study. The Terms of Reference provides a plan for the preparation of the EA and a benchmark for the subsequent review and approval of the Study.

During Spring 2004, TTC and the City prepared the Terms of Reference for the Spadina Subway Extension Environmental Assessment, which:

- 1) Described the background and context,
- 2) Identified the purpose of the Spadina Subway Extension,
- 3) Provided a preliminary description of the key elements of the Project,
- 4) Determined a preliminary Study Area,
- 5) Developed a proposed work plan for the EA Study, and
- 6) Described the plan for public and stakeholder consultation during the EA.

The Terms of Reference was reviewed by the general public at Open Houses held on April 20, 2004 (C.W. Jefferys Collegiate Institute) and April 22, 2004 (York University) and was circulated to key stakeholder agencies. The Commission, at its meeting of June 16, 2004, approved the submittal of the Terms of Reference to the Ministry of the Environment. Subsequently, the Minister of the Environment approved the Terms of Reference on September 13, 2004.

In November 2004, TTC retained URS Canada Inc. to conduct the Environmental Assessment Study, in accordance with the approved Terms of Reference.



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



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STUDY AREA

ES-3

The EA Study was conducted in three phases, as follows:

- 1) **Phase 1: Routes and Station Locations** – This initial phase involved generating, evaluating and selecting alternative routes (i.e. corridors) and general station locations;
- 2) **Phase 2: Alignments and Station Concepts** – The second phase involved generating and evaluating more detailed alignments and station concepts within the technically-preferred route; and
- 3) **Phase 3: Detailed Assessment of the Undertaking** – The last phase of the Study involved the detailed environmental assessment of the technically-preferred alignment and station concepts selected in Phase 2.

The study methodology and findings are described in detail in Sections 2, 3 and 4, below.

1.3.2 Canadian Environmental Assessment Act

The Canadian Environmental Assessment Act (CEAA) applies to federal authorities responsible for a decision or planned action, which enables a project to proceed in whole or in part. The requirements of the Act are “triggered” when a federal authority is the proponent of the project, provides funding or land to the project, or issues a permit, license or authorization (as prescribed in the Law List Regulations).

Commencing with the Terms of Reference phase and continuing throughout the EA Study, the Study Team consulted with federal authorities (through the Canadian Environmental Assessment Agency) to identify any CEAA “triggers”. At the time of writing of this Executive Summary, no CEAA triggers had been determined.

1.3.3 Consultation

Public and stakeholder agency consultation is a key requirement of the Ontario Environmental Assessment Act. As such, a comprehensive plan was developed during the EA Terms of Reference and implemented during the EA Study.

The plan for public consultation was to offer the public a wide range of methods of communicating with the EA Study Team and to choose their level of involvement in the EA study. Accordingly, a dedicated telephone number (including TTY), fax, email address and web site were introduced during the Terms of Reference. Opportunities for public participation in decision-making at the three key milestones of the study included: open houses (with commenting forms), interactive on-line commenting and facilitated workshops (both of which included detailed questionnaires).

A Technical Advisory Committee (TAC), consisting of senior staff of key stakeholder agencies, was established in early 2004 to provide ongoing advice and assistance to TTC and the City of Toronto during the EA Study. Under the leadership of TTC, the TAC consisted of representatives of the Canadian Environmental Assessment Agency, City of Toronto (City Planning and Transportation Services Divisions), City of Vaughan, GO Transit, Ontario Ministry of Transportation, Parc Downsview Park, Toronto and Region Conservation Authority, York Region, York Region Transit and York

University. TAC meetings were held on a monthly basis throughout the Terms of Reference and EA Study.

In addition, contacts were established with a broad range of Federal, Provincial and Municipal agencies with a potential interest in the Project during the Terms of Reference stage. Stakeholder agency workshops, including participants from the TAC and a wide range of agencies, were held twice during the EA Study. In addition, ad-hoc meetings were arranged to discuss and resolve specific issues.

Major comments received from the public and stakeholder agencies about key study findings and recommendations are noted in Sections 2, 3 and 4. Issues that are outside of the scope of the EA, but will need to be addressed during detailed design or beyond, are included in Commitments to Future Work (Section 5).

2 PHASE 1: ROUTES AND GENERAL STATION LOCATIONS

Three key activities were conducted during the first phase of the EA Study, including:

- 1) A detailed inventory of existing and future conditions in the proposed Study Area;
- 2) Review and confirmation of the Study Area boundaries;
- 3) Review of alternatives to the Undertaking;
- 4) Development of alternative routes (including general station locations);
- 5) Preparation of route evaluation criteria and indicators;
- 6) Public and stakeholder consultation; and
- 7) Evaluation and selection of the technically preferred route.

2.1 EXISTING AND FUTURE CONDITIONS

The EA study began with a comprehensive inventory of existing and future conditions within the Study Area (as proposed in the EA Terms of Reference) (see Exhibit ES-3), and focused on transportation, natural and cultural heritage, as well as socio-economic issues.

2.1.1 Land Use and Transportation Planning Context

Exhibit ES-2 presents the land use and planning influences within the Study Area. The current land use structure within the Study Area includes:

- 1) The Keele Industrial Area, a stable industrial/employment area, which is bounded by Sheppard Avenue to the south and includes an extensive gas/oil tank storage and distribution centre north of Finch;
- 2) Two hydro corridors (under the jurisdiction of Hydro One Networks Inc.), including: the Richview-Cherrywood Hydro Corridor (commonly known as the Finch hydro corridor), located north of Finch Avenue, which includes Trans-Northern, Sun-Canadian, Esso, Trans-Canada and Enbridge crude oil and gas pipelines, and the Cherrywood-Claireville Hydro Corridor (commonly known as the Steeles hydro corridor), located north of Steeles Avenue;

- 3) York University, which currently has a day-time population of over 70,000 students, faculty and staff, whose land holdings include the core campus lands as well as undeveloped or developing lands in the vicinity of Steeles Avenue, Keele Street and the Murray Ross Parkway;
- 4) Parc Downsview Park (under Federal jurisdiction), which occupies lands previously occupied by Canadian Forces Base Downsview;
- 5) Downsview Airport, which continues to operate with a single north-south runway in support of Bombardier's ongoing aircraft manufacturing operations; and
- 6) Stable, residential neighbourhoods, including apartments (on Keele and north-west of the Keele/Finch intersection) and low density residential (south-west of the Keele/Finch intersection and east of Dufferin Street).

The former City of North York Official Plan established and protected this underlying urban structure. The City of North York Official Plan remains as the overriding planning policy document for the lands south of Steeles Avenue, including the 1994 MetroPlan, the York University Secondary Plan and the Downsview Area Secondary Plan. The new City of Toronto Official Plan (currently under review) promotes measures to reduce car dependency and rush hour congestion by increasing trips made by transit, walking and cycling. Specifically, a corridor between Downsview Station and Steeles Avenue has been identified as a "Higher Order Transit Corridor", to be initially served by the bus-only lanes from Downsview Station to York University (the Municipal Class EA was filed in April 2005) and ultimately by subway (Spadina Subway Extension).

The York University Secondary Plan Update is currently underway and is expected to be completed in 2006. In addition to the York University and Downsview Area Secondary Plans, the City of Toronto has conducted planning studies for the Allen/Sheppard area and Keele Street corridor, which have identified opportunities for intensification and redevelopment.

North of Steeles Avenue, the York Region Official Plan and supporting Transportation Master Plan identify a system of Urban Centres and Corridors focused on the Vaughan Corporate Centre (located at the Jane/Highway 7 intersection) and Highway 7. The City of Vaughan incorporates this concept into their statutory planning documents. Both York Region and the City of Vaughan have prepared plans that anticipate the future extension of the Spadina Subway to Vaughan Corporate Centre.

All of these planning documents, with their various levels of statutory approval and influence, support higher density redevelopment in anticipation of the extension of the Spadina Subway to York University, Steeles Avenue and, ultimately, Vaughan Corporate Centre.

2.1.2 Existing Transportation Systems

The focal points of transit services within the Study Area are: Downsview Station, the current terminus of the Spadina Subway, and York University, which is served by over 1,500 buses a day, operated by TTC, GO Transit, York Region Transit, Viva and Brampton Transit. In addition, GO Transit operates the Bradford commuter rail service, from Bradford to Union Station, via the Canadian National Railway Newmarket Subdivision. Within the Study Area, the GO Bradford service stops at the temporary York University Station, which is located near the campus at Canartic Drive.

Recent ridership trends show a significant increase in demand for bus service within southern York Region and to York University.

The existing road network consists of a grid pattern of arterial roads within the City of Toronto. The north end of the Study Area is bounded by Highway 407 and Highway 7. The arterial roads and Highway 7 are subject to chronic traffic congestion during rush hours, which also results in delays to bus services.

2.1.3 Existing Natural Environment

The Study Area is situated between the valleys of Black Creek and the West Don River, and generally drains east to the West Don River. Historical records indicate soils consisting of fill, upper till, upper sand/silt deposits and upper clay deposits.

As shown in Exhibit ES-4, watercourse/water bodies located within the potential zone of influence of the Spadina Subway Extension include Dufferin Creek, Stong Pond and the York University Pond. No aquatic species at risk are located within the Study Area.

The most significant vegetation communities within the Study Area are associated with the Dufferin Creek Valley, the Black Creek Valley, and the West Don River Valley. There are also woodlots (Boynton, Boyer, Danby, Osgoode and Saywell) at York University. Because the Study Area is urbanized, wildlife habitat is typical of an urban setting and hosts species that are very tolerant of human disturbance.

2.1.4 Existing Socio-Economic Environment

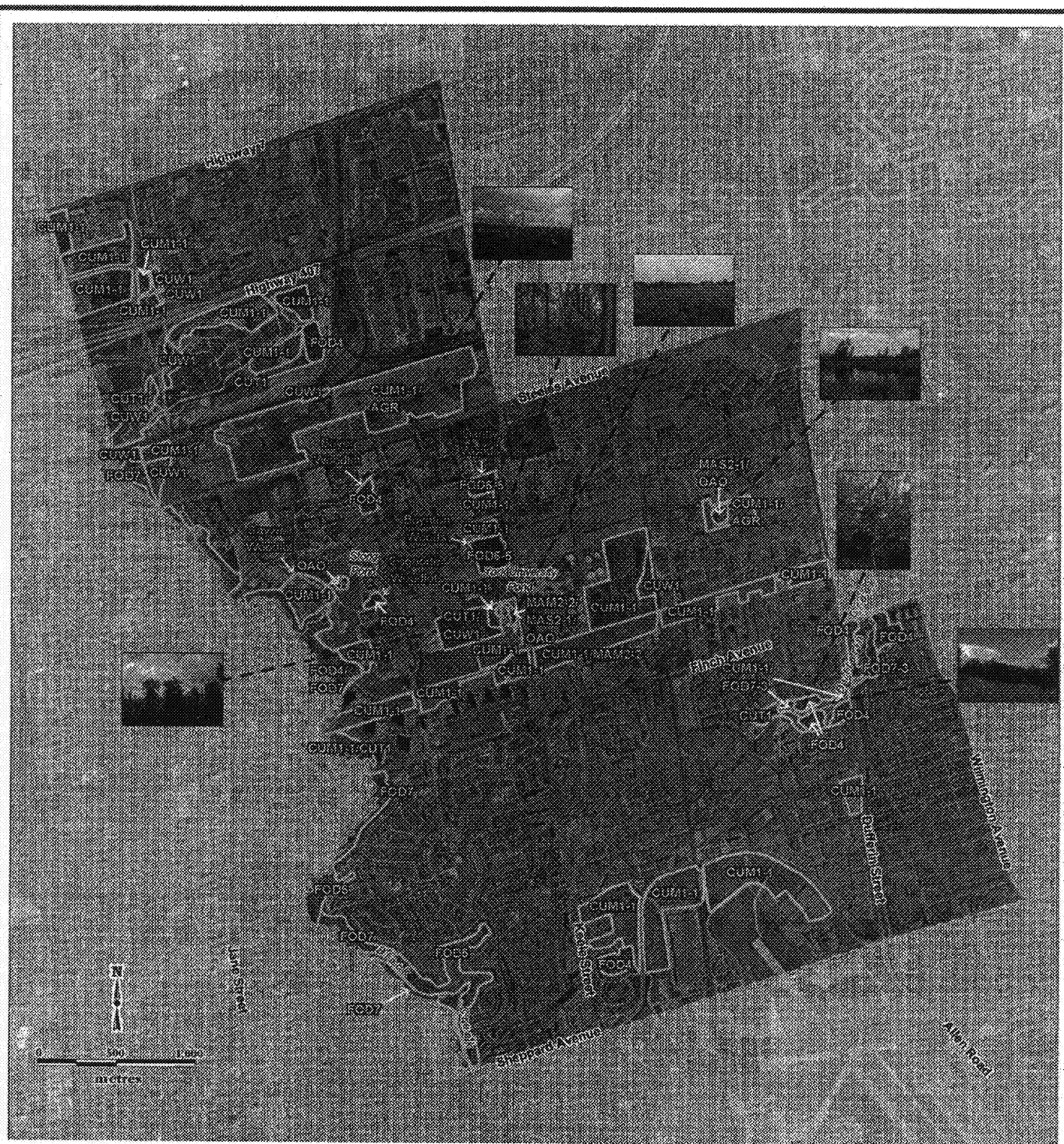
As shown in Exhibit ES-5, the Study Area hosts a broad range of community centres, recreation centres, and schools (mainly located within the residential areas) as well as places of worship. In addition to Parc Downsview Park, other parkland is situated within the residential communities and in the vicinity of the Black Creek and West Don River valleys.

Although there are no registered archaeological sites within the Study Area, eleven properties associated with historic communities have heritage significance (see Exhibit ES-5).

2.2 REVIEW OF ALTERNATIVES TO THE UNDERTAKING

Alternatives to the Undertaking are functionally different ways of approaching or dealing with a problem or opportunity. The Environmental Assessment Act requires that an evaluation of alternatives to the Undertaking be conducted as part of the environmental assessment process. Because the current EA study is being undertaken to update the approved 1994 Yonge-Spadina Subway Loop EA, the current EA:

- 1) Identified and reviewed the alternatives to the Undertaking considered in the 1994 Yonge-Spadina Subway Loop EA and the 2001 Rapid Transit Expansion Study;
- 2) Presented the assessment of each alternative based on these previous studies;



Legend

- Study Area
- Watercourse
- Vegetation Community Boundary
- Vegetation Communities
- Agricultural
- Dry-Moist Old Field Meadow Type
- Mineral Cultural Thicket Ecosite
- Mineral Cultural Woodland Ecosite

- Dry-Fresh Deciduous Forest Ecosite
- Dry-Fresh Sugar Maple Deciduous Forest Ecosite
- Fresh-Moist Sugar Maple-Hardwood Deciduous Forest Type
- Fresh-Moist Lowland Deciduous Forest Ecosite
- Fresh-Moist Willow Lowland Deciduous Forest Type
- Rood-canary Grass Mineral Meadow Marsh Type
- Catalpa Mineral Shadow Marsh Type
- Open Aquatic

Shade Brown: L.O.T., Limited Data Only

IGL

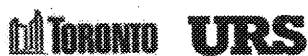
SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Legend			
	Study Area		Arena
	Parks		Outdoor Pool
	Utility Corridor		Indoor Pool
	Four Winds Drive		Library
	Allotment Community Garden		Child Care Centre
	Cultural Heritage Site		Place of Worship
	Toronto District School Board Elementary		
	Toronto Catholic School Board Secondary		
	Toronto District School Board Others		
	Toronto Catholic District School Board Elementary		
	Toronto District School Board Secondary		
	Private School		

Data Sources: Toronto Urban Development Services, Toronto District School Board, Toronto Catholic District School Board, and Information Resources Community & Neighbourhood Services at the City of Toronto.

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



CULTURAL HERITAGE

ES-5

- 3) Identified the key changes to the environment which have occurred since the completion of the 1994 Approved Undertaking and assess how they may affect the conclusions of the previous studies;
- 4) Examined the ability of each alternative to meet the purpose of the Spadina Subway Extension (See Section 1.2); and
- 5) Determined the preferred alternative to carry forward for detailed analysis and evaluation.

2.2.1 1994 Yonge-Spadina Subway Loop Environmental Assessment

The 1994 EA examined a comprehensive range of alternatives to the Undertaking, including:

- 1) Doing nothing;
- 2) Roadway improvements (including reserved bus lanes and additional automobile lanes);
- 3) Modifications to the Yonge-University-Spadina Subway Line (including terminal and Bloor Station improvements, Automatic Train Control, and Bus or Light Rail Transit between the Yonge and Spadina Subway corridors;
- 4) Extension of the proposed Sheppard Subway from Yonge Street (now Sheppard-Yonge Station) to Allen Road (now Downsview Station);
- 5) Extensions of the existing Yonge-University-Spadina Subway Line (including northerly extensions of the Yonge and Spadina Subway Lines; northerly extensions, with a bus or Light Rail Transit connection between the Yonge and Spadina Subway corridors; and northerly extensions with a Yonge Street to Allen Road extension of the Sheppard Subway; or
- 6) Connection of the Yonge and Spadina Subway lines to form a continuous "loop".

These alternatives were evaluated on the basis of how well they achieved the project objectives, including level of transit service (i.e. sufficient system capacity and reliability), integration of transit services, intensification of land use, social and natural environmental impacts and costs. The evaluation confirmed that extension of the Spadina Subway to the north, ultimately connecting to the Yonge Subway at Finch Station (via Steeles Avenue) to form a "loop", was the preferred alternative.

2.2.2 2001 Rapid Transit Expansion Study

In 2001, TTC conducted the Rapid Transit Expansion Study (RTES) to examine the needs and priorities for expansion of TTC's rapid transit system to the Year 2021 in support of the population and employment growth envisaged in the new City of Toronto Official Plan and in recognition of GTA development trends.

One of the critical issues examined in RTES was whether connecting the Yonge and Spadina Subway lines was still required, given changes which have occurred since the Yonge-Spadina Subway Loop EA was conducted. The RTES report observed that, while the need for a loop seemed more pressing in 1992/93 due to congestion on the Yonge Subway, ridership circumstances have changed significantly since the Yonge-Spadina Subway Loop EA was conducted. RTES also noted that while looping has certain operational benefits, there would be more cost-effective ways of eliminating operational constraints at terminal stations (such as terminal and signalling improvements) than connecting the Yonge and Spadina Subways.

Accordingly, the report concluded that looping of the Yonge and Spadina Subways would not be required in the medium term and that looping of the two lines via Steeles Avenue in the long term is unlikely. The conclusions opened the following opportunities for extending the Spadina Subway:

- 1) The loop that would connect the Yonge and Spadina Subways on Steeles Avenue could be pushed further north (e.g. Highway 7) if required in the future;
- 2) Radial extension of the line beyond York University to Steeles Avenue could be considered if Steeles Avenue is no longer a constraint on the location of the top of the loop; and
- 3) Alignments that penetrate further west into the York University campus could be considered (rejected in the 1994 EA due to increased capital costs for an easterly extension of the Spadina Line to join the Yonge Line).

The Rapid Transit Expansion Study (RTES) recommended extension of the Spadina Subway line to Steeles Avenue (instead of terminating within the York University campus). This would offer the potential for some commuter facilities to be relocated from the York University campus lands (as proposed in the 1994 Approved EA) to the hydro corridor north of Steeles Avenue. By moving some of these facilities into the hydro corridor, the prime lands on the York University campus would be freed for development.

RTES also recommended further analysis to determine the best alignment of the Spadina Subway between Downsview Station and York University, including a review of an alternative alignment with the GO Bradford Rail Line-TTC interchange station at Sheppard Avenue and a Keele/Finch station closer to the Keele/Finch intersection.

The current Environmental Assessment Study builds on the Project need and justification established in the 1994 Approved EA and the 2001 Rapid Transit Expansion Study. The new EA is being conducted to ensure the best alignment for the Spadina Subway Extension is chosen to capitalize on recent and future changes within the Study Area.

2.3 DEVELOPMENT OF ALTERNATIVE ROUTES

Alternative subway routes and general station locations were developed for further analysis and evaluation. Routes were defined by the Study Team as broad geographical corridors, within which, a number of subway alignments may occur. Routes and general station locations were developed using "route generation criteria", which were based on the five key project objectives (see Section 1.2 and Table 1 below).

Table 1
Route Generation Criteria

Objectives	Criteria
1) Provide subway service to the Keele/Finch area, York University and a new inter-regional transit terminal and commuter parking facility at Steeles Avenue.	a) Locate subway station within 500 m of the Keele/Finch Intersection.
	b) Locate a subway station within York University Campus.
	c) Terminate subway extension at York Region's inter-regional transit terminal site on the north side of Steeles Avenue between Jane Street and Keele Street.

Objectives	Criteria
2) Provide improved connections between the TTC subway system and GO Transit, York Region Transit and other inter-regional transit services.	a) Locate subway station where the subway extension crosses the GO Bradford Rail Line. b) Provide bus terminals, where appropriate, to allow bus passengers (TTC, GO and York Region Transit) to transfer to the subway.
3) Support local population and employment growth.	a) Protect for a future subway extension to the Vaughan Corporate Centre. b) Subway stations should be 1.0 km apart to maximize the areas serviced by the subway (based on maximum walking distance of 500 m).
4) Minimize any negative environmental impacts.	a) Where possible, avoid residential areas, fuel tank farms, and significant natural and cultural heritage features.
5) Achieve reasonable capital and operating costs.	a) Make route as straight as possible or use very large curves so that trains can operate at maximum speeds. b) Start the subway extension where the existing track ends at Downsview Station.

As summarized in Table 2, a total of eight routes were developed using these criteria.

Table 2
Overview of Routes

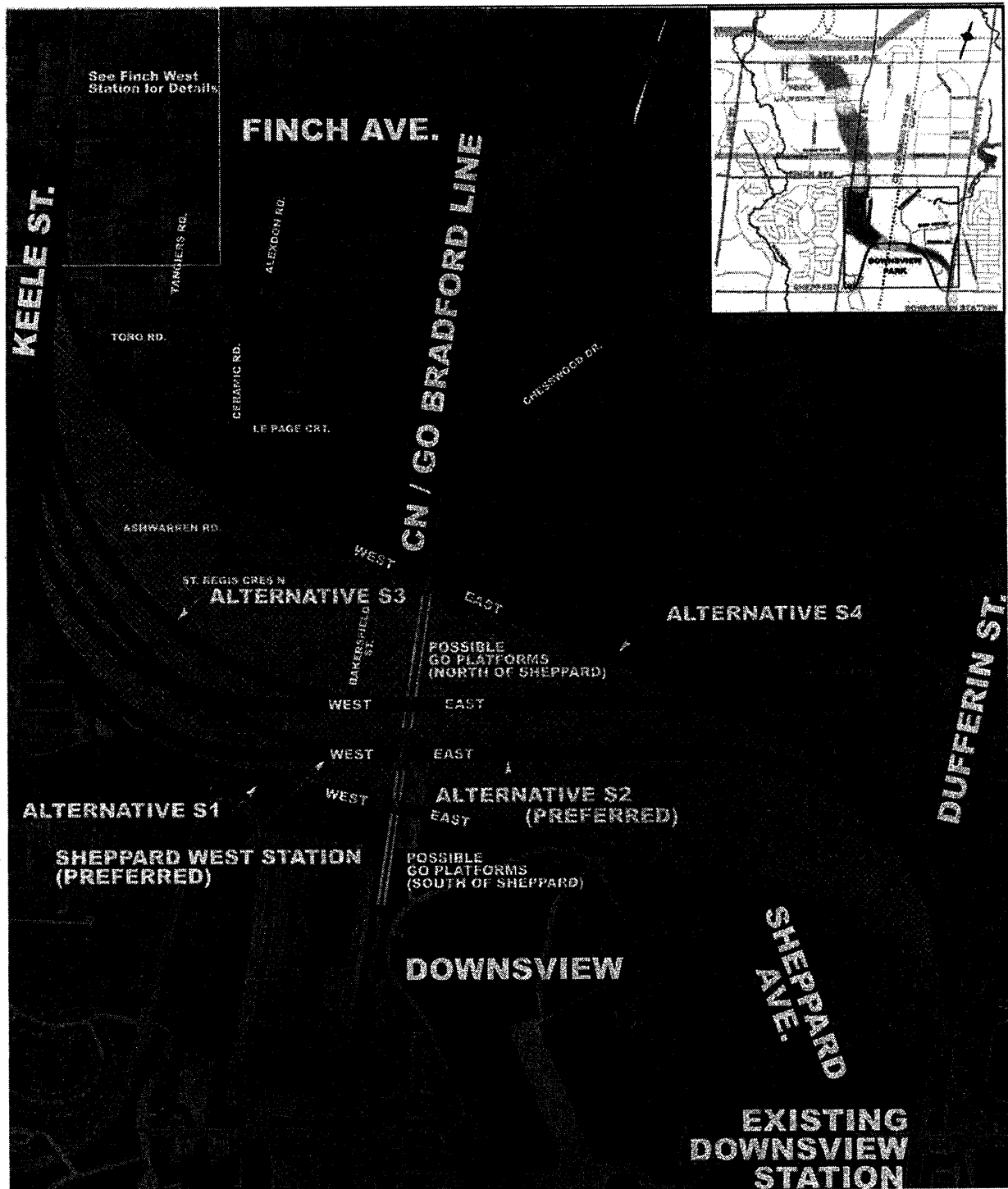
	TTC-GO Bradford Rail Line Interchange	Keele/Finch Intersection	York University
Route 1	Sheppard Avenue	Keele Street/ Finch Avenue	Common
Route 2	Sheppard Avenue	Keele Street/ Murray Ross Parkway	Common
Route 3	Sheppard Avenue	Keele Street/ Murray Ross Parkway	Sentinel
Route 4	Sheppard Avenue	Keele Street/ Finch Avenue	Sentinel
Route 5	Finch Avenue	Keele Street/ Murray Ross Parkway	Common
Route 6	Finch Avenue	Keele Street/ Murray Ross Parkway	Common
Route 7	Chesswood Avenue	Keele Street/ Murray Ross Parkway	Common
Route 8	Chesswood Avenue	Keele Street/ Murray Ross Parkway	Sentinel

Notably, Route 1 (Exhibit ES-6) follows the alternative alignment (with the TTC-GO Bradford Rail Line interchange at Sheppard Avenue) proposed for further analysis in RTES and Route 5 (Exhibit ES-7) is consistent with the 1994 Approved EA Alignment from Downsview Station to York University.

2.4 PUBLIC AND STAKEHOLDER CONSULTATION

During the first round of consultations, held in February 2005, members of the public and stakeholder agencies were invited to review and comment on the following:

- 1) Inventory of existing and future conditions,
- 2) Review of alternatives to the Undertaking,
- 3) Proposed alternative routes and general station locations, and
- 4) Proposed route evaluation criteria and indicators.



Legend

-  ALL ALIGNMENTS ARE SUBJECT TO REFINEMENT WITHIN THE SHADED AREA
-  POTENTIAL STATION PLATFORM LOCATIONS

NOTES:

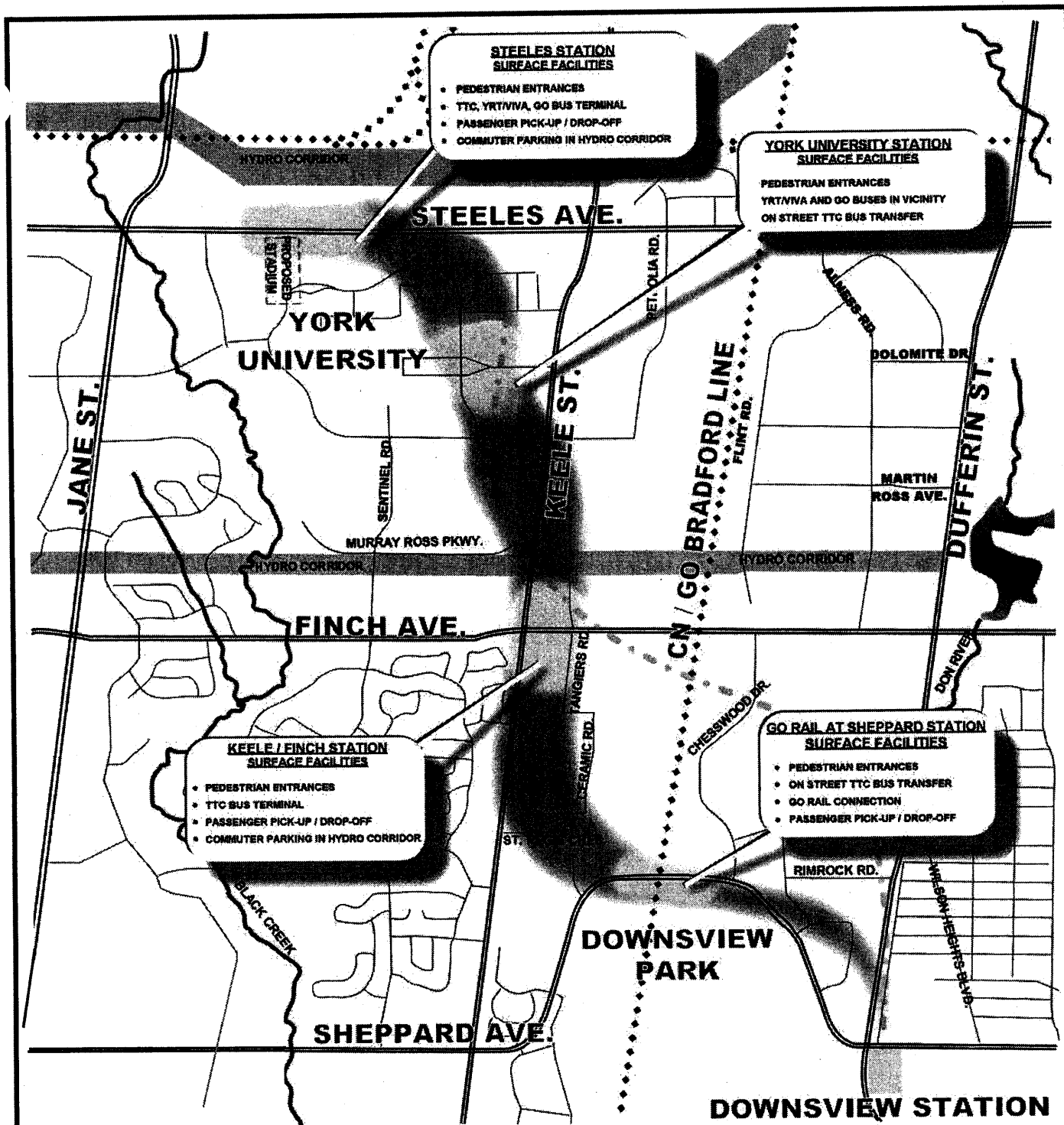
1. SHEPPARD WEST STATION PLATFORM MAY BE LOCATED EITHER EAST OR WEST OF THE GO BRADFORD LINE
2. ALL ALIGNMENTS IN SOUTH SECTION CAN BE COMBINED WITH ALTERNATIVE ALIGNMENTS IN NORTH SECTION

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



**SOUTHERN ALIGNMENT
ALTERNATIVES**

ES-9



Legend



ROUTES



GENERAL STATION LOCATION



1994 EA-APPROVED ALIGNMENT

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

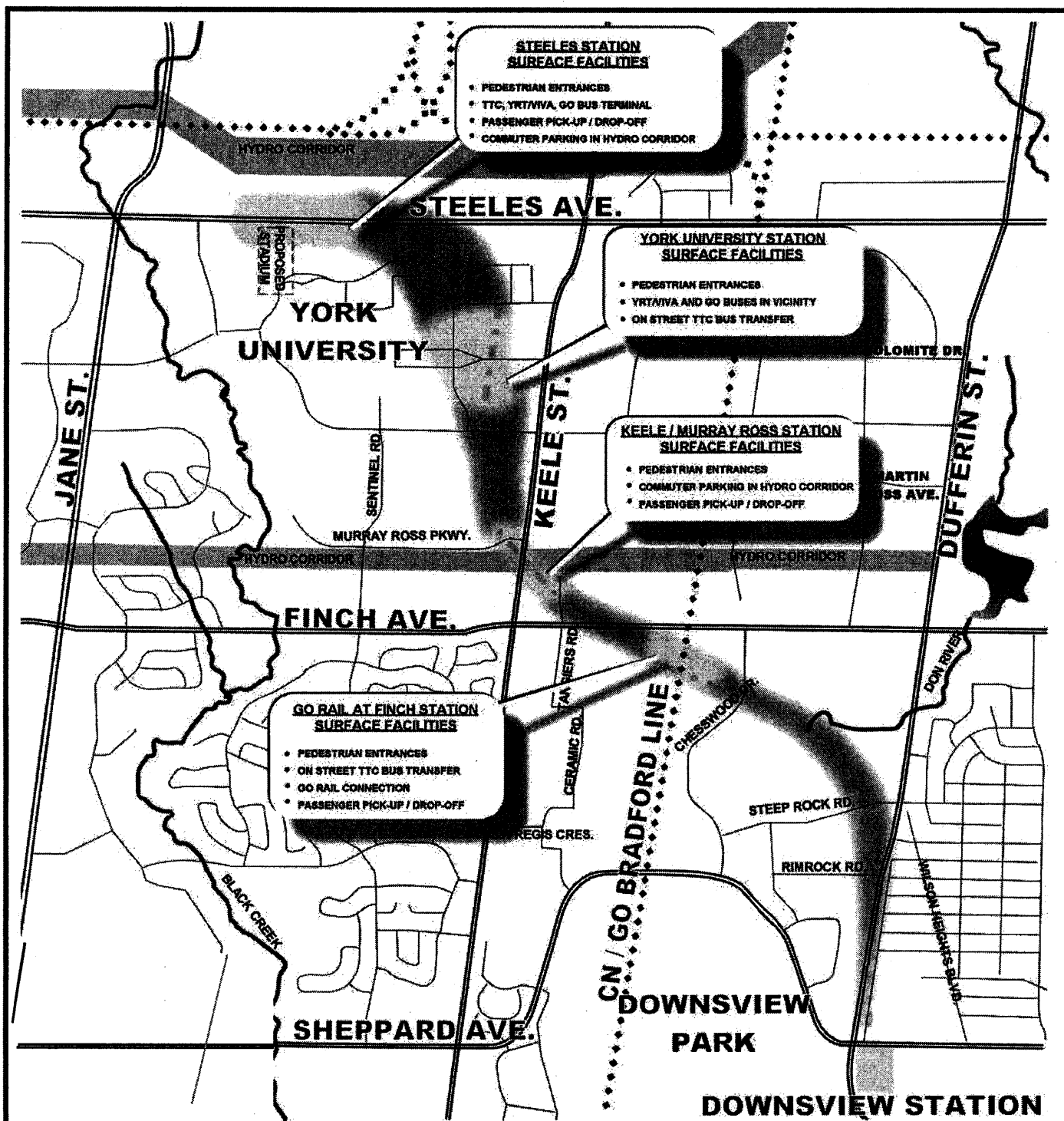


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ROUTE 1

ES-6



Legend



ROUTES



GENERAL STATION LOCATION



1994 EA-APPROVED ALIGNMENT

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



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ROUTE 5

ES-7

Based on these consultations, further details on local conditions were added to the Study Area inventory and several new or revised indicators were added to the route evaluation criteria.

2.5 EVALUATION OF ROUTES

A comprehensive list of evaluation criteria and indicators were developed by the Study Team in order to analyze and evaluate the alternative routes. As detailed in Appendix A, these criteria were derived from the project objectives and included the following considerations:

- 1) Convenience for riders to walk to local stations;
- 2) Convenience for other modes of travel;
- 3) Conform with current, approved planning documents;
- 4) Maximize redevelopment potential in support of the subway extension;
- 5) Maximize the potential to create a high quality urban/pedestrian environment;
- 6) Protect existing stable land uses;
- 7) Minimize the potential effects on important natural and cultural heritage features;
- 8) Minimize capital and operating costs of the subway extension;
- 9) Maximize revenue generated from the subway extension;
- 10) Maximize the subway extension in lands with no property costs to the Project; and
- 11) Quality of subway service.

For the evaluation of the eight alternative routes (and general station locations), the Study Team used both numeric and a qualitative analysis methods. These two methods were used concurrently to provide a traceable decision-making process.

The evaluation of the eight possible routes and the selection of the technically-preferred route focussed on determining the best location for TTC-GO Rail interchange, the Finch/Keele and York University stations. All routes would serve a station located at the York-Region inter-regional bus terminal lands at Steeles Avenue West.

Three general station locations were considered for the TTC-GO Rail interchange: at Sheppard Avenue (Routes 1, 2, 3 and 4), in the centre of the Keele Industrial Area at Chesswood Drive (Routes 7 and 8) and at Finch Avenue (Routes 5 and 6). While all proposed locations would serve passengers transferring between the GO Bradford Rail Line and the subway, both the Chesswood Drive and Finch Avenue locations (within the Keele Industrial Area) would offer limited opportunities for future population and employment growth. This is because the Keele Industrial Area is a stable, low density employment area, which is protected under the new City of Toronto Official Plan. At Finch Avenue, development opportunities are further inhibited by extensive fuel storage tank lands and the Finch hydro corridor to the north. In comparison, a station at Sheppard Avenue would be situated at Parc Downsview Park, which is slated for future development as parkland and for a technology park and housing. Therefore, the preferred location for the TTC-GO Rail interchange would be at Sheppard Avenue.

One of the most significant transportation requirements for the Keele/Finch area is to provide a convenient transfer between the subway and the 36 - Finch West bus route, which is one of Toronto's highest demand bus routes. This could occur at the Keele / Finch intersection (as proposed in Routes

1 and 4) or as identified in the 1994 Approved EA, on Finch at the Bradford GO Rail line (as proposed in Routes 5 and 6). Greater than 200 metres from Finch Avenue, bus passengers who are not transferring to the subway would incur too much delay and, therefore, a connection between the 36 - Finch West bus route and the subway could not be made. This lack of transfer opportunity was one of the key reasons for not considering Routes 2, 3, 7 and 8 for further analysis. In addition, a station at the Keele/Finch intersection would offer enhanced transit-oriented redevelopment opportunities, compared to the hydro corridor which can host only limited types of uses (such as recreation trails, allotment gardens, roads and commuter parking).

At York University, the two general station locations were either in the Common (Routes 1, 2, 5 and 7) or at Sentinel Road (Routes 3, 4, 6 and 8). The Common, which is the current transit hub for the University, served by over 1,500 buses a day, was preferred over the Sentinel Road location.

2.6 SELECTION OF THE PREFERRED ROUTE

Route 1, which comprises the preferred locations for the GO Rail-TTC interchange, Keele/Finch node and York University stations, was selected as the technically-preferred route.

Route 1 would include stations at the following locations:

- 1) Sheppard Avenue West at the Bradford GO Rail Line (Sheppard West Station),
- 2) The intersection of Keele Street and Finch Avenue West (Finch West Station),
- 3) The Common area of the York University campus (York University Station), and
- 4) The proposed inter-regional transit terminal at Steeles Avenue West (Steeles West Station).

Route 1 was selected as the technically-preferred route for the following reasons:

- 1) The proposed Sheppard West Station connects to the GO Bradford line and will encourage redevelopment of the Downsview lands;
- 2) The proposed Finch West Station will provide a convenient connection to the busy 36 Finch West bus route;
- 3) The proposed York University Station is situated in the Common area, which is the existing transit hub for the University;
- 4) The route maximizes use of the Keele Street road right-of-way, which reduces property impacts and costs;
- 5) The route minimizes impacts to the natural environment and avoids Black Creek and Dufferin Creek; and
- 6) The route protects for future expansion into York Region and Vaughan Corporate Centre.

During the second round of public and stakeholder consultation, the selection of Route 1 was supported by over 90% of respondents.

3 PHASE 2: ALIGNMENTS AND STATION CONCEPTS

The second phase of the EA Study included the development and evaluation of detailed alignments within the Route 1 corridor as well as station concepts.

3.1 DEVELOPMENT OF ALTERNATIVE ALIGNMENTS

3.1.1 Alignment Generation Criteria

Alternative alignments were developed using "alignment generation criteria", which were developed by the Study Team based on the overall objectives for the Spadina Subway Extension, subway operating requirements and TTC's engineering design criteria. Alignments were defined as 30-metre wide rights-of-way located within the technically-preferred Route 1.

These criteria were as follows:

- 1) Construct subway under road right-of-way to avoid disruption and minimize property acquisition;
- 2) Avoid petroleum storage facilities;
- 3) Avoid structures with deep foundations (buildings and existing bridges);
- 4) Construct below existing grade to minimize impacts to crossing roads and adjacent properties;
- 5) Avoid impacts to cultural and natural heritage features;
- 6) Avoid stable residential areas;
- 7) Meet geometric design standards (absolute minimum radius = 300 metres; desirable minimum radius = 700 metres; all stations must be on at least 200 m of straight track);
- 8) Allow trains to operate at two-minute headways;
- 9) Provide cross over and storage tracks for operational needs; and
- 10) Protect for further extension into York Region (Vaughan Corporate Centre).

In addition, "special track work areas" were identified based on the following subway operations requirements:

- 1) Provision of scheduled short-turn service at Downsview Station (similar to existing AM peak short-turn service at St. Clair West Station), which would require a three-track, double-ended cross-over, immediately north of the Downsview Station platform;
- 2) Provision for switching trains between northbound and southbound tracks at Finch West Station, to be used to provide reliable service or in emergency situations, which would require double cross-over tracks south of the station);
- 3) Turn back of trains at the Steeles West Station terminus, requiring double cross-over tracks immediately south of the platform; and
- 4) Provision of temporary storage of trains in a tail track structure north of the Steeles West Station platform.

3.1.2 Construction Methodology

Historically, three types of construction methods have been used for Toronto subway projects:

- 1) **Tunnelling Method** – A Tunnel Boring Machine (TBM) is placed in the ground via a launch site and is used to remove soil and to fabricate the subway tunnels. Because most of the tunnelling activity occurs below the ground level, disruption to traffic and buildings is minimised. Tunnelling method is used to construct the subway running structures (i.e. tracks running between stations).
- 2) **Cut-and-Cover Method** – Cut-and-Cover method involves excavating from the ground level to the bottom of the subway structure, building the subway structure and then backfilling on top of the structure. This method is used for the more complex sections of the subway alignment, including stations and special track work areas (such as tail tracks, cross-overs and three-track structures). Typically when cut-and-cover method is used within a road right-of-way, decking is installed at the road level to allow traffic to operate while excavation and construction of the subway continues below.
- 3) **Open Cut Method** – Similar to cut-and-cover method, the open cut method involves excavating from the ground level to the base of the subway structure. The difference is that once the subway structure is constructed, no backfilling occurs, creating an open “trench”. An example of open cut is the Rosedale Station to St. Clair Station section of the Yonge Subway. Notably, there are certain locations along this section of the Yonge Subway, which have been covered as local development occurs.

In order to determine the environmental impacts arising during the construction of the Spadina Subway Extension, preliminary investigations of the proposed construction methodology were conducted as part of the alignment development and evaluation process.

As shown in Exhibit ES-8, cut-and-cover method would be used for:

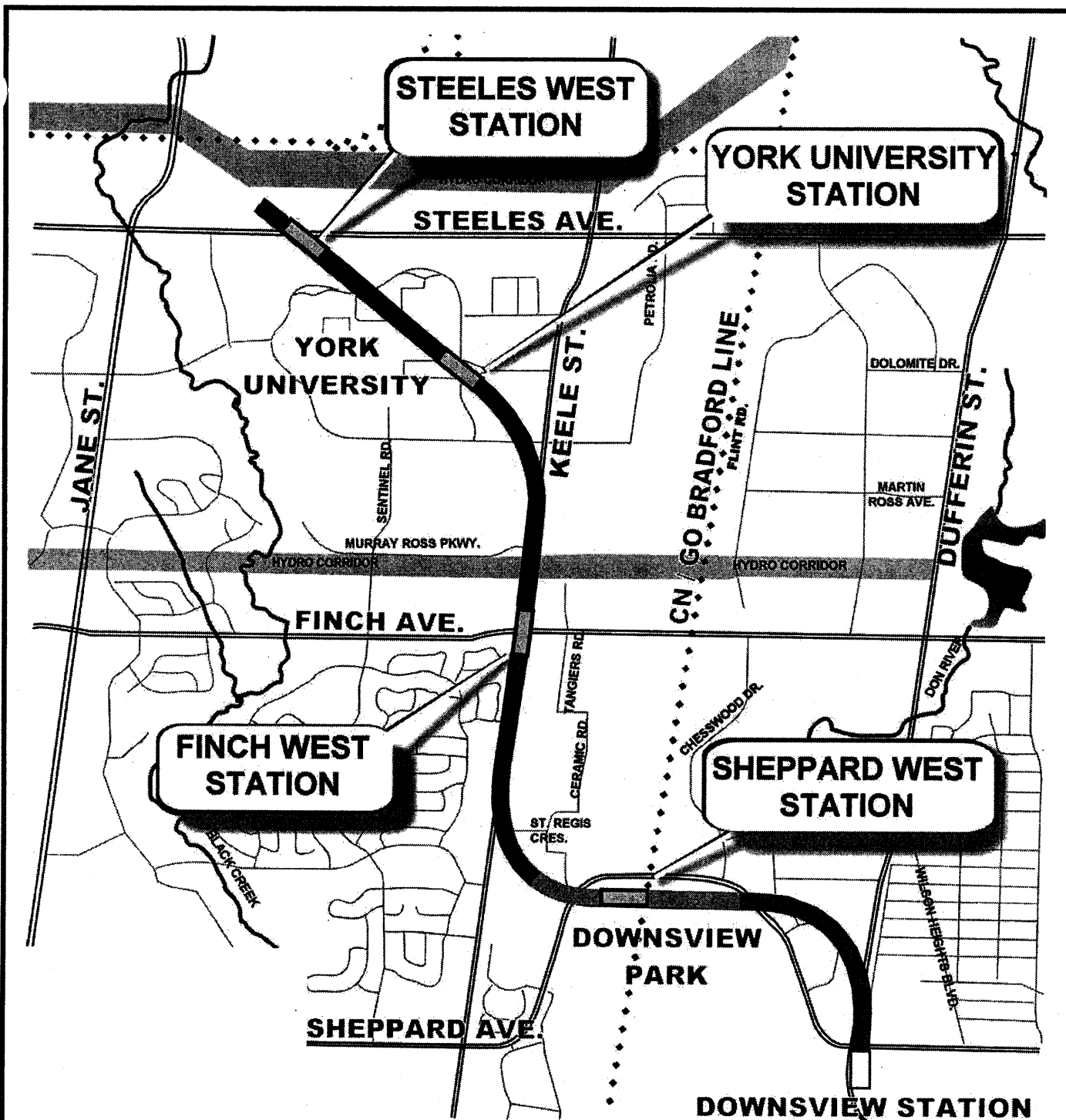
- 1) Each of the four stations;
- 2) The three track structure immediately north of Downsview Station;
- 3) The proposed cross-overs south of Finch West Station and Steeles West Station; and
- 4) The tail tracks at the north-end of Steeles West Station.

The remaining 4 kilometres of running structures would be constructed by tunnelling method. Open cut method was also considered for the section of the alignment within the undeveloped Parc Downsview Park lands as an alternate construction method to tunnelling or cut-and-cover.

3.1.3 Keele Street Alignment

At the outset of the development of alternative alignments, the Study Team determined the following benefits of maximizing the length of the subway alignment within the Keele Street road right-of-way:

- 1) The number of properties with subway tunnels running below would be minimized. As such, potential property impacts would be avoided;
- 2) Construction of Finch West Station (which must be constructed by cut-and-cover method) within the Keele Street right-of-way would minimize the number of private properties to be acquired for the station and related commuter facilities in the vicinity of the Keele and Finch intersection. This



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 SUBWAY PLATFORM (CUT AND COVER)	 TUNNELLING
 CUT AND COVER	 ALTERNATIVE CONSTRUCTION TECHNIQUES (OPEN CUT)

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

- would result in fewer properties to be acquired for the subway project, resulting in decreased business disruption and socio-economic impacts); and
- 3) Property costs would be minimized by using the municipal-owned road right-of-way, instead of private properties for the subway tunnels and Finch West Station.

For these reasons, it was determined that the best location for the Finch West Station would be under the Keele Street right-of-way, in the vicinity of Finch Avenue West. Because the alignment would be within the road right-of-way, the Finch West Station box could be shifted north or south, without impacting private property.

Because all potential alignments would converge at the Keele/Finch intersection, Route 1 was divided into a southern section, from Downsview Station to Finch Avenue West and a northern section from Finch Avenue West to Steeles Avenue West. Alternative alignments were developed and evaluated for both sections. Any of the northern and southern alternatives could be combined to achieve the best overall Spadina Subway Extension alignment.

3.1.4 Southern Alignments

As shown in Exhibit ES-9, four alignments were developed for the southern section of Route 1, including:

- 1) **Alternative S1**, which runs along the south perimeter of Route 1, with the minimum allowable curve immediately north of Downsview Station, maximizing the use of the government-owned Department of National Defence and Parc Downsview Park lands located south of Sheppard Avenue;
- 2) **Alternative S2**, which runs immediately south of Sheppard Avenue, mainly within the Parc Downsview Park lands;
- 3) **Alternative S3**, which runs immediately north of Sheppard Avenue, under privately-owned properties within the Keele Industrial Area; and
- 4) **Alternative S4**, which runs along the north perimeter of Route 1, within the Keele Industrial area.

The potential for running the alignment under the Sheppard Avenue West road right-of-way was investigated early in the EA Study. It was determined that the subway tunnels would conflict with the footings of the Canadian National Railway bridge and that costly and disruptive reconstruction of the bridge would be required. As well, the subway alignment would be extremely deep at this point, which would result in passenger inconvenience due to the vertical distance between the ground level pedestrian entrances and the Sheppard West Station platform level. Accordingly, the use of the Sheppard Avenue road right-of-way was not considered further.

In addition, sub-options for each of the four southern alignments were developed with Sheppard West Station located either on the east side or the west side of the Canadian National Railway right-of-way (used by the GO Bradford Rail Line).

Table 3
Southern Alignments: Sub-Options

	Sheppard West Station located west of GO Bradford Rail Line	Sheppard West Station located east of GO Bradford Rail Line
Alignment S1	S1 (West)	S1 (East)
Alignment S2	S2 (West)	S2 (East)
Alignment S3	S3 (West)	S3 (East)
Alignment S4	S4 (West)	S4 (East)

Within each of the sub-options, there are minor differences in the alignments between the GO Bradford Rail Line and Keele Street, due to the location of Sheppard West Station.

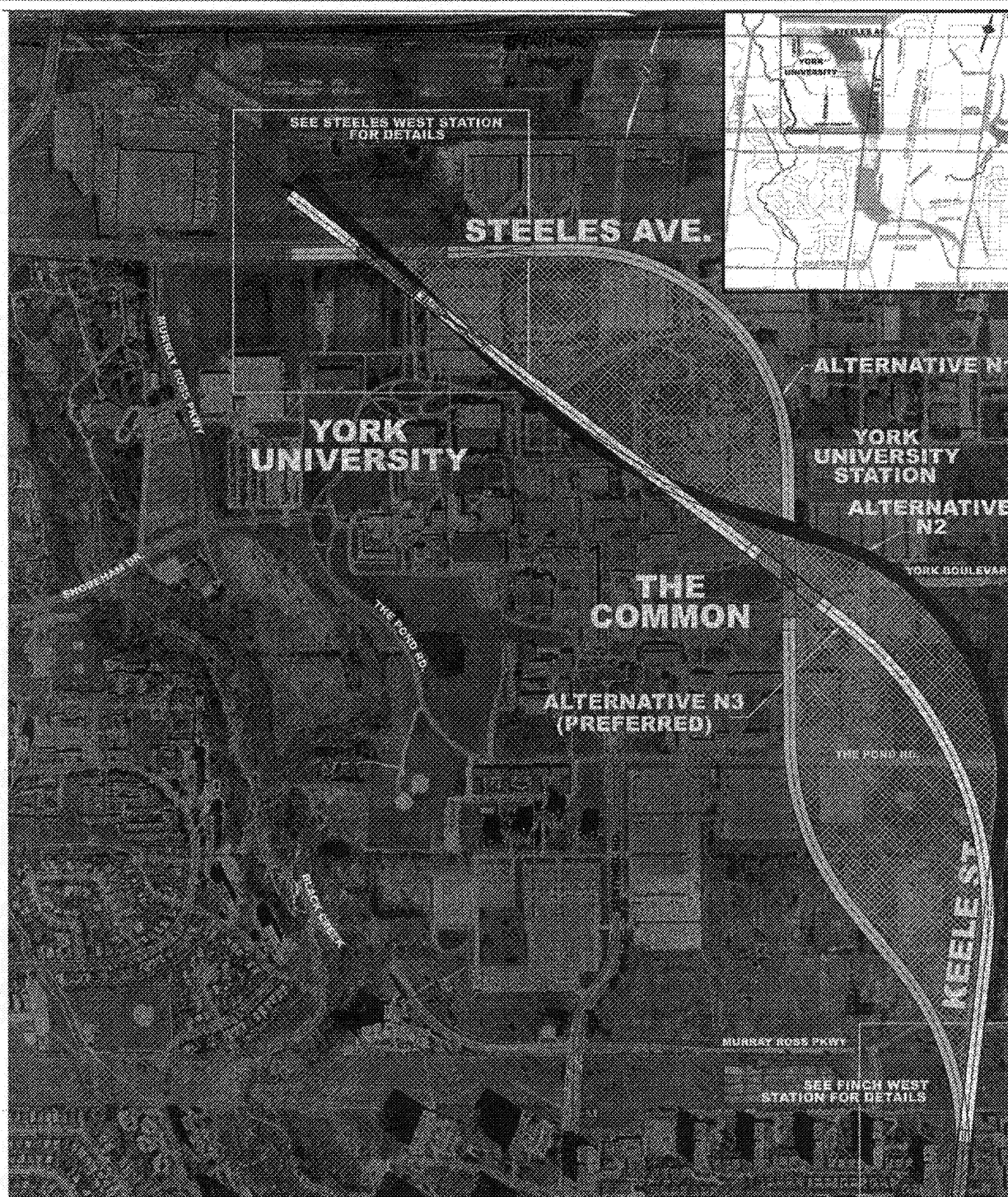
3.1.5 Northern Alignments

For the northern section of Route 1, three alignments were developed (see Exhibit ES-10), including:

- 1) **Alternative N1**, which generally runs under Ian MacDonald Boulevard within the York University campus and Steeles Avenue West. This alignment was originally proposed in the 2001 Rapid Transit Expansion Study. Under this alternative, the proposed York University Station would be located on Ian MacDonald Boulevard, at the east end of the Common. The proposed Steeles West Station would be located under the Steeles Avenue West road right-of-way;
- 2) **Alternative N2**, which would run under the Keele Street right-of-way up to The Pond Road and would run in relatively direct alignment between existing campus buildings. The proposed York University Station would be located north-east of York Lanes and the Common. The proposed Steeles West Station would be centred on Steeles Avenue, with a north-west to south-east orientation; and
- 3) **Alternative N3**, which would run under the Keele Street right-of-way up to The Pond Road and in a direct alignment between Keele Street and Steeles Avenue West, passing under the existing Schulich School of Business and York Lanes buildings. The proposed York University Station platform would be located at the east end of the Common, between the Schulich and York Lanes buildings. The Steeles West Station would have a similar location and orientation as for Alignment N2.

3.2 DEVELOPMENT OF ALTERNATIVE STATION CONCEPTS

Station concepts were developed based on travel demand forecasts, the proposed feeder bus network, future transit supportive development opportunities and TTC's engineering design criteria. These concepts included preliminary layouts of the subway platforms, pedestrian entrances, bus terminals, commuter parking, passenger pick-up and drop-off facilities and traction power substations. The type and size of commuter facilities (in addition to pedestrian entrances) to be provided at each station is summarized in Table 4, below.



Legend

-  ALL ALIGNMENTS ARE SUBJECT TO REFINEMENT WITHIN THE SHADED AREA
-  POTENTIAL STATION PLATFORM LOCATIONS
-  CROSS-OVER TRACKS

NOTE:
ALL ALIGNMENTS IN NORTH SECTION CAN BE COMBINED WITH ALTERNATIVE ALIGNMENTS IN SOUTH SECTION

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



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**SOUTHERN ALIGNMENT
ALTERNATIVES**

ES-10

Table 4
Summary of Commuter Facilities by Station

	Sheppard West Station	Finch West Station	York University Station	Steeles West Station
Bus Facilities	On-street bus stops	8-10 bay bus terminal	On-street bus stops	35-40 bay bus terminal(s)
Passenger Pick-up and Drop-Off	No	Yes	No	Yes
Commuter Parking	No	400 spaces in hydro corridor, north of Finch	No	2,400 to 3,000 spaces in the hydro corridor, north of Steeles

Alternative station concepts were developed and evaluated for Finch West and Steeles West Station. Because both York University and Sheppard West Stations would have modest commuter facilities (i.e. pedestrian entrances and on-street bus stops only), alternative station concepts were not developed for comparison and evaluation purposes. Instead, layouts showing the station box location and entrances were developed once the station locations were confirmed (through the evaluation of the alternative alignments).

3.2.1 Finch West Station

For Finch West Station, five alternative concepts were developed. Each concept sited the passenger pick-up and drop-off and commuter parking at the same location within the hydro corridor lands, but had different bus terminal locations, as shown in Exhibits ES-11 to ES-15, and described below:

- 1) **Option 1** – The bus terminal would be located on the east side of Keele Street, immediately south of the hydro corridor;
- 2) **Option 2** – The bus terminal would be located north and east of the Keele/Finch intersection, on lands currently occupied by a commercial/industrial condominium complex;
- 3) **Option 3** – The bus terminal would be located at the north-east corner of the Keele/Finch intersection;
- 4) **Option 4** – The bus terminal would be situated at the south-east corner of the intersection; and
- 5) **Option 5** – The bus terminal would be located south and east of the Keele/Finch intersection.

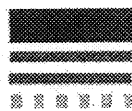
In order to protect existing stable residential areas, no alternatives were developed for the west side of Keele Street. Another important consideration was a potential to link with a future Higher Order Transit Corridor running along the hydro corridor, as proposed in the new City of Toronto Official Plan.

3.2.2 Steeles West Station

For Steeles West Station, four alternative bus terminal concepts were developed (see Exhibits ES-16 to ES-19). All of the following concepts would use the lands owned by York Region, which are designated for a future inter-regional bus terminal:



Legend



STATION PLATFORM
SUBWAY LINE
UNDERGROUND WALKWAY



ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

URS

**FINCH WEST STATION
 OPTION 1**

ES-11



Legend

-  STATION PLATFORM
-  SUBWAY LINE
-  UNDERGROUND WALKWAY

 ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

URS

FINCH WEST STATION
OPTION 2

ES-12



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

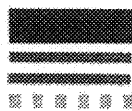


**FINCH WEST STATION
OPTION 3**

ES-13



Legend



STATION PLATFORM
SUBWAY LINE
UNDERGROUND WALKWAY



ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

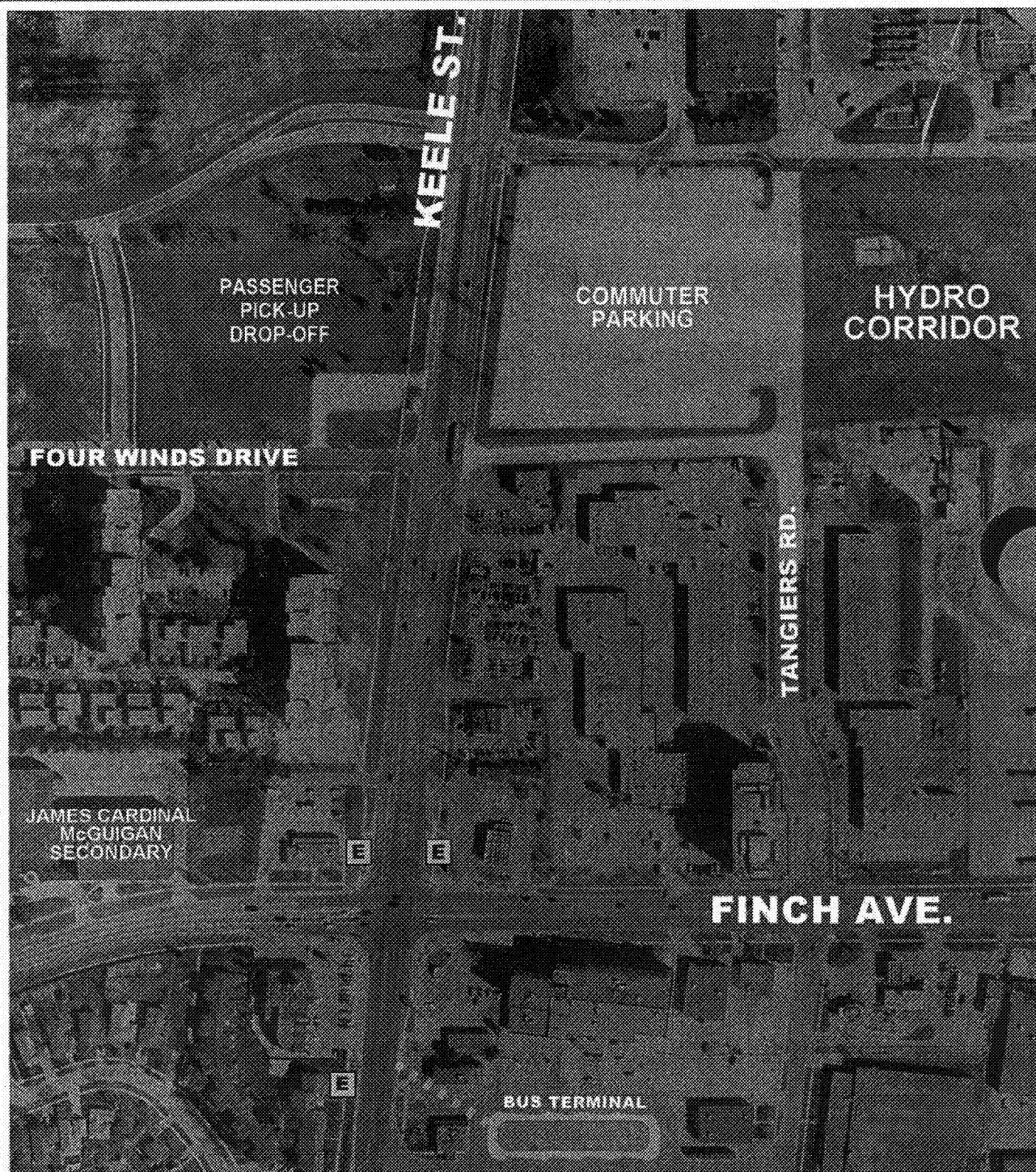


Toronto

URS

**FINCH WEST STATION
 OPTION 4**

ES-14



Legend

 **STATION PLATFORM**
 **SUBWAY LINE**
 **UNDERGROUND WALKWAY**

 **SUBSTATION**
 **ENTRANCE**

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

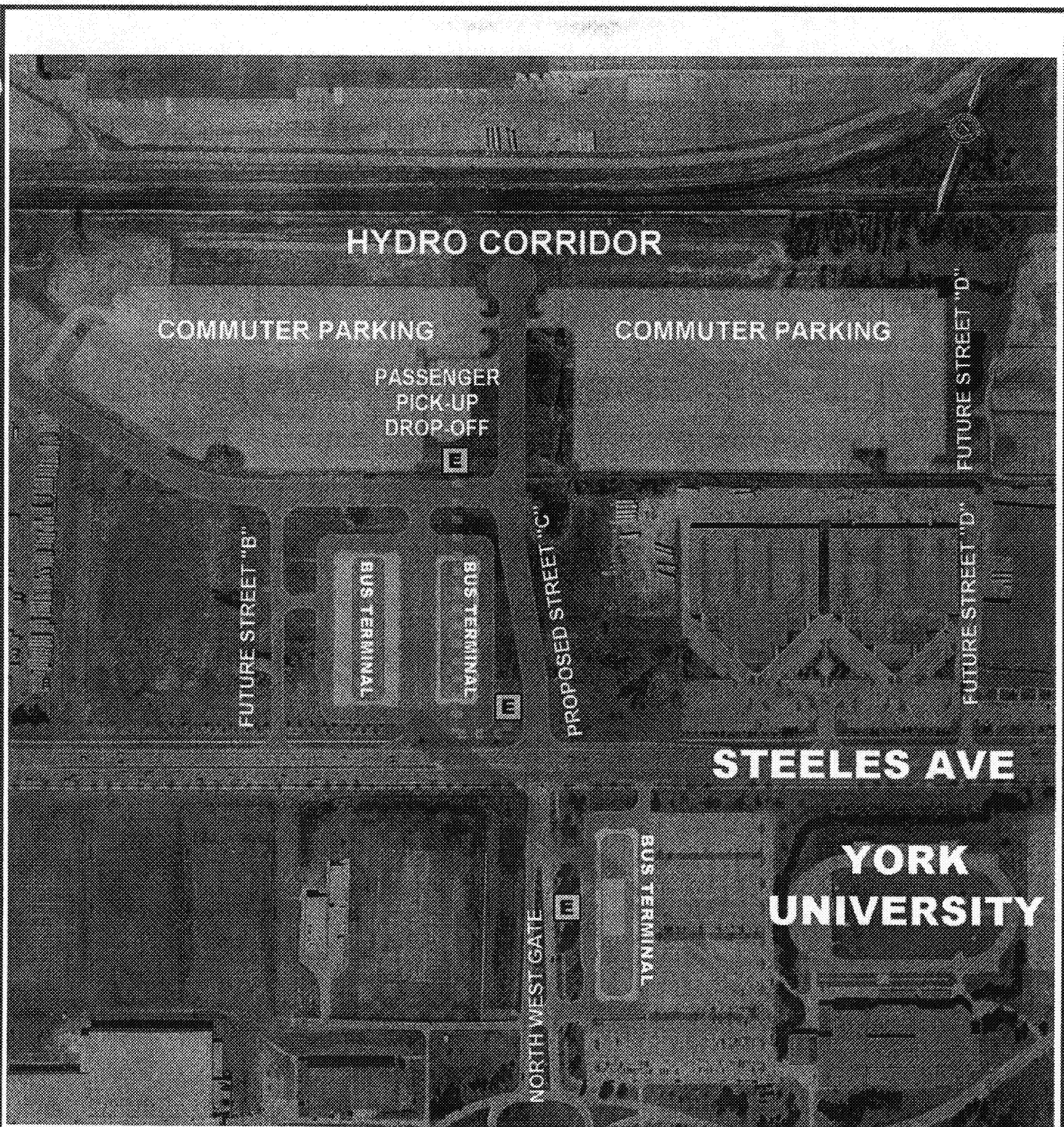


Toronto

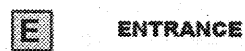
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**FINCH WEST STATION
OPTION 5**

ES-15



Legend

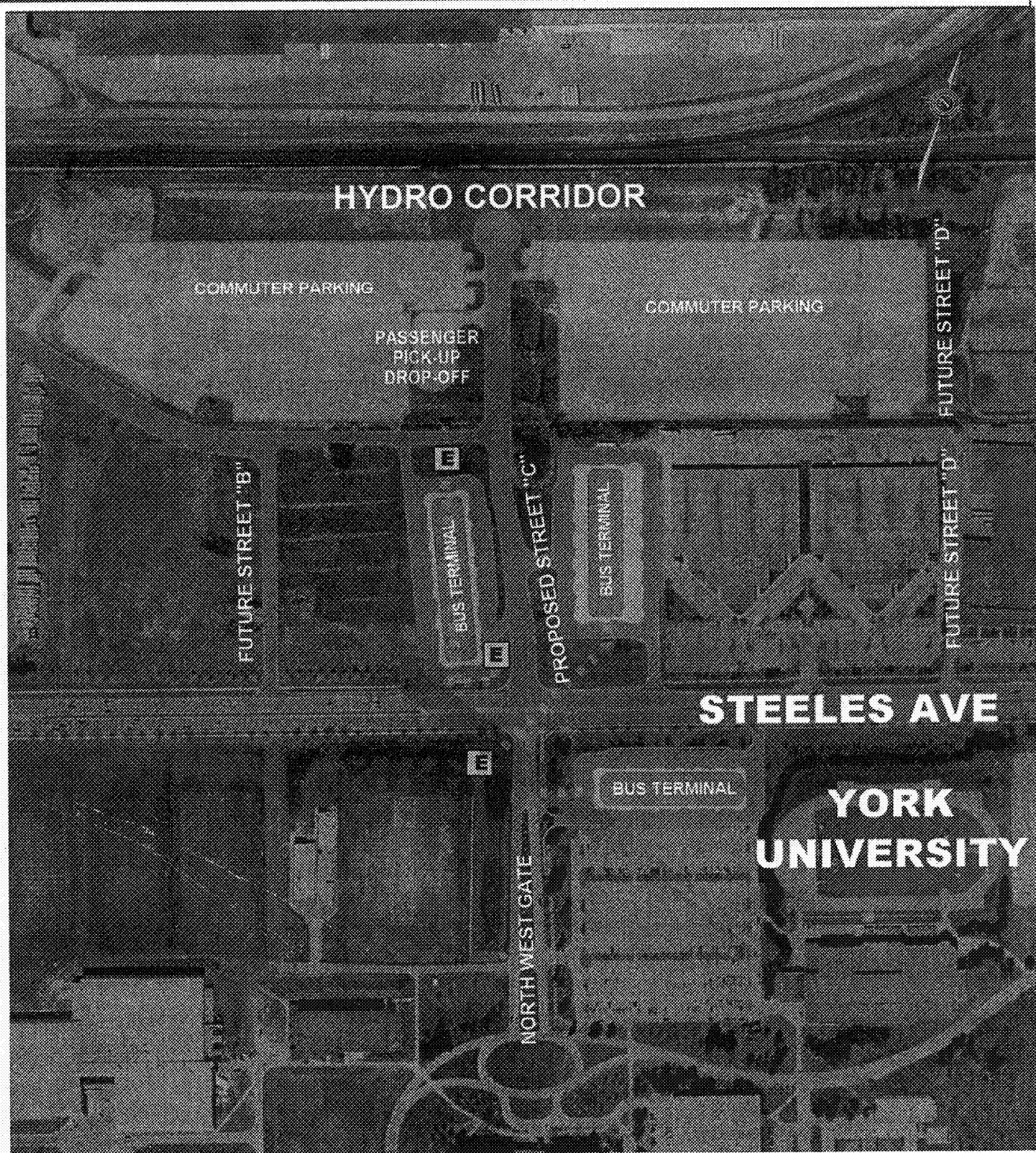


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



STEELES WEST
OPTION 1A

ES-16



Legend



STATION PLATFORM
SUBWAY LINE
UNDERGROUND WALKWAY



ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY

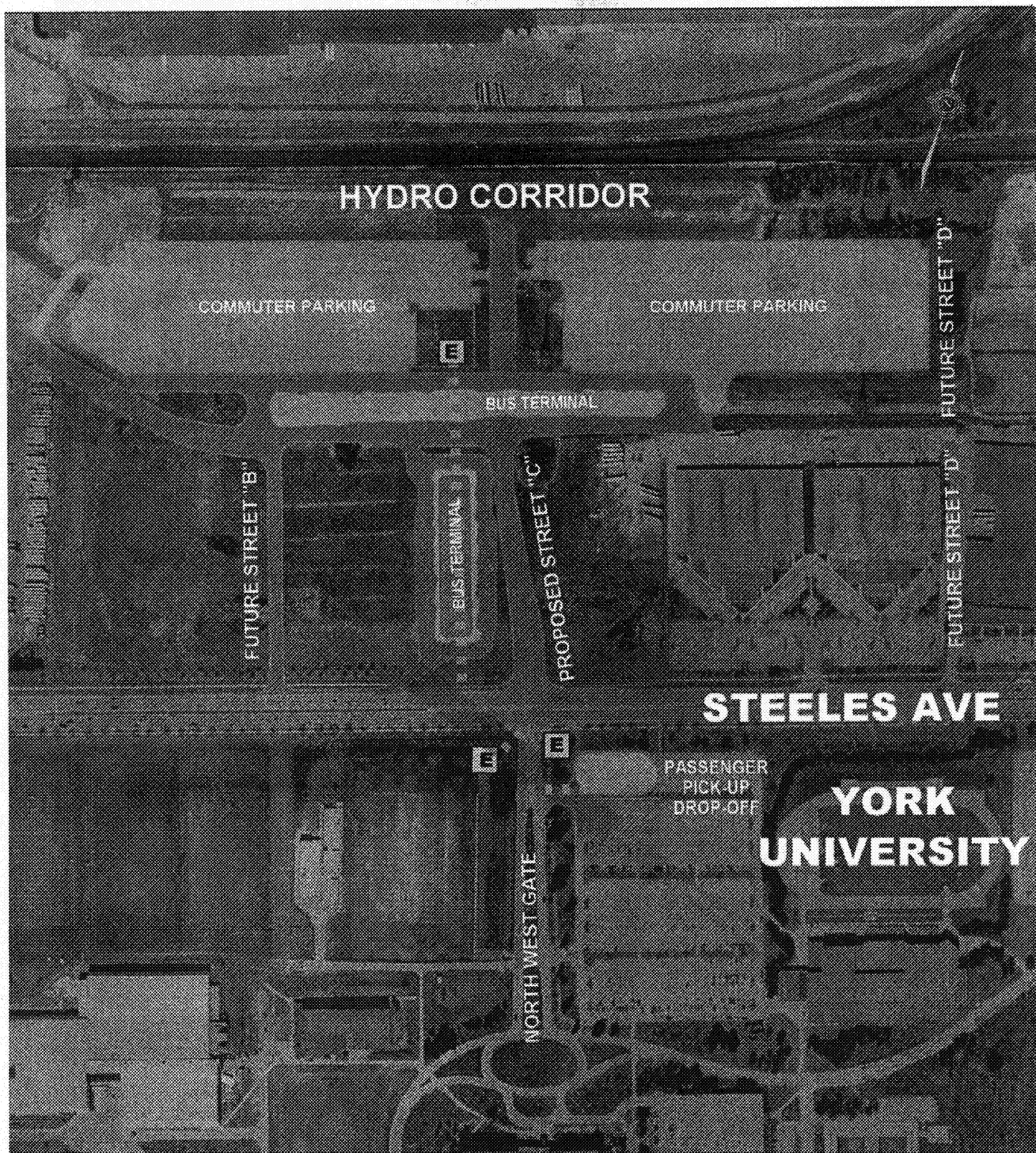


Toronto

URS

**STEELES WEST
 OPTION 1B**

ES-17

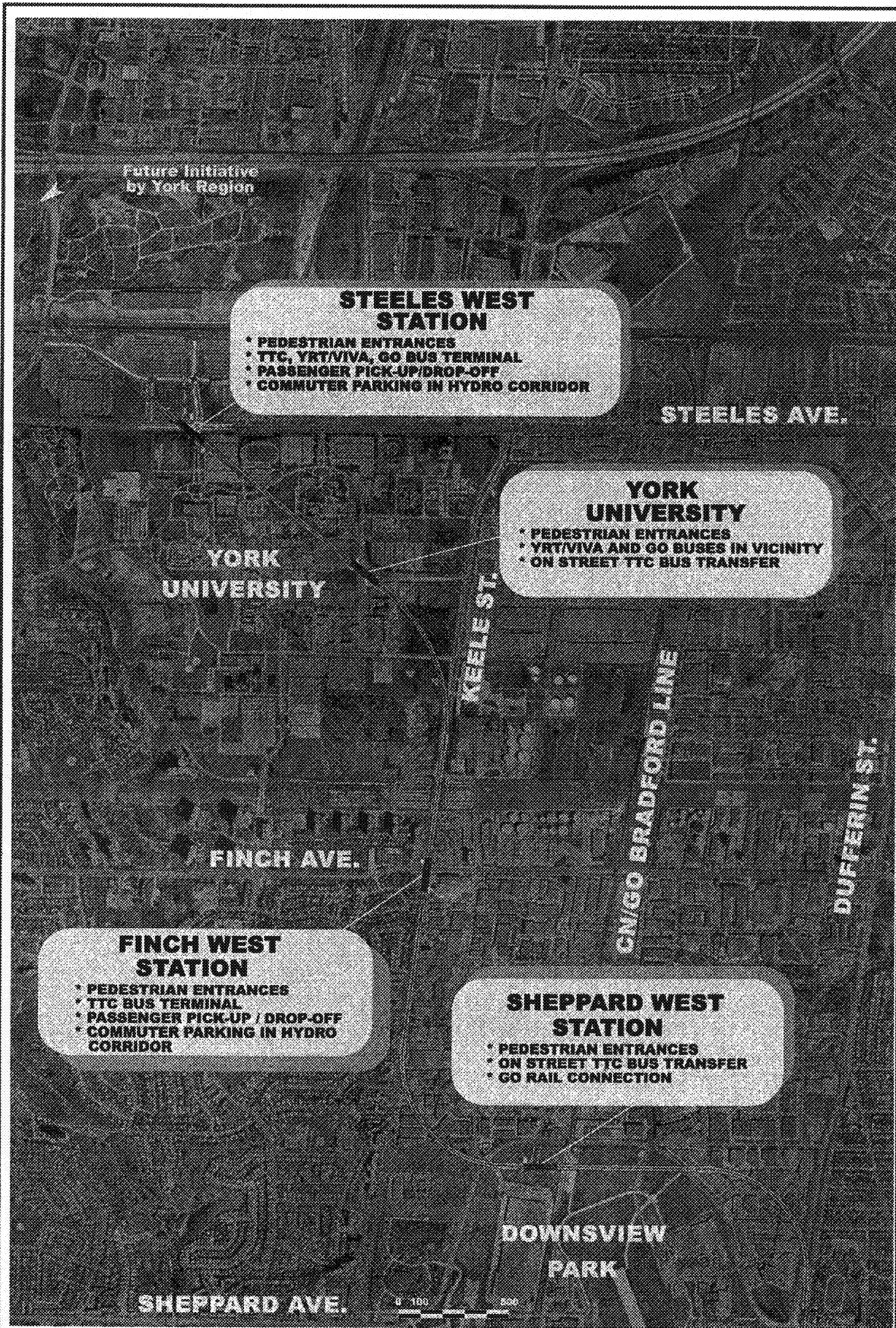


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



STEELES WEST
OPTION 2

ES-18

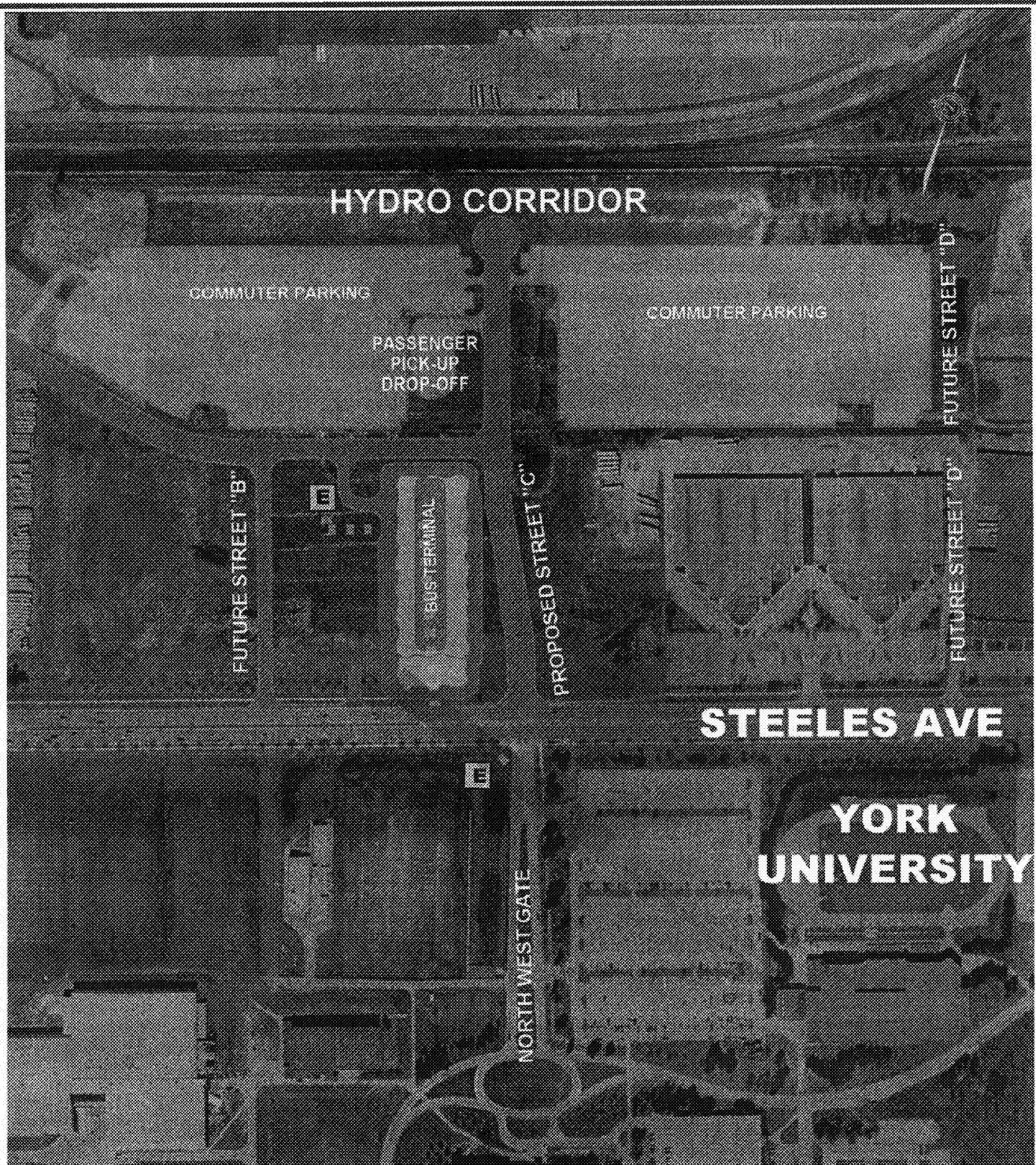


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



PREFERRED SPADINA SUBWAY EXTENSION
ALIGNMENT PRESENTED DURING
THIRD ROUND OF CONSULTATIONS

ES-20



Legend

 STATION PLATFORM
 SUBWAY LINE
 UNDERGROUND WALKWAY

 ENTRANCE

SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

URS

STEELES WEST
OPTION 3

ES-19

- 1) **Option 1A** - This option would include three surface level bus terminals: two located north of Steeles on the lands between the proposed future Street B and Street C and one terminal on the York University lands, south of Steeles Avenue;
- 2) **Option 1B** - This option would be similar to Option 1A, but with the terminals north of Steeles located on lands on each side of the future Street C;
- 3) **Option 2** - Two surface bus terminals would be located on property purchased by York Region-owned lands and within the hydro corridor, north of Steeles Avenue; and
- 4) **Option 3** - Under this option, a two-level bus terminal would be constructed on the York Region lands, north of Steeles Avenue (similar to Wilson Station bus terminal).

3.3 EVALUATION AND SELECTION OF THE PREFERRED ALIGNMENT

3.3.1 Evaluation Criteria and Indicators

The Study Team developed a comprehensive list of indicators, which were refined based on public and stakeholder agency comments received during the second round of consultations. These indicators are based on the criteria listed below and are detailed in Appendix B:

- 1) Potential for riders to walk to local stations;
- 2) Speed and comfort for subway passengers;
- 3) Convenience for transfers from buses (including Wheel-Trans and Mobility Plus) or GO Rail to subway;
- 4) Convenience for access from other travel modes (taxi, bicycle, pedestrians (including ambulatory/non-ambulatory disabled persons), passenger pick up and drop off and commuter parking;
- 5) Flexibility for potential future subway extension into York Region;
- 6) Maximize redevelopment potential in support of the subway extension;
- 7) Maximize the potential to create a high quality urban/pedestrian environment;
- 8) Potential effects on natural heritage features;
- 9) Potential effects on geology and hydrogeology;
- 10) Potential effects on hydrology;
- 11) Potential effects on socio-economic features;
- 12) Potential effects on pedestrian and traffic access/ flow;
- 13) Potential effects on freight and rail passenger service and its signal systems at the Sheppard West Station;
- 14) Potential effects on cultural heritage resources;
- 15) Potential effects on pipelines located in the Finch hydro corridor;
- 16) Minimize capital costs;
- 17) Minimize costs of property acquisition; and
- 18) Minimize net operating cost.

As for the selection of the technically-preferred route, the Study Team used both qualitative and numerical analysis methodologies to evaluate the alternative alignments and station concepts.

3.3.2 Southern Alignments

For the southern section of the alignment, Alternatives S1 and S2 (see Exhibit ES-9), which were located south of Sheppard Avenue West, maximizing use of the under-developed, federally-owned Parc Downsview Park lands were preferred over Alternatives S3 and S4 (see Exhibit ES-9), which would run under existing businesses located in the Keele Industrial Area, north of Sheppard Avenue. Parc Downsview Park offers significant opportunities for long-term transit-oriented development, which would be served by the proposed Sheppard West Station. Alternative S2 was preferred over S1, because it is closer to Sheppard Avenue, offering convenient access for passengers transferring from bus routes on Sheppard Avenue West to the subway.

Further analysis of Alternative S2 (West) (Sheppard West Station west of the CN Rail right-of-way) compared to Alternative S2 (East) (Sheppard West Station located east of the CN Rail right-of-way), indicated that by locating Sheppard West Station west of the CN Rail right-of-way, higher development densities could be achieved within the catchment area (i.e. 500-metre walk distance) of the station, due to less severe height restrictions (related to continued operation of Downsview Airport runways) and better access to future development lands within Parc Downsview Park.

In summary, Alternative S2 (West), was selected as the technically-preferred alternative, because it would:

- 1) Minimize impacts on existing businesses and properties in the Keele Industrial Area;
- 2) Maximize development opportunities on the Parc Downsview Park lands; and
- 3) Facilitate convenient transfers between the Sheppard West bus route and the subway.

Due to the need to construct the complex three-track structure located north of Downsview Station by cut-and-cover method, seven properties in the vicinity of Dufferin Street would be directly affected. Specifically, these properties would need to be acquired and the existing businesses on these lands would need to be relocated or removed to facilitate subway construction.

3.3.3 Northern Alignments

For the northern section of Route 1, three alternative alignments were analyzed. Alternative N1 (see Exhibit ES-10), which was the alignment recommended for further analysis in the 2001 Rapid Transit Expansion Study, would maximize use of the Ian MacDonald Boulevard and Steeles Avenue road rights-of-way. By doing so, this alternative would include two additional curves, compared to Alternatives N2 and N3 (see Exhibit ES-10). In addition, Alternative N1 would require that the future extension of the Spadina Subway, from Steeles Avenue West to Vaughan Corporate Centre (at Jane Street and Highway 7), pass under Black Creek.

Alternatives N2 and N3 are more direct, resulting in lower subway operating and maintenance costs. Although a future extension of N2 or N3 to the Vaughan Corporate Centre would potentially affect Black Creek, the potential environmental impacts are less than Alternative N1. From a transit service perspective, N3 is more centrally located in the Common and will provide for possible direct connections to York Lanes, the Schulich School of Business and the new Accolade East.

In summary, Alternative N3 was selected as the technically-preferred alternative, because it would:

- 1) Provide the most direct alignment, resulting in lower subway and operating costs;
- 2) Provide a centrally located station that serves the existing transit hub – the Common; and
- 3) Minimize environmental impacts for future extensions north of Steeles, to the Vaughan Corporate Centre.

3.3.4 Alignment Refinement

Following the detailed analysis of the northern and southern alignment sections, the technically-preferred alignment (combination of S2 (West) and N3) was shifted approximately 100 metres south of Sheppard Avenue within the Parc Downsview Park lands (see Exhibit ES-20) to:

- 1) Provide better access to the Station within the prime Parc Downsview Park development lands;
- 2) Permit flexibility for development of buildings or a linear park on the Sheppard frontage, even if the subway extension (or Sheppard West Station only) is not implemented for many years into the future; and
- 3) Reduce property impacts for the alignment section between Downsview Station and Sheppard West Station.

During the third round of consultations, the technically-preferred alignment (including the refinement described above) was strongly endorsed by the public and the majority of key stakeholder agencies.

However, in order to reduce both the capital cost and property impacts associated with the three-track structure north of Downsview Station, further refinements to the alignment were conducted following the third round of consultations, as shown in Exhibit ES-21. This alignment will require full acquisition of six properties (instead of seven) and will result in reduced construction-related disruption and Project costs, due to a 400 metre decrease in the complex three track structure to be constructed by cut-and-cover method.

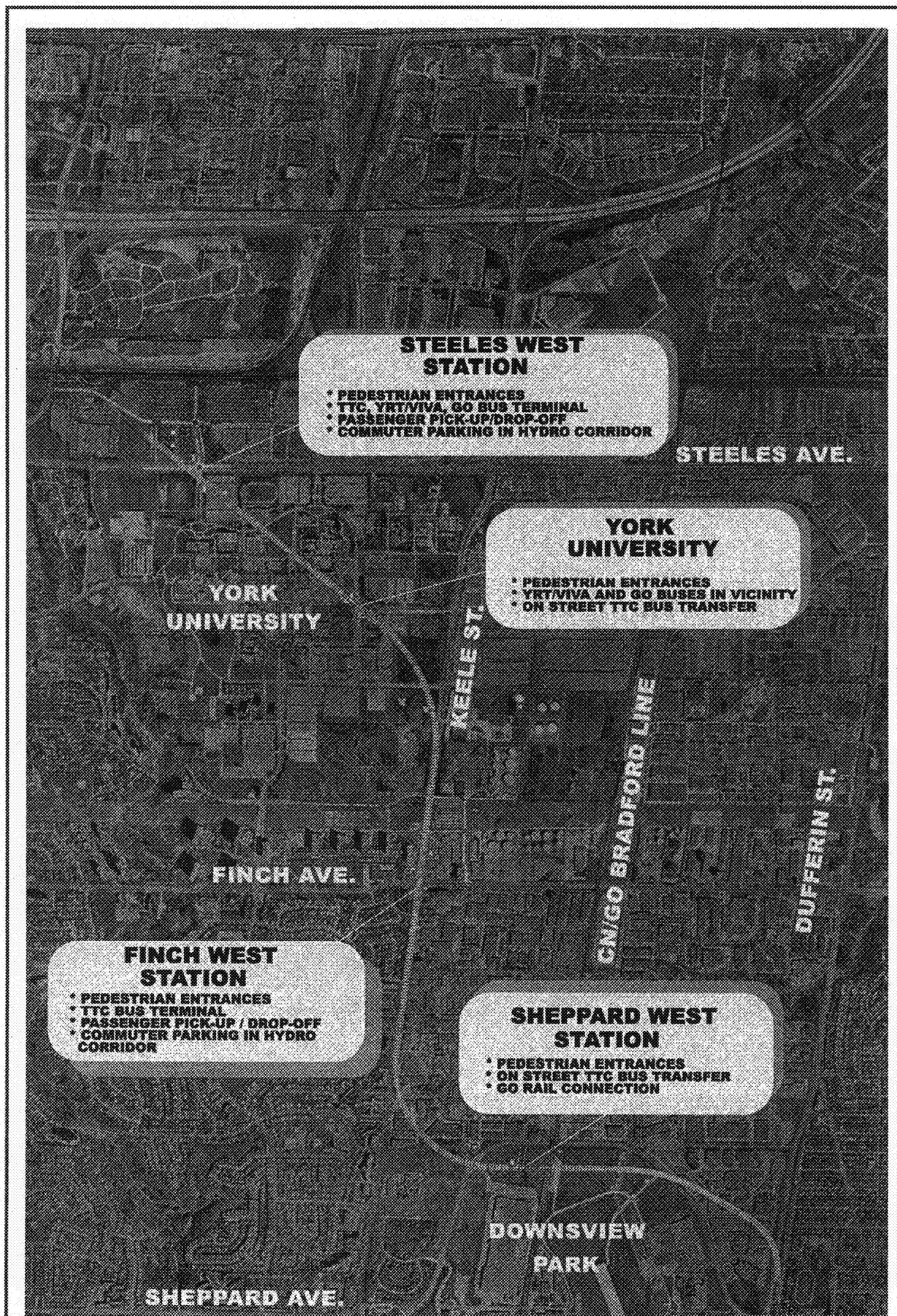
3.3.5 Emergency Exit Buildings

Emergency Exit Buildings are used for the evacuation of subway train passengers in the event of an emergency. In accordance with TTC's design criteria, seven Emergency Exit Building sites were identified for the recommended alignment, as shown in Exhibit ES-22. These locations will be subject to further review during detailed design.

3.3.6 EVALUATION AND SELECTION OF PREFERRED STATION LAYOUTS

3.3.7 Sheppard West Station

As shown in Exhibit ES-23, Sheppard West Station will be situated west of the GO Rail Bradford Line within the Parc Downsview Park lands and will include entrances at each end of the station platform and a possible underpass connecting to east of the GO Rail Bradford Line. Further work will be



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



RECOMMENDED
SPADINA SUBWAY EXTENSION
ALIGNMENT

ES-21

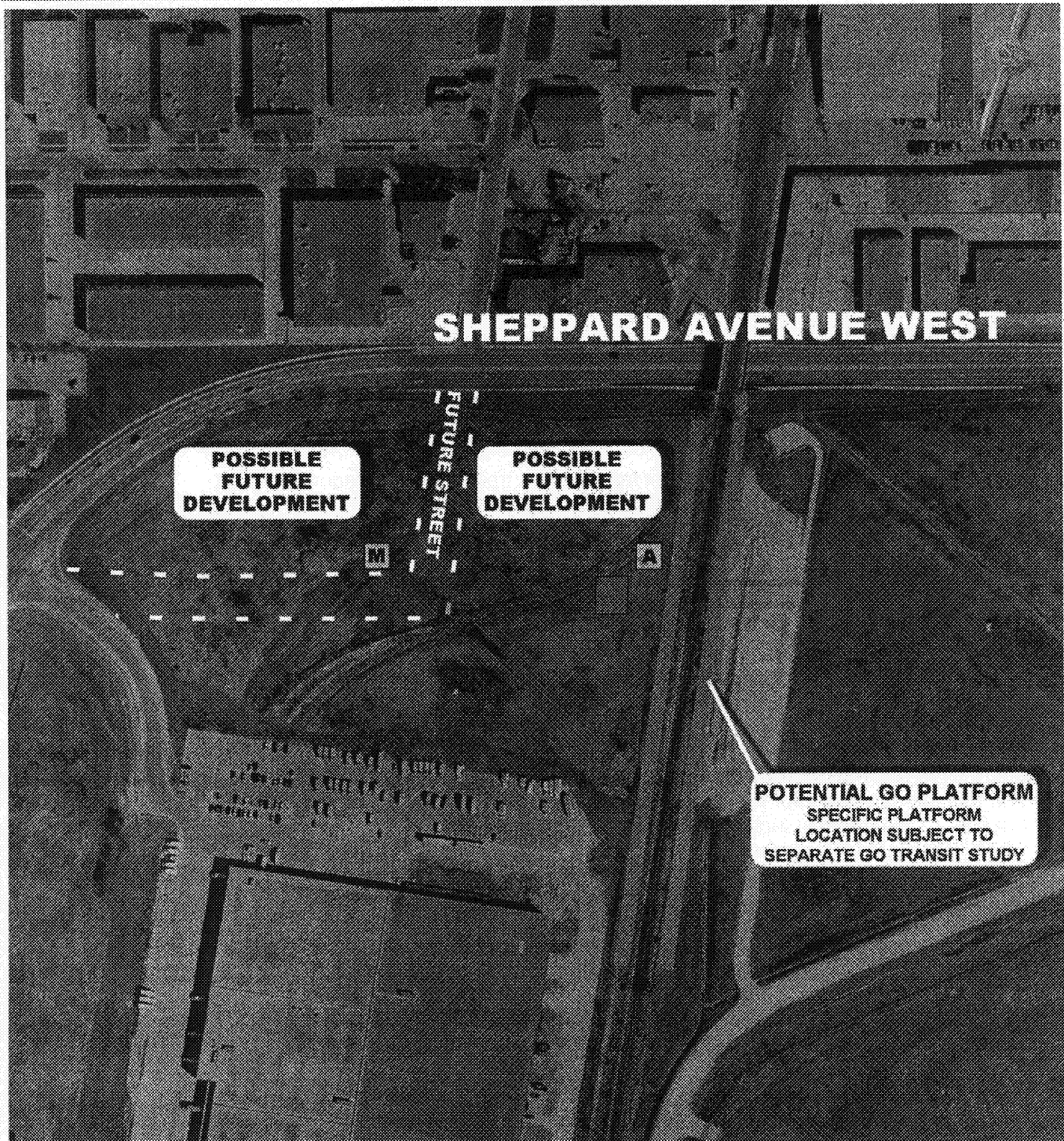


SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



RECOMMENDED
EMERGENCY EXIT
BUILDING LOCATIONS

ES-22



Legend



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



RECOMMENDED
SHEPPARD WEST STATION
CONCEPT

ES-23

conducted during the design of the Spadina Subway Extension to optimize long-term pedestrian and bus passenger access to the station and integration of the station with Parc Downsview Park.

3.3.8 Finch West Station

Consistent with the overall project objectives, the key requirements for the bus terminal at Finch West Station are as follows:

- 1) Provide fast, convenient and reliable access for buses operating on Keele Street and Finch Avenue West;
- 2) Minimize walk times between the bus terminal and the subway platform for transferring passengers;
- 3) Preserve the Keele and Finch street frontages for transit-oriented redevelopment;
- 4) Minimize impacts on existing businesses and residents, and
- 5) Achieve reasonable costs.

Options 3 and 4 (Exhibits ES-13 and ES-14), would situate the bus terminal on the north-east and south-east corners of the Keele/Finch intersection, respectively. Consequently, bus access/egress for these station locations would be from driveways in close proximity to the congested Keele Street / Finch Avenue intersection. Daily bus operations for these two station concepts would be slow and unreliable because buses would have difficulties negotiating left turns to and from the bus terminal. These options would also use prime development lands at the Keele/Finch intersection.

Options 1, 2 and 5 (Exhibits ES-11, ES-12 and ES-15) would offer comparable bus access times, operational reliability (through the introduction of new transit-priority traffic signals, where warranted) and bus to subway platform transfer times. Option 1 would situate the bus terminal on prime transit-oriented redevelopment lands, on the Keele Street frontage, north of Finch Avenue West. Option 2, which is situated on lands currently occupied by an industrial/commercial condominium complex, would result in displacement of a significant number of existing businesses and would incur substantial property acquisition and business loss costs. Option 5, which is located off of the Keele Street frontage, south of Finch Avenue and which affects a limited number of properties (compared to Option 2), was carried forward as the technically-preferred option for public and stakeholder agency review and comment during the third round of consultations.

During the third round of consultation, the public generally supported the selection of Option 5 but expressed concern over the distance between the main entrance and the commuter facilities in the Finch hydro corridor. Significant opposition to Option 5 was expressed by the key stakeholder agencies, who favoured a more compact station concept that would reduce the transfer time between the bus terminal and subway platform and provide a more convenient entrance location to the passenger pick-up and drop-off and commuter parking facilities.

To address these concerns, representatives of TTC, City of Toronto Planning and City of Toronto Works (Traffic section) worked collaboratively to develop a modified Option 1. The recommended Finch West Station concept, as shown in Exhibit ES-24, will have the following advantages:

- 1) Reduced business loss impacts (impacts to the industrial/commercial condominium complex are limited to a minor loss of parking and the elimination of all direct vehicular access on to Keele Street);
- 2) Acceptable transit and traffic operations; and
- 3) The desired compact station form, while still providing connections to the north and south sides of Finch Avenue West.

Opportunities for integration of pedestrian entrances and the bus terminal with potential redevelopment of the Keele/Finch intersection will be explored further during the design of the station.

Recognizing that this recommendation will directly affect different property owners (versus the technically-preferred Option 5), which was presented at the third round of public consultation, TTC notified all directly affected parties in order to provide an opportunity for these property owners to respond prior to filing the EA with the Ministry of the Environment. One of the new properties affected by the recommended Finch West Station concept is the Toronto Fire Services Station #141 (3965 Keele Street). Discussions have been initiated with Toronto Fire Services for the proposed relocation of this facility.

3.3.9 York University Station

As shown in Exhibit ES-25, the proposed York University Station platform will be situated at the east end of the Common area, between the York Lanes and Schulich School of Business. Entrances are proposed at each end of the station. Opportunities to integrate entrances into adjacent York University buildings will be considered during future design stages.

The concept received broad, general support from the public and stakeholder agencies during the third round of consultations.

3.3.10 Steeles West Station

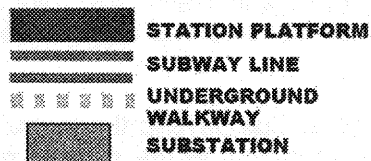
For Steeles West Station, the challenge is to provide adequate facilities to meet rapidly increasing demand for bus services from York Region and beyond to York University and the proposed subway extension, while minimizing the impact on developable land.

In 2001, York Region acquired property on the north side of Steeles Avenue for an 18-bay bus terminal. Since that time, due to the growth in GO Transit, York Region Transit and Viva services, the required number of bus bays for the Steeles West bus terminal has more than doubled and can no longer be entirely accommodated on the intended site.

Option 2 (Exhibit ES-18), which would accommodate the additional bus bays in the hydro corridor, would result in long walk times (up to 5 minutes) from the bus terminal to the subway platform.



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SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



Toronto

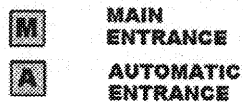
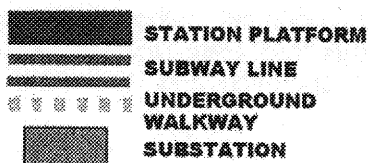
URS

RECOMMENDED
FINCH WEST STATION
CONCEPT

ES-24



Legend



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



URS

RECOMMENDED
YORK UNIVERSITY STATION
CONCEPT

ES-25

Furthermore, restrictions due to the high voltage hydro lines, would limit the opportunities to provide a high-quality, weather-protected waiting area for bus passengers in the hydro corridor.

Option 3 (Exhibit ES-19), which would involve constructing a multi-level bus terminal (similar to the existing facilities at Wilson Station) on the York Region-owned lands, would require significant capital and ongoing maintenance costs. As well, there would be limited ability to expand or reduce the size of the bus terminal structure in the event of changes in future bus bay requirements. Furthermore, the ramping requirements for the multi-level facility would require additional lands beyond the property purchased by York Region.

Options 1A and 1B (Exhibits ES-16 and ES-17) provide surface level facilities, north and south of Steeles Avenue, and are more easily adaptable to changes in bus demands. Option 1A is preferred because the location of the bus terminals north of Steeles Avenue will result in shorter bus terminal to subway platform transfer times than under Option 1B. As well, the terminals are adjacent to each other and will allow for combining into one single platform if deemed desirable during the detailed design stage of the Project.

As a result of discussions held with York Region, the City of Vaughan, York University and the affected bus operators during the third round of consultations, the orientation of the bus terminals was adjusted to preserve the affected north and south frontages of Steeles Avenue West for future transit-oriented development (see Exhibit ES-26). Opportunities for integration of pedestrian entrances and the bus terminals with new development will be explored further during the design of Steeles West Station. A key objective will be to facilitate co-ordinated or joint development of the lands in the vicinity of the Station.

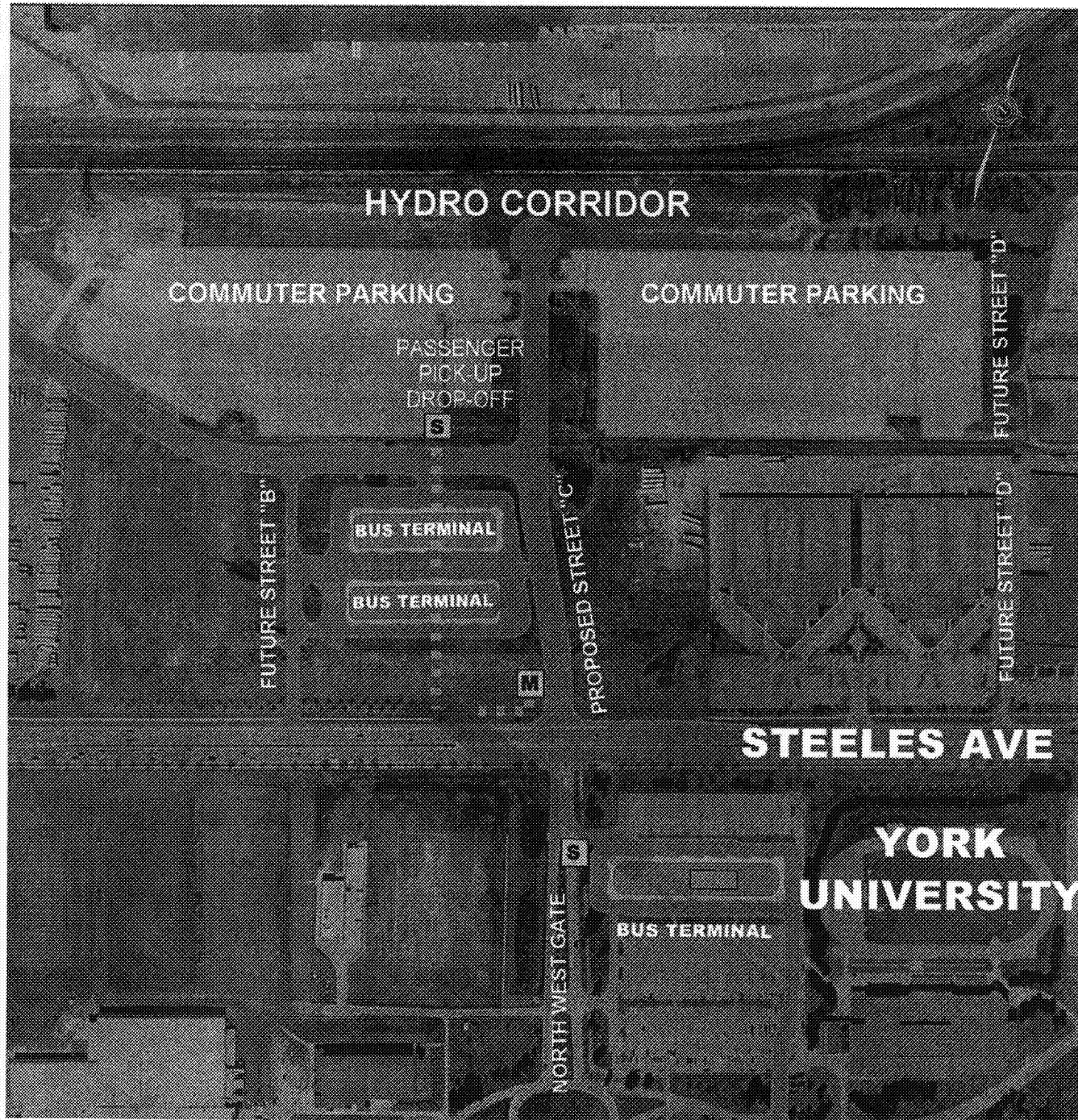
4 PHASE 3: DETAILED ASSESSMENT OF THE UNDERTAKING

The final phase of the study included:

- 1) Public and stakeholder consultation,
- 2) Confirmation of the recommended subway alignment and station layouts (see Sections 3.3 and 3.3.6);
- 3) Determination of environmental effects;
- 4) Development of mitigation measures for any negative effects; and
- 5) Commitments to future work to address any issues that are beyond the EA scope.

4.1 ALTERNATIVE CONSTRUCTION METHODS

The Study Team identified an opportunity to defer project costs by constructing a portion of the alignment on the undeveloped Parc Downsview Park lands using open cut method (to be covered as development occurs at a later date). However, initial comments from Parc Downsview Park, TTC Operations and the general public have not supported this approach and, therefore, it is not recommended.



Legend



SPADINA SUBWAY EXTENSION ENVIRONMENTAL ASSESSMENT STUDY



URS

RECOMMENDED
STEELES WEST STATION
CONCEPT

ES-26

For the purposes of the Environmental Assessment Study, standard construction methods were assumed, as described in Section 3.1.2. Detailed investigations of construction methods will be conducted during detailed design in order to minimize temporary and permanent impacts on buildings, properties, pedestrians, transit passengers and automobile and truck traffic, while achieving reasonable costs and project implementation schedule impacts.

4.2 PROJECT DURATION

The anticipated duration of a project of this scope would be approximately 7 years, including the following overlapping activities:

- 1) Design (2 to 3 years);
- 2) Construction (3 to 4 years); and
- 3) Testing and commissioning (1 to 2 years).

The actual duration of the project would depend on project financing, property acquisition, the construction methodology, contracting methods and procedures as well as other factors.

4.3 PROJECT COSTS

The order-of-magnitude cost estimate for the 6.2 kilometre subway extension, including design and construction costs, property, yard improvements and vehicles, is \$1.4 billion in 2005 dollars.

4.3.1 Environmental Effects and Mitigation Measures

The environmental effects for the Spadina Subway Extension are classified as follows:

- 1) **Displacement of Existing Features by the Subway Facilities** – These include existing features within the Study Area, which would be directly affected by the introduction of the subway tunnels, stations, commuter facilities and ancillary facilities.
- 2) **Construction Impacts** – These are short-term potential impacts due to construction activities for the Spadina Subway Extension.
- 3) **Operations and Maintenance Impacts** – These are ongoing, long-term impacts related to the operation and maintenance of the Spadina Subway Extension.

These impacts and proposed measures to mitigate any negative effects are summarized below and are detailed in Appendix C.

4.3.2 Displacement of Existing Features by the Subway Facilities

The most critical impact of the Project is the displacement of existing businesses and buildings which conflict with either the proposed three-track structure north of Downsview Station or the proposed Finch West bus terminal. The City of Toronto (on behalf of TTC) would acquire these properties and

provide compensation through either a negotiated settlement or, in the event that expropriation is required, in accordance with the Ontario Expropriation Act.

The following six properties would be directly impacted by the three-track structure:

- 1) 11-15 Kodiak Crescent,
- 2) 23 Kodiak Crescent,
- 3) 40 Kodiak Crescent,
- 4) 44 Kodiak Crescent,
- 5) 1150 Sheppard Avenue West, and
- 6) 1170 Sheppard Avenue West (one of three buildings).

The following three properties would be directly impacted by the proposed Finch West Station bus terminal:

- 1) 3941 Keele Street,
- 2) 3955 Keele Street, and
- 3) 3965 Keele Street (Toronto Fire Services Station #141).

TTC and the City of Toronto are committed to the following process/principles for these impacted properties:

- 1) Early notification to property owners;
- 2) Ongoing meetings and discussions with property owners concerning property impacts to minimize property takings and identify mitigative measures;
- 3) Further investigations of alternative construction methods for the three-track structure, with the objective of minimizing direct impacts on these properties, while achieving reasonable Project costs; and
- 4) Uniform and equitable treatment, in accordance with the Ontario Expropriation Act.

During the EA process, partial takings have been identified for a further 16 properties. These include underground easements for the subway tunnels and partial surface takings for station entrances, commuter facilities (such as bus terminals and passenger pick-up and drop-off facilities) and ancillary facilities (such as Emergency Exit Buildings). TTC and the City of Toronto will conduct a Property Protection Study during the design of the Spadina Subway Extension, which will determine detailed property requirements, including temporary construction easements. The acquisition of these properties will follow the same principles described above in this section.

Significant property requirements are needed on both the York University and Parc Downsview Park lands. York University previously offered most of the land required for the Yonge-Spadina Subway Loop alignment at no cost to the Project. TTC staff have met with York University on a co-operative basis to further refine and develop a set of property acquisition principles for this Project. Parc Downsview Park (under Federal jurisdiction) has indicated their support for recommended subway alignment and Sheppard West Station on their lands. As well, Toronto City Council requested, at its meeting of September 30, 2005, that "an approach be made to the Federal Government to seek their participation in the capital funding of the two subway stations that directly benefit the PDP and other federal properties in the vicinity". TTC staff will be meeting with Parc Downsview Park on a co-

operative basis to further refine and develop a set of property acquisition principles for the Spadina Subway Extension.

4.3.3 Construction Impacts

For sections of the subway alignment that are tunnelled, the impacts will be very limited.

For stations, commuter facilities and sections of the alignment to be constructed by cut-and-cover construction, mitigation measures will be implemented to prevent or minimise or eliminate the following:

- 1) Erosion and sedimentation due to excavation activities;
- 2) Effects of dewatering on aquifers and recharge/ discharge areas; and
- 3) Building settlement/structural stress due to tunnelling, piling and dewatering;

Mitigation measures will also be implemented to minimize the following:

- 1) Disruption of existing vehicle circulation patterns due to road and lane closures and temporary traffic detours and diversions;
- 2) Impact on pedestrian circulation and safety due to road diversions and detours;
- 3) Noise and vibration generated by construction equipment;
- 4) Increase in air emissions, including dust due to excavation activities and operation of construction equipment;
- 5) Impacts to local business operations due to:
 - a) modified vehicle and pedestrian circulation patterns;
 - b) reduced visibility of store fronts and signs; reduction in on-street parking;
 - c) less convenient access to off-street parking;
 - d) customer inconvenience due to temporary construction debris, noise and dust; and
- 6) Migration of mud and litter off site.

Mitigation methods will include detailed engineering studies and ongoing management and monitoring of construction activities, as detailed in Appendix C.

4.3.4 Operations and Maintenance Impacts

Negative environmental impacts due to the operation of the Spadina Subway Extension and related commuter facilities would include:

- 1) Potential traction power stray current impacts on buried utilities using metal piping;
- 2) Noise generated by subway, bus and private vehicle operations;
- 3) Vibration generated by subway and bus operations;
- 4) Potential interference with electromagnetic field of the subway DC traction power system; and
- 5) Although the operation of the subway will result in overall reductions in air emissions, localized increases will occur due to increased bus traffic at Finch West and Steeles West Stations.

Subway noise and vibration will be mitigated through the use of the double-tie track system, which has proven to be effective where implemented in the existing subway system. Stray current impacts will be mitigated through use of isolated and insulated power rails.

5 COMMITMENTS TO FUTURE WORK

During the EA study, TTC and the City of Toronto have worked closely with key stakeholder agencies to address and resolve any issues or concerns. In addition, the TTC's and City of Toronto's commitments to future work include the following:

- 1) **Consultations** – The TTC/City will consult with the public, property owners and stakeholder agencies (including City of Vaughan, York Region, as well as Toronto and York Region Police, Fire and other emergency service providers) during the design of the Spadina Subway Extension alignment, stations and related commuter and ancillary facilities;
- 2) **Property Acquisition** – The City of Toronto and TTC will:
 - a) Proceed with a Property Protection Study during the early stages of the design of the Spadina Subway Extension;
 - b) Continue with property negotiations with York University for property required for the Project, in accordance with the commitments made by the University during the 1994 EA and reflecting more recent discussions on detailed property acquisition principles;
 - c) Initiate discussions with Parc Downsview Park, in accordance with direction received by Toronto City Council at its September 30, 2005 meeting;
 - d) Continue discussions with Toronto Fire Services for proposed relocation of Station #141; and
 - e) For all other properties, at the appropriate time, the City of Toronto will acquire property by negotiation or expropriation as required.
- 3) **Planning Initiatives** – The City of Toronto will take a leadership role in planning initiatives which support the Spadina Subway Extension, as listed below:
 - a) For the Parc Downsview Park lands, the City and TTC will work co-operatively with Parc Downsview Park, taking into consideration the proposed subway alignment, Sheppard West Station, the possible future GO Bradford Rail Line station and Parc Downsview Park's emerging development plans;
 - b) The City of Toronto will initiate a planning study for the vicinity of the proposed Finch West Station, as recommended in the City's 2001 Keele Street Study;
 - c) The City of Toronto and York University will continue to update the York University Secondary Plan, which shall include provisions for the subway alignment, York University Station, Steeles West Station (including related commuter facilities) and related transit-oriented development;
 - d) TTC will enter into development agreements with York University for the potential integration of station entrances into existing buildings; and
 - e) The City of Toronto and TTC will work with York Region and the City of Vaughan, through the approval and implementation of current planning processes (Official Plan Amendment 620) and subsequent processes, to stimulate transit-oriented development, which incorporates and integrates the Spadina Subway Extension alignment, including Steeles West Station and related commuter facilities into development plans north of Steeles Avenue.

- 4) **Construction Issues** - TTC will conduct further research and analysis for the construction of the Spadina Subway Extension, including, but not limited to the following activities:
- a) Investigate alternative construction methods for the Downsview Station to Sheppard West Station section of the alignment, with the objective of minimizing property impacts, while achieving reasonable Project costs;
 - b) Include noise and air quality monitoring and mitigation measures and construction site maintenance/upkeep requirements in construction contract documents;
 - c) Develop traffic, transit and pedestrian management strategies to be included in construction contract documents;
 - d) Prepare and implement tree and streetscape protection and restoration plans;
 - e) Undertake Designated Substances Surveys for any buildings or structures which require demolition and to reflect the findings in construction contract documents;
 - f) Develop procedures for disposal of excavated materials, including contaminated soils, in accordance with Ministry of the Environment requirements;
 - g) Prepare and implement a Soil and Groundwater Management Strategy, including:
 - i) water treatment methods, which complies with prevailing TRCA and City of Toronto Water guidelines and requirements; and
 - ii) contaminated soils management, in accordance with environmental legislation, regulations and guidelines;
 - h) Arrange for a Stage 2 archaeological assessment to be conducted at areas where ground disturbance will occur during construction, and which have archaeological potential;
 - i) Undertake buildings, structures, and railway protection and monitoring;
 - j) Undertake stray current protection (if applicable) and monitoring for pipelines and other utilities; and
 - k) Conduct a Phase 2 Environmental Site Assessment for any areas of existing contamination along the alignment of the Spadina Subway Extension.
- 5) **Permits and Approvals** - TTC will secure necessary permits and approvals for the implementation of the Spadina Subway Extension Project, including, but not limited to:
- a) Planning approvals (including Site Plan Approval) for above-grade structures and facilities (through City of Vaughan and City of Toronto);
 - b) Building permits for the stations and Emergency Exit Buildings (through City of Vaughan and City of Toronto);
 - c) Permit to Take Water (from Ministry of the Environment) (if dewatering exceeds 50,000 litres per day);
 - d) Fill Permit (from TRCA) (if required);
 - e) Stormwater management, in accordance with City of Toronto (south of Steeles Avenue), City of Vaughan (north of Steeles Avenue), TRCA and MOE requirements;
 - f) Sewer discharge approvals, in accordance with City of Toronto, City of Vaughan and York Region requirements;
 - g) Railway Crossing Agreement (CN Newmarket Sub-Division);
 - h) Pipeline Crossing Agreements (Finch hydro corridor); and
 - i) Agreements to allow for the use of the Steeles and Finch hydro corridors for transit-related purposes.
- 6) **Noise and Vibration Protocols** - TTC will conduct a noise and vibration study, in accordance with the protocols established with the Ministry of the Environment for the recent Sheppard Subway project.

- 7) **Canadian Environmental Assessment Act "Triggers" Monitoring** – TTC will continue to monitor the Project for potential CEAA "triggers", and, in the event that the CEA Act applies to the Project, TTC will prepare an Environmental Screening Report.

6 AMENDING PROCEDURE

The Study Team has prepared an EA amending procedure, which identifies scenarios that would trigger the preparation of an EA Amendment Report and identifies procedures for:

- 1) Notification to affected members of the public and stakeholder agencies (including the Ministry of the Environment),
- 2) Consultation with the public and stakeholder agencies,
- 3) Documentation of the amendment, the rationale, anticipated environmental effects and mitigation measures, and
- 4) Submittal to and review and approval by the Ministry of the Environment.

3. Results and Discussion

3.1. The results of the experiments show that the proposed method is highly effective in detecting anomalies and identifying potential risks. The data indicates a significant improvement in the accuracy of the detection process.

3.2. The discussion section provides a detailed analysis of the results, highlighting the strengths and limitations of the proposed method. It also compares the findings with previous studies in the field.

3.3. The conclusion of the study is that the proposed method is a promising approach for enhancing the security and integrity of financial systems. Further research is needed to optimize the method and explore its application in other contexts.

4. The final part of the document provides a summary of the key findings and recommendations for future work. It also includes a list of references and a bibliography.

Spadina Subway Extension Environmental Assessment Study
Appendix A – Criteria and Indicators Used to Evaluate Routes

Objectives	Criteria	Indicators	Rationale
A) Provide subway service to the Keele/Finch area, York University and a new inter-regional transit terminal at Steeles Avenue.	A1) Convenience for riders to walk to local stations.	A1.1) Existing population and employment within 500 m walking distance of subway stations. A1.2) Future population and employment within 500 m walking distance of subway stations.	Stations should be located closer to higher density development (major traffic generators or attractors) to maximize ridership. Existing and future ridership levels should be taken into consideration when siting stations. The station to be located at York University should maximize convenience for students, faculty and staff.
	B1) Convenience for other modes of travel.	A1.3) Students, faculty and staff within 500 m walking distance of the York University station. B1.1) Connection to Finch West Bus (Route 36) and Keele Bus (Route 41) in the Keele/Finch area. B1.2) Ease of accessibility for other travel modes (taxi, bicycle, pedestrians, Wheeltrans, passenger pick up and drop off, commuter parking, ambulatory/non-ambulatory disabled persons).	The subway extension should intercept heavily used TTC bus routes in the Keele/Finch area to maximize ridership. All potential routes and general station locations for the subway extension will intercept YRT bus and GO Transit bus and trains to maximize ridership. The Steeles Avenue inter-regional transit terminal will intercept TTC, YRT and GO Transit buses; therefore, there is no distinction to be made among the subway stations. Similarly, there is no distinction to be made among the subway stations to be located along the GO Transit Bradford line. The subway extension should maximize the potential for all modes of transportation to interface with the subway extension. This, in turn, increases the overall ridership of the subway extension.
	C1) Conform with current, approved planning documents.	C1.1) Conformity with the goals, objectives and policies of the City of Toronto planning documents including the Metroplan, City of North York Official Plan, York University Secondary Plan, and Downsview Area Secondary Plan. C1.2) Conformity with the goals, objectives and policies of the Region of York and the City of Vaughan planning documents including the Region of York Official Plan and ROPA 43, and the City of Vaughan OPAs 450, 500, 529 and 620.	The subway extension is proposed through already developed areas, and areas that have been planned for many years without consideration of the new subway service. It is important to consider the impacts of the subway on current approved planning policy and to confirm whether or not that context remains valid. The new City of Toronto Official Plan has been appealed to the OMB; therefore, it is not currently in effect.

*Spadina Subway Extension Environmental Assessment Study
Appendix A – Criteria and Indicators Used to Evaluate Routes*

Objectives	Criteria	Indicators	Rationale
C) Support local population and employment growth. (continued)	C2) Maximize redevelopment potential in support of the subway extension.	C2.1) Consistency with the objectives of the new City of Toronto Official Plan and the Keele Street Study. C2.2) Consideration of the development objectives of the Parc Downsview Park and York University. C2.3) Potential to stimulate transit supportive development in proximity to station locations.	Notwithstanding current approved planning policies, the objectives of the City's new Official Plan (not approved) and the impact of the subway extension as a stimulator of land use changes, must be recognized. The requirement for transit supportive, intensified development in proximity to subway stations may require changes to current planning policy.
	D1) Protect existing stable land uses.	D1.1) Length of subway route adjacent to residential neighbourhoods. D1.2) Length of subway route within Keele Industrial area. D1.3) Number of sensitive operations at York University within the zone of influence of the subway extension.	The station extension should not have an adverse effect on existing stable land uses including residential, employment and institutional lands.
	D2) Minimise the potential effects on important natural and cultural heritage features.	D2.1) Number of important natural heritage features within the zone of influence of the subway extension. D2.2) Area of groundwater discharge within the zone of influence of the subway extension. D2.3) Number of important cultural heritage features within the zone of influence of the subway extension.	The subway extension should not have an adverse effect on important natural and cultural heritage features such as valleylands, woodlots, archaeological sites and Black Creek Pioneer Village. Groundwater discharge areas are considered important due to their role in sustaining baseflow in watercourses. The requirement to dewater adds complexity to construction and may result in adverse environmental effects.
	E1) Minimise capital and operating costs of the subway extension.	E1.1) Length of subway route.	The length of the route will impact the capital and operating costs. The duration of a trip will also be reduced.
E) Achieve reasonable capital and operating costs.	E2) Maximize revenue generated from the subway extension.	E2.1) Total number of a.m. peak period passengers on the subway extension.	The subway extension should be located to maximize revenue generation.

Spadina Subway Extension Environmental Assessment Study
Appendix A – Criteria and Indicators Used to Evaluate Routes

Objectives	Criteria	Indicators	Rationale
E) Achieve reasonable capital and operating costs. (continued)	E3) Maximize the subway extension in lands with no property costs to the project.	E3.1) Length of subway route within existing road rights-of-way.	A subway extension located within a municipally owned right-of-way will reduce the requirement to purchase property.
	E4) Quality of subway service.	E4.1) Ability to develop alignments with the routes that minimise the use of curves < 600 m radius.	The use of curves with a < 600 radius can either affect the operating speed (increases travel time) or result in wheel flange coming in contact with the track (increases wheel and track wear/maintenance and results in squeal).

Spadina Subway Extension Environmental Assessment Study
Appendix B – Criteria and Indicators Used to Evaluate Alignments and Station Concepts

Objectives	Criteria	Indicators	Rationale
A) Provide subway service to the Keele/Finch area, York University and a new inter-regional transit terminal at Steeles Avenue.	A1) Potential for riders to walk to local stations.	A1.1) Existing population and employment within 500 m walking distance of subway stations. A1.2) Future population and employment within 500 m walking distance of subway stations. A1.3) Students, faculty and staff within 500 m walking distance of York University Station.	Stations should be located closer to higher density development (major traffic generators or attractors) to maximize ridership. Existing and future ridership levels should be taken into consideration when siting stations. The station to be located at York University should maximize convenience for students, faculty and staff.
	A2) Speed and comfort for subway passengers.	A2.1) Travel time from Downsview Station to Steeles West Station. A2.2) Speed and comfort for subway passengers.	The vertical profile and horizontal alignment influences operating speed, operating costs, maintenance costs, passenger comfort and passenger travel time. An alignment should be selected that exceeds the minimum geometric design standards.
	B1) Convenience for transfers from buses (including Wheel-Trans and Mobility Plus) or GO Rail to subway.	B1.1) Transfer time from bus to subway platform at Steeles West Station and Finch West Station. B1.2) Transfer time from GO Rail to subway platform at the Sheppard West Station. B1.3) Delay time for through passengers on the 36 - Finch West bus route and the 41 - Keele bus route at Finch West Station. B1.4) Transfer time from subway to future LRT in hydro corridor at Finch West Station	Subway stations will intercept GO Transit buses and trains, YRT buses and local TTC buses. Total travel time will be reduced by selecting a station concept that minimizes transfer time between alternative transportation systems and modes. Reduced travel time enhances the attractiveness of the subway extension. Through passengers on TTC buses will also be delayed while the bus enters the subway station, allows passengers to board/alight and returns to its original route. The intent is to reduce the delay associated with diversion through the subway station. Passenger safety and comfort should be maximized while walking between subway facilities.
	B2) Convenience for access from other travel modes (taxi, bicycle, pedestrians (including ambulatory/non-ambulatory disabled persons), passenger pick up and drop off and commuter parking.	B2.1) Opportunity to link with cycling routes identified in the City of Toronto's and City of Vaughan's Cycling Master Plans. B2.2) Transfer time from other travel modes to subway platform. B2.3) Quality of walking environment from other travel modes to subway platform.	Reduced travel distance enhances the convenience of the subway extension for other travel modes. This in turn increases the attractiveness of the subway extension. Passenger safety and comfort should be maximized while walking between subway facilities.

Spadina Subway Extension Environmental Assessment Study
Appendix B – Criteria and Indicators Used to Evaluate Alignments and Station Concepts

Objectives	Criteria	Indicators	Rationale
B) Provide improved connections between the TTC subway and GO Transit, York Region Transit and TTC buses. (continued)	B3) Flexibility for potential future subway extension into York Region.	B3.1) Number, type and sensitivity of significant environmental features potentially affected by a future subway extension into York Region.	The potential exists to expand the subway system into York Region at a future date. The alignment selected in the vicinity of the Steeles West Station will have an influence on a future extension. Several environmental constraints are located north of Steeles Avenue that should be avoided.
		B 3.2) Number and type of curves between Steeles West Station and Highway 407.	The termination of the subway extension being planned as part of the Environmental Assessment will determine the alignment of a future extension into York Region.
C) Support local population and employment growth.	C1) Maximize redevelopment potential in support of the subway extension.	C1.1) Ability to combine stations with the existing and future built form.	The requirement for transit supportive development in proximity to subway stations may require changes to current planning policy.
	C2) Maximize the potential to create a high quality urban/pedestrian environment.	C2.1) Potential to create a safe environment for pedestrians, cyclists and transit passengers.	The ability to improve the urban environment with the subway extension and its station locations should be maximized. A safe environment for pedestrians, cyclists and passengers should also be achieved.
D) Minimise adverse environmental effects.	D1) Potential effects on natural heritage features.	D1.1) Area, type, significance and sensitivity of aquatic and terrestrial landscapes, ecosystems/communities and populations/species located within alignment and station footprint areas.	Aquatic and terrestrial landscapes, ecosystems/communities and populations/species are valuable resources that should be maintained. The intent is to minimise the loss of and disturbance to natural heritage features. Note: Zones of influence will be impact-specific based on measurement and modelling of groundwater dewatering/drawdown, air emissions, noise, vibration, etc. generated by the subway extension. Analysis will follow provincially recognized protocols.
		D1.2) Area, type, significance and sensitivity of aquatic and terrestrial landscapes, ecosystems/communities and populations/species located within adjacent zones of influence.	
	D2) Potential effects on geology and hydrogeology.	D2.1) Magnitude and significance of permanent groundwater drawdown (if any) on hydrogeological conditions.	Groundwater recharge/discharge areas and aquifers sustain watercourse baseflow in urban areas. The requirement to temporarily dewater adds complexity to construction and may result in impacts to watercourses. Construction of facilities into or through aquifers may require special construction measures to eliminate or minimise permanent changes to groundwater flow conditions.
		D2.2) Potential for soil erosion.	Poor soil conditions will impact capital cost estimates and may cause erosion/water discharge problems during construction.

Spadina Subway Extension Environmental Assessment Study
Appendix B – Criteria and Indicators Used to Evaluate Alignments and Station Concepts

Objectives	Criteria	Indicators	Rationale
D) Minimise adverse environmental effects. (continued)	D3) Potential effects on hydrology.	D3.1) Area of flood storage capacity removed. D3.2) Length/area of watercourses/waterbodies altered. D3.3) Ease and effectiveness of stormwater management at subway facilities.	New development in flood plains is to be prohibited or restricted according to Provincial Policy Statement. Disruption of existing drainage patterns can impact flows and flood levels, riparian rights and aquatic environments. Stormwater management practices are required to treat runoff from hardened surfaces such as parking lots. Some stations provide greater opportunities for quality and quantify control than others. Impacts (based on each configuration) to be compared. I.e. The greater the hard surface area, the greater the need for increased quality/quantity control requirements and increased associated cost (bigger oil/grit separator).
	D4) Potential effects on socio-economic features.	D4.1) Number, type and sensitivity of residences, businesses and community/recreational/institutional facilities located within alignment and station footprint areas. D4.2) Number, type, and sensitivity of residences, businesses and community/recreational/institutional facilities located within adjacent zones of influence.	Residences, businesses and community/recreational/institutional facilities contribute to community character, cohesion and stability. The intent is to minimise displacement of residents, employees, service providers and clients. This indicator includes facilities at York University and ATC Downsview. Emissions of particulate matter, greenhouse gases, noise, vibrations, electromagnetic fields may pose a health risk or nuisance to humans. Some businesses may be sensitive to vibrations or electromagnetic interference. This indicator includes facilities at York University and CFB Downsview.
	D5) Potential effects on pedestrian and traffic access/ flow.	D5.1) Number of permanent road closures or access modifications. D5.2) Traffic impacts due to operations of station commuter facilities (bus terminals, passenger pick-up and drop-off and commuter parking)	Note: Zones of influence will be impact-specific based on measurement and modelling of air emissions, noise, vibration and electromagnetic interference generated by the subway extension. Analysis will follow provincially recognized protocols. Subway facilities may result in road closures and access modifications that can disrupt traffic and pedestrian movements and access. Subway facilities can also disrupt traffic flows during passenger pick up and drop off, bus boarding/alighting and commuter parking. Passenger safety must be maintained during these activities. Major intersections in the vicinity of the Finch West Station include Keele/Finch, Keele/Murray Ross, Keele/Four Winds and Finch/Tangiers. Major intersections in the vicinity of the Steeles West Station include New East/West Road/Jane, Jane/Steeles and Steeles/Westgate.

Spadina Subway Extension Environmental Assessment Study
Appendix B – Criteria and Indicators Used to Evaluate Alignments and Station Concepts

Objectives	Criteria	Indicators	Rationale
D) Minimise adverse environmental effects. (continued)	D5) Potential effects on pedestrian and traffic access/ flow. (continued)	D5.3) Impact on safety of transportation system.	Queues could potentially block access/ egress to bus terminals. At 50th percentile, this will be a common occurrence which will negatively affect bus operations.
	D6) Potential effects on freight and rail passenger service and its signal systems at the Sheppard West Station.	D5.4) Accessibility for emergency services including fire, police and ambulance.	Subway facilities should be readily accessible to police, fire and ambulance services in the event of an emergency.
	D7) Potential effects on cultural heritage resources.	D6.1) Impacts on the operation of the CN Newmarket/GO Bradford rail line during construction and operation of the subway extension.	The interface between the GO Bradford/CN Newmarket line and the TTC subway extension should not interfere with existing freight and rail passenger service and signalling.
		D7.1) Number, type, significance and sensitivity of archaeological sites, built heritage features and cultural landscapes located within alignment and station footprint areas.	Archaeological sites, built heritage features and cultural landscapes are valuable resources that should be maintained. The intent is to minimise the loss of and disturbance to cultural heritage resources.
E) Achieve reasonable capital and operating costs.		D7.2) Number, type, significance and sensitivity of archaeological sites, built heritage features and cultural landscapes located within adjacent zones of influence.	Note: Zones of influence will be impact-specific based on measurement and modelling of air emissions, noise, vibration, etc. generated by the subway extension. Analysis will follow provincially recognized protocols.
	D8) Potential effects on pipelines located in the Finch Hydro corridor.	D8.1) Number, type, and length of pipelines requiring relocation due to subway extension.	Relocation of major oil and gas pipelines is a lengthy and expensive process that should be avoided or minimized, where possible.
	E1) Minimise capital costs.	E1.1) Capital costs including underground and surface subway facilities, fleet and storage.	The subway extension should be planned to minimise capital costs of the subway system and feeder bus network.
	E2) Minimise the costs of property acquisition.	E2.1) Total property cost. E2.2) Potential environmental cleanup costs.	The subway extension should be located to minimise property acquisition costs. The cost of decommissioning contaminated sites is significant and should be avoided, where possible.
	E3) Minimise the net operating cost.	E3.1) The dollar value of net fare and other revenues including commuter parking. E3.2) Operations and maintenance cost of the subway extension, including feeder bus operations.	A subway facility should be planned to minimise costs and maximize revenues.

Spadina Subway Extension Environmental Assessment Study
Appendix C – Summary of Environmental Impacts, Mitigation Measures and Commitments

Classification	Category	Potential Environmental Impacts	Mitigation Measures by TTC
Displacement of Existing Features by Subway Facilities	1) Land Use	Displacement of existing land use including commercial and industrial areas located near Dufferin/Sheppard, Keele/Sheppard and at the Finch West and Steeles West Stations and hydro corridors located north of Finch and north of Steeles.	a) Undertake station and emergency exit building design in accordance with City of Toronto/City of Vaughan Site Plan Approval process. b) Conduct public consultation during design of subway stations and other surface facilities.
	2) Vegetation	Displacement of existing cultural meadow communities located at Park Downsview Park, Steeles West Station and the Finch hydro corridor.	a) Prepare and implement tree protection plans and restoration plans. b) Comply with City of Toronto and York Region tree protection by-law.
	3) Archaeology and Heritage	Displacement of yet to be discovered archaeological sites. Note: No displacement of known archaeological sites, cultural landscapes or built heritage features.	a) Stop work immediately if archaeological remains are discovered. b) Contact the Ministry of Culture to determine course of action. c) Stop work immediately if human remains are discovered. d) Contact the Ministry of Culture and the Ministry of Consumer and Business Services to determine course of action.
	4) Aesthetics	Visual intrusion of surface facilities.	a) Design in accordance with City of Toronto/City of Vaughan Site Plan Approval process. b) Conduct public consultation during design of subway stations and other surface facilities.
	5) Soils	Excavation and disposal of potentially contaminated soils.	a) Conduct geotechnical and geo-environmental investigations. b) Prepare and implement Soil Management Strategy. c) Manage contaminated soils in accordance with environmental legislation, regulations and guidelines.
	6) Utilities	Relocation of utilities, pipelines and sewer/water mains.	a) Negotiate relocation plans with utility companies. b) Maintain service to utility customers. c) Conduct required interruptions of service during non-peak hours. d) Provide notification of planned temporary service interruptions.
	7) Utilities	Relocation of utilities, pipelines and sewer/water mains.	a) Negotiate relocation plans with utility companies. b) Maintain service to utility customers. c) Conduct required interruptions of service during non-peak hours. d) Provide notification of planned temporary service interruptions.
	8) Property and Buildings	Displacement of 10 existing buildings located near Dufferin/Sheppard, and at Finch West Station.	a) Maximize use of public lands. b) Undertake property acquisition and compensation in accordance with Ontario Expropriations Act. Remove any hazardous substances prior to demolition. c) Recycle/recover building materials where possible.
	9) Surface Water	Changes in surface water quality and quantity at Finch West and Steeles West Stations.	a) Adopt storm water management practices. b) Implement erosion and sedimentation control measures.

Spadina Subway Extension Environmental Assessment Study
Appendix C – Summary of Environmental Impacts, Mitigation Measures and Commitments

Classification	Category	Potential Environmental Impacts	Mitigation Measures by TTC
Construction	1) Automobile and Bus Traffic	Disruption of existing vehicle circulation patterns due to road and lane closures and temporary traffic detours and diversions.	a) Prepare traffic management plans. b) Stage construction activities to minimise traffic disruptions. c) Install decking over cut and cover construction sites located in road rights-of-way. d) Provide notification to local property owners and tenants. e) Monitor and adjust bus services on roads directly affected by subway construction.
	2) Pedestrian Movements	Impact on pedestrian circulation and safety due to road diversions and detours.	a) Prepare traffic management plans to address pedestrian requirements. b) Provide temporary sidewalks.
	3) Soils	Erosion and sedimentation due to excavation activities.	a) Minimise extent and duration of excavation activities. b) Implement erosion and sedimentation control measures to keep sediment on-site.
	4) Groundwater	Effects of dewatering on aquifers and recharge/discharge areas.	c) Prevent surface water runoff from entering excavation areas. a) Use earth pressure balance tunnelling method, where warranted. b) Secure Permit to Take Water (from Ministry of the Environment) if water taking exceeds 50,000 l/day. c) Conduct groundwater monitoring during construction.
	5) Noise and Vibration	Noise and vibration generated by construction equipment.	d) Minimise extent and duration of dewatering activities. a) Minimise noisy activities during evening hours. b) Conduct noise monitoring, reporting and mitigation.
	6) Air Quality	Increase in air emissions, including dust due to excavation activities and operation of construction equipment.	a) Monitor dust emissions during construction. b) Use dust control and suppression measures such as water application, where warranted. c) Avoid unnecessary idling of construction equipment.
	7) Business Disruption	Impacts to local business operations due to: • modified vehicle and pedestrian circulation patterns; • reduced visibility of store fronts and signs; reduction in on-street parking; • less convenient access to off-street parking; • patron inconvenience due to temporary construction debris, noise and dust.	a) Hold ongoing discussions with property owners during design development. b) Develop and implement a comprehensive traffic management and pedestrian plan, including signage and temporary parking (if required). c) Use on-site community liaison staff to communicate with local businesses during construction.
	8) Buildings	Building settlement/structural stress due to tunnelling, piling and dewatering.	a) Conduct further geotechnical investigations. b) Support/reinforce building foundations. c) Monitor buildings and structures during construction.
	9) Aesthetics	Migration of mud and litter off site.	a) Install and maintain hoarding, fencing, and/or screening at construction sites. b) Employ good housekeeping practices. c) TTC to provide ongoing, full-time construction management and inspection of all construction activities.

Spadina Subway Extension Environmental Assessment Study
Appendix C – Summary of Environmental Impacts, Mitigation Measures and Commitments

Classification	Category	Potential Environmental Impacts	Mitigation Measures by TTC
Operations and Maintenance	1) Noise	Noise generated by subway, bus and private vehicle operations.	a) Use double tie track system. b) Comply with TTC Design Standards. c) Maintain buses in state-of-good repair. d) Install silencers on subway ventilation fans.
	2) Vibration	Vibration generated by subway and bus operations.	a) Use double tie track system. b) Maintain buses in state-of-good repair.
	3) Electromagnetic Interference (EMI)	Interference with electromagnetic fields due to subway DC traction power system.	a) Provide EMI shielding in tunnels (if required).
	4) Air Quality	Overall improvement in air emissions due to replacement of surface diesel bus operations with underground, electric subway trains. Local increases in air emissions due to increased diesel bus traffic at Finch West and Steeles West Stations bus terminals.	a) Avoid unnecessary idling of buses. b) Purchase "clean" fuel-powered buses.
	5) Stray Current	Potential traction power stray currents impacts on buried utilities using metal piping.	a) Use of track isolation system and insulated power rails.

1. The first part of the report is a general introduction to the project. It describes the purpose of the study and the objectives that were set at the beginning. It also mentions the scope of the work and the limitations of the study.	2. The second part of the report is a literature review. It discusses the work that has been done in the field of research and identifies the gaps in the knowledge. It also mentions the theoretical framework that was used in the study.	3. The third part of the report is a description of the methodology that was used in the study. It includes information about the sample, the data collection methods, and the data analysis techniques.	4. The fourth part of the report is a presentation of the results of the study. It includes a description of the findings and a discussion of their implications.	5. The fifth part of the report is a conclusion. It summarizes the main findings of the study and provides recommendations for future research.	6. The sixth part of the report is a list of references. It includes all the sources that were used in the study.
7. The seventh part of the report is an appendix. It includes any additional information that is relevant to the study, such as questionnaires, interview transcripts, or raw data.	8. The eighth part of the report is a bibliography. It lists all the books, articles, and other sources that were consulted during the research.	9. The ninth part of the report is a glossary. It defines the key terms and concepts that are used in the study.	10. The tenth part of the report is an index. It provides a quick reference to the different sections of the report.	11. The eleventh part of the report is a list of figures and tables. It includes a description of each figure and table and its location in the report.	12. The twelfth part of the report is a list of abbreviations. It defines the abbreviations that are used in the report.
13. The thirteenth part of the report is a list of acronyms. It defines the acronyms that are used in the report.	14. The fourteenth part of the report is a list of symbols. It defines the symbols that are used in the report.	15. The fifteenth part of the report is a list of units. It defines the units that are used in the report.	16. The sixteenth part of the report is a list of variables. It defines the variables that are used in the report.	17. The seventeenth part of the report is a list of parameters. It defines the parameters that are used in the report.	18. The eighteenth part of the report is a list of constants. It defines the constants that are used in the report.