

UNION STATION RAIL CORRIDOR

Recommended Terminal Station Track for Airport Rail Link Operation

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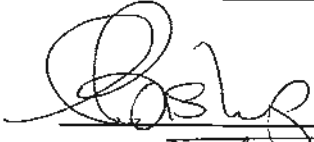



October 2003

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REPORT STATUS

Revision No.	Date	Author(s)
Initial Issue Draft	October 2003	Wayne Duncan / Chris Bishop / Lee Sims
Rev. 1	April 2006	Chris Bishop / Bert Peverini / Dave Amm

Approvals

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1. INTRODUCTION

Transport Canada is planning the introduction of an Airport Rail Link (ARL) that would connect Union Station and downtown Toronto with the new passenger terminal nearing completion at Lester B. Pearson International Airport (LBPIA). This link would utilize the Union Station Rail Corridor (USRC), the CN Weston Subdivision and new trackage from Woodbine Racetrack into the airport terminal area. The Airport Rail Link would use diesel multiple unit (DMU) trains; each train would be made up of one or two cars.

The Airport Rail Link (ARL) will require platform accommodation at Union Station. To ensure visibility and clarity and to make sure that the required services (ticket sales, baggage check-in, etc.) are immediately available, it should be located on a specific platform.

Two possible locations for the ARL platform were identified and briefly evaluated. This report describes that evaluation and identifies the preferred location for the platform. Further feasibility work will be required to confirm this conclusion.

2. NUMBER OF PLATFORMS REQUIRED

Because of the high demand for platforms at Union Station, it is assumed that only one platform will be assigned to the ARL. This is in contrast to the Heathrow Express where, at the downtown terminal (Paddington Station), two tracks with a central island platform are assigned to the airport trains. This is done so that there is always a train available to receive passengers.

With a maximum headway of every 15 minutes and a round trip time of 60 minutes, a train will normally be available in Union Station or the Airport Station to accommodate intending passengers.

3. PLATFORM ALTERNATIVES

Two alternative locations for the ARL have been identified:

- A new platform on the south side of the train shed. Two possible locations have been identified for this, between Tracks 13 and 14 and between Tracks 14 and 15. (It is immaterial for the purposes of this report whether the Track 14 platform is located between Tracks 13 & 14 or between a relocated Track 14 and 15).
- The west end of Track 1 adjacent to the Union Station building.

3.1 New Platform on South Side

The feasibility of a new platform on the south side has been previously investigated and two possible configurations have been identified, between Tracks 13 and 14 and between Tracks 14 and 15. A platform in either one of these locations is feasible. Because of the configuration of the plant, however, the length of the platform that can be

created is less than 300 meters. This link can accommodate one full length GO train but not a GO train and the Airport Rail Link train. This platform could be used by GO Transit, VIA or the ARL trains. Since this would be a new platform it would not remove any existing platform from GO/VIA service. A platform in this location could be accessed from the VIA concourse, from the existing GO East Concourse or from the future GO West Concourse.

The location on the south side of the station has two main disadvantages:

- It would be a considerable distance from Front Street and from the Union Subway Station. It would be accessible by stairs or escalators from the concourse level. Therefore, a passenger from Front Street would have to go down to the concourse level through one of the concourses and then up to the platform. The recent changes made to the south end of the VIA Concourse would make the access to a new southern platform through the VIA concourse indirect and not very visible.
- Trains would enter the Union Station plant from the CN Weston Subdivision which is essentially on the north side of the plant; the ARL trains would then have to cross the whole plant to get to the south side to access a platform in this location.

There is a potential advantage to this location. A passenger drop-off/pick-up location could be provided on the south side of the station from the proposed roadway access to the Air Canada Centre from York Street.

3.2 Track 1

The alternate location is the use of Track 1 for the Airport Rail Link. Track 1 is currently used by GO Transit. Its use for the ARL does not necessarily mean removing a track from service. As discussed below, there is the possibility of continuing to use a major part of Track 1 for GO Transit services and using only the west end of the track and platform for the ARL service. Currently, because of the proximity of switches at the east end of the train shed, a 10-car GO Transit train sits with the locomotive on the east side of Bay Street and the last car almost to York Street in the train shed. Therefore, the platform location for the Airport Rail Link, with this arrangement (sharing Track 1 with GO Transit), would have to be above York Street or on the west side of York Street.

Check-in facilities could be located in the west wing of Union Station in the West Waiting room, or on the west side of York Street accessed from Skywalk, in the former CN Express building. This would require negotiations with the private owner of the CN Express building.

This location has major advantages:

- It would not require the crossing of the plant by ARL trains for outbound trains;
- For inbound trains it only crosses three tracks;
- Passengers would be much closer to Front Street and the historic Union Station building;
- The access would be much more visible; and,
- It would be close to the Front Street level, requiring fewer level changes.

There are four disadvantages or potential problem areas associated with Track 1:

- Currently, there is a TTR operating restriction against double-berthing of trains on Track 1;
- West of York Street, the passenger platform is quite narrow;
- The frequent ARL operation would affect access to and from Bathurst North Yard; and,
- The growth of GO traffic on the Weston Subdivision would increase the potential congestion through this area.

4. EXAMINATION OF TRACK USAGE IMPACTS

To examine the potential impacts of these two possibilities on track capacity usage, three assumptions were made:

- All tracks would be double direction with Centralized Traffic Control (CTC).
- There would not be any additional crossovers connecting Track D1 and D2 or D2 and the North Connecting Track.
- There would not be a new B1 track. The B1 track is a potential new track to be added to the USRC plant. This possible addition to the system is discussed further below.

Although trains in any direction can occupy any track, generally right-hand running is observed and has been assumed in this report. It is further assumed that, under normal conditions within the USRC, an ARL train would, as far as practical, use one track entering the station, and a different track leaving the station. This operation would minimize the potential for interference between delayed inbound and outbound ARL trains.

4.1 Track 1 ARL Terminal Station, Union Station

Typically an inbound train would enter the USRC from the Weston Subdivision south main line, which becomes Track C2, passes over the Flyunder, and uses the John Street North Ladder 1 to reach Track 1. This route passes through the lateral side of only one switch; DSS #608. This route crosses South Ladder 2; North Ladder 2; Track C1; Track A3 and Track A2.

An outbound ARL train would depart station Track 1 via Track 1, to Track B, to Track C1, to the Weston Sub north main line. This route passes through the lateral side of two switches; DSS #643 and Turnout #179. This route interferes with no other USRC route.

The advantage of a Track 1 ARL Terminal Station and the above-described routes is that interference between delayed inbound and outbound ARL trains is minimized, with only Track 1 common to the inbound and outbound routes. Sketch 01 shows the Track 1 routings.

4.2 Track 14 ARL Terminal Station, Union Station

Typically an inbound train would enter the USRC from the Weston Subdivision south main line, which becomes Track C2, passes over the Flyunder, and uses the John Street

South Ladder 2 to reach Track 14. This route passes through the lateral side of switch DSS #543 and Turnout #590B. This route crosses North Ladder 1, South Ladder 1, Track D1, Track D2, Track A2, Track 8, Track 9, and occupies South Ladder 2 to station Track 14.

An outbound ARL train would depart via South Ladder 2, to Track C1, and over the Flyunder to the Weston Sub north main line. This route passes through the lateral side of turnouts #590B and #542A. This route crosses Tracks 9, 8, D2, D1, 7, and Track 6/C2.

There is the potential for interference between delayed inbound and outbound ARL trains from the junction of Tracks C1 and C2 at DSS #543. Sketch 02 shows the Track 14 routes.

5. EVALUATION OF ALTERNATIVES

From a customer service point of view, a Track 1 ARL Terminal Station would be preferable to a Track 14 (or 15) ARL Terminal Station. ARL terminals would be adjacent to Front Street and much more visible. The access route to a new platform on the south side would require intending passengers to thread their way through either the VIA or GO Concourses to the far southern edge of the station. The new platform would have one potential advantage; a new access to the south side of the station could be provided which would access the proposed road adjacent to the Air Canada Centre where a well located taxi rank might be provided.

From an operations point of view, ARL access to a Track 1 Terminal Station would conflict with fewer other routes in the USRC than the Track 14 alternative. Table 1 summarizes the impacts of the two routings. A Track 1 access would be much better from a potential capacity point of view.

Table 1
ARL Operational Features
Terminal Station at Union Station
Station Alternatives – Track 1 or Track 14

FEATURE	TRACK 1	TRACK 14
No. of turnouts traversed on diverging route	3	4
No. of routes crossed / blocked	5	13
Length of shared inbound/outbound track	250 m	550 m

There would be a problem with the use of Track 1, however. Under a current TTR operating restriction, only one train at the time can use Platform 1. This restriction was implemented within the signal system as a result of a collision between two GO trains on Platform 1.

There are ways to address this problem:

- Amend the operating restriction so that a second train (the ARL train) can be parked at the west end of Track 1. The ARL trains would use the west end of Track 1. There should be sufficient sight distance along the straight section of Track 1 to permit this.
- Change the existing signal aspect system for Track 1 to provide a three aspect system that can provide increased information;
- Procure an energy absorbing bumper to be placed between the two sections of Track 1 which can be retracted when it is necessary to run a train through the plant, either an ARL train to the east or a GO train to the west. Having the capability of using both ends of the platform for either GO trains or ARL trains would increase capacity and flexibility, particularly when maintenance operations are occurring or when there is a problem with the plant.
- Physically separate the two sections of track. This would not be operationally beneficial since, because of possible problems with switches or other situations, it is much more preferable to have tracks in both directions available at all times.

Obtaining a modification of the TTR operating restriction is obviously necessary; this could be assisted by the implementation of the second or third measure. Physically separating the two ends of the track is not recommended.

6. MITIGATION OF POTENTIAL CAPACITY PROBLEMS

The ARL would utilize capacity on the west end of the USRC plant. This capacity is a scarce commodity. One possible method of limiting the impact of the new ARL on USRC capacity is the addition of a new track to the west of the station. This has been planned for a number of years and has been termed the B1 plant expansion. This would connect Track 1 to the existing "fence track" which is currently used for the parking of business cars. To the west, a new track would be added to the throat at John Street between the Royal Bank building and Skydome. This will have to await the relocation of the John Street tower as the new track will physically occupy part of the footprint of this tower. Further west, an additional track could be constructed on the south side of the Bathurst North Yard or could be added to the Flyunder.

Adding this entirely new route through the plant would substantially increase capacity, replacing some or all of the capacity used up by the ARL. Sketch 03 shows how this would operate. Table 2 compares this option with the two previous options.

TABLE 2
ARL Operational Features
Terminal Station at Union Station
Station Alternatives – Track 1, Track 14, NewB1 Track

FEATURE	TRACK 1	TRACK 14	TRACK 1 AND B1
No. of turnouts traversed on diverging route	3	4	6
No. of routes crossed / blocked	5	13	5
Length of shared inbound / outbound track	250m	550m	250

7. OTHER CONSIDERATIONS

It has long been recognized that the location of the switch on the east end of the station limits the length of Tracks 1 and 2 and the flexibility of their use. There have been plans on the books for a number of years to extend Tracks 1 and 2 to the east. The new GO bus station located on the former end of the former CP Express site has been built to accommodate such a track lengthening albeit with some major structural upgrades. Such a development would allow GO trains to be parked further east; the ARL trains in turn could be located east of York Street, directly south of the west waiting room where check-in facilities could be located.

8. PASSENGER ACCOMODATION ON PLATFORM 1

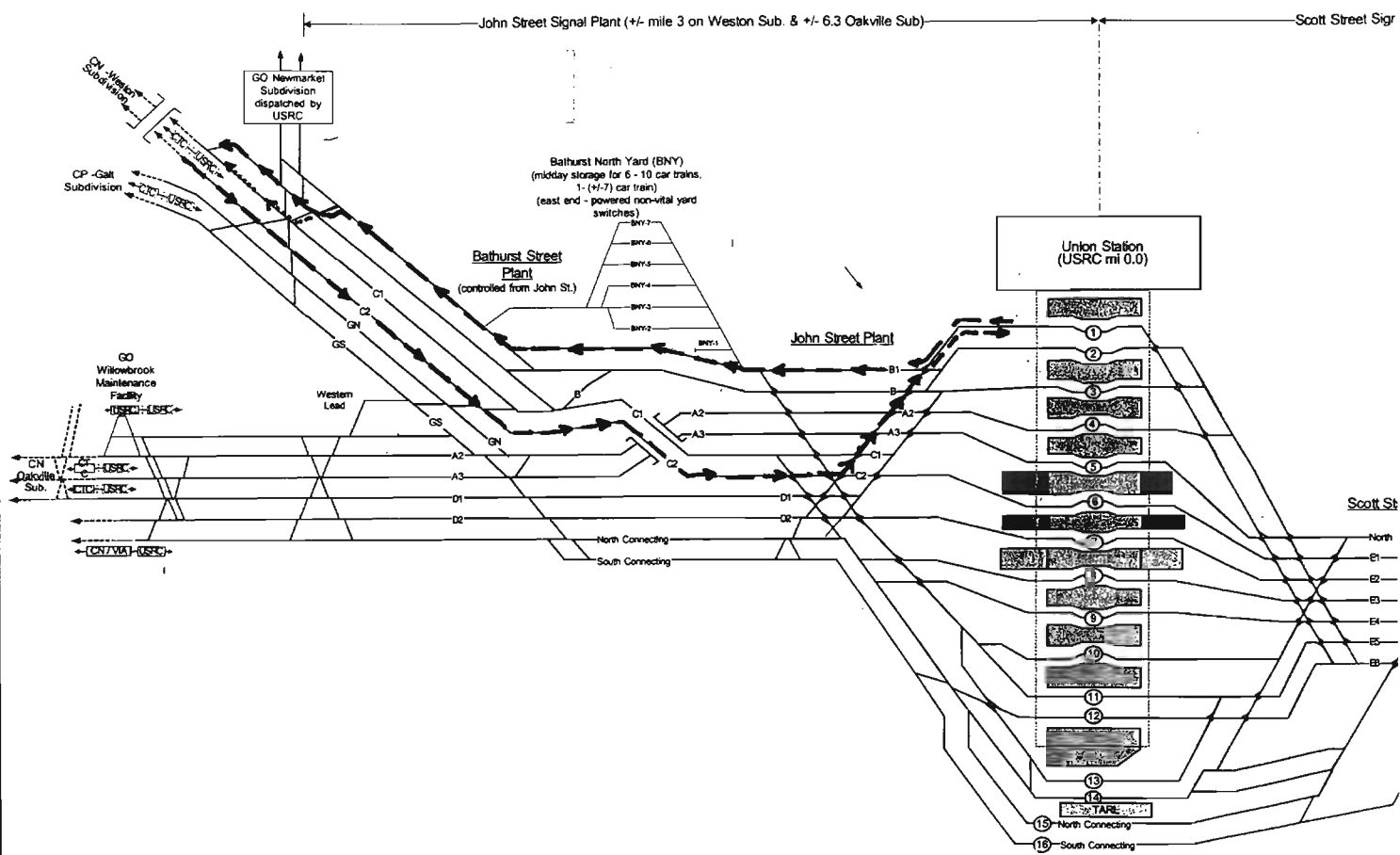
The width of Platform 1 to the west of York Street is quite restrictive. It may be possible to make modifications to the Skywalk (the former CN Express building) to functionally widen this platform and to provide additional exits. If this approach is to be accepted, more detailed investigation will have to be done. In addition, the Skywalk is now owned by a private developer and fiscal arrangements would have to be made.

Sketches 4 and 5 show a possible arrangement of passenger facilities in this area. Passenger access can be provided from Front Street via the Skywalk or from Station Street.

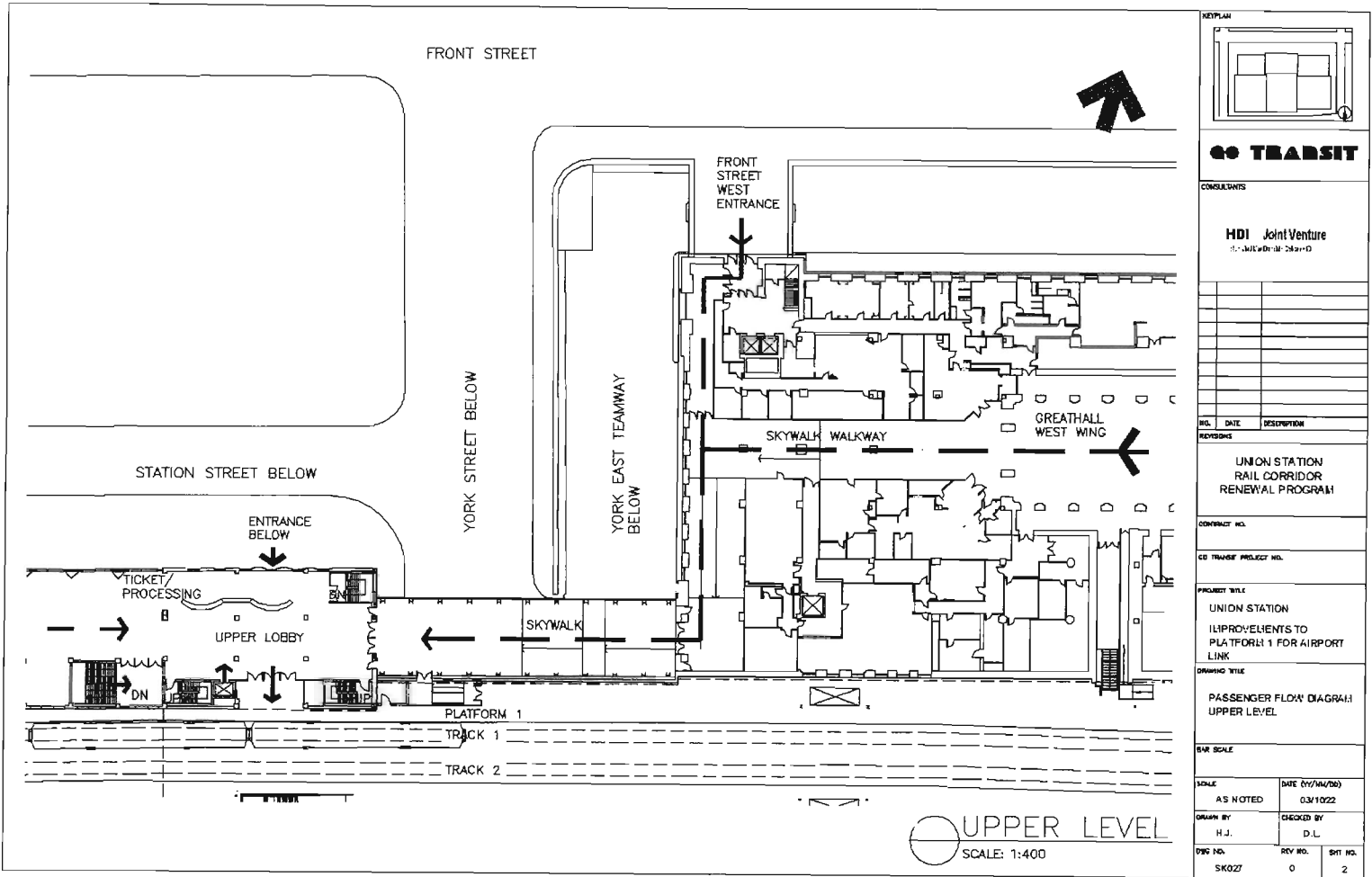
9. CONCLUSIONS

The initial conclusion from this brief analysis is that a Track 1 location would be superior in terms of capacity impacts on the USRC rail plant and would be more acceptable to passengers.

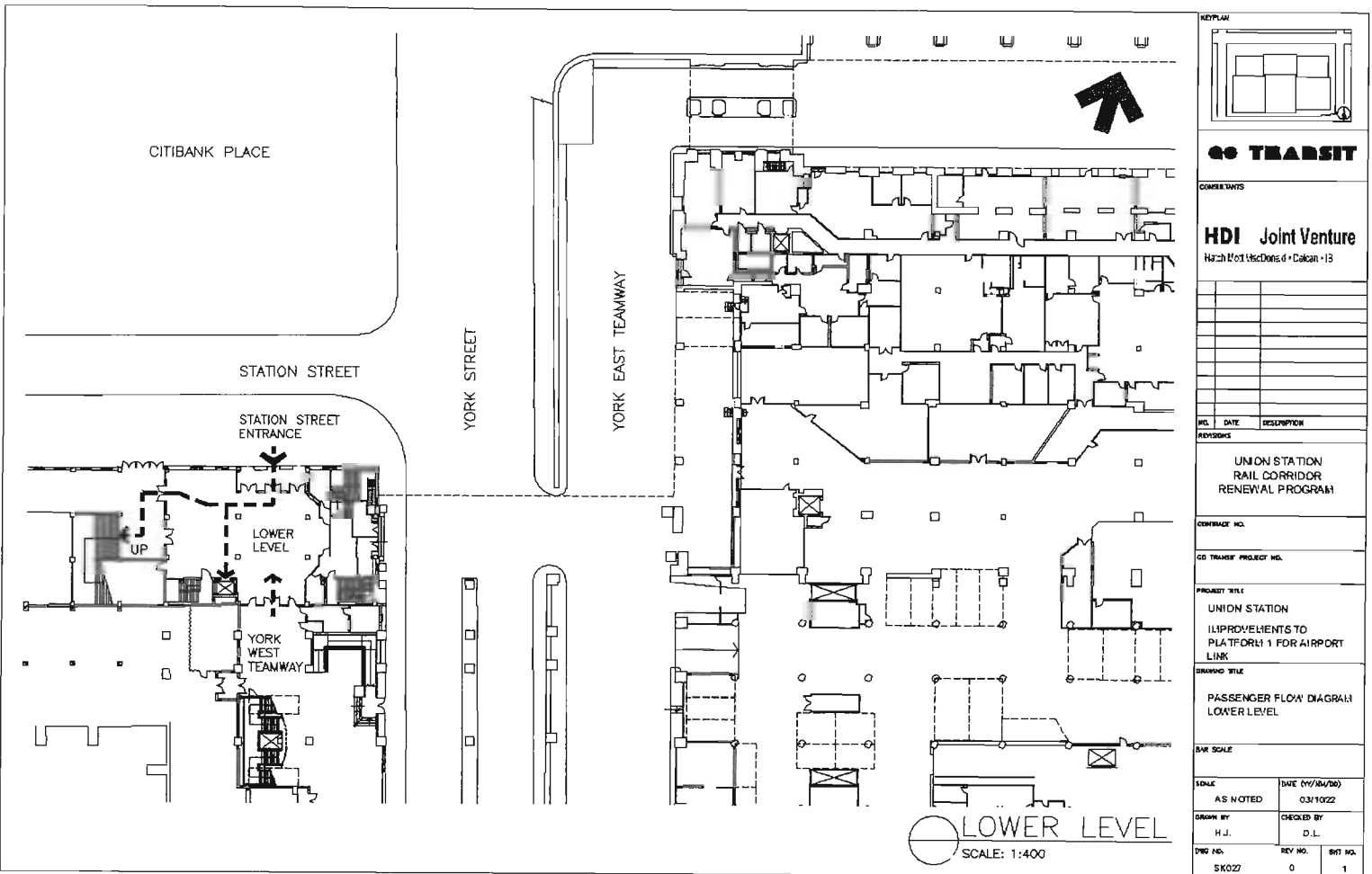
The addition of a new frequent two way service moving across the entire John Street interlocking would directly affect peak period capacity and adversely affect GO Train revenue service. A Track 1 option would minimize this impact on existing and future service. In addition, the construction of a new B track connection to the west corridor would replace some of the plant capacity that would be taken up by the new ARL service.



SKETCH 03
 17 OCTOBER, 2003



Sketch 4 – Front Street Level Access to ARL Platform 1



Sketch 5 – Station Street Level