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Chebucto Community Council
November 1, 2010

TO: Chair and Members of Chebucto Community Council

SUBMITTED BY: Ken Reashor, P.Eng., Director, Transportation and Public Works

DATE: October 13, 2010

SUBJECT: **Lacewood Terminal Site Selection**

ORIGIN

This report originates from staff's recommendation that the Lacewood Terminal be replaced by a more suitable, modern facility. This is based on the Metro Transit Five-Year Capital Approach and the Metro Transit Five-Year Strategic Operations Plan.

RECOMMENDATION

It is recommended that:

- Chebucto Community Council approve in principle that PID#40090169 (referred to as the "Willet Site") be designated as the future location for the new Lacewood Transit Terminal as per the recommendation in the attached report;
- That Chebucto Community Council forward a recommendation to Regional Council endorsing this approval in principle.
- That this endorsement be subject to receiving appropriate environmental approvals on the site; and
- That this endorsement be subject to the future approval of Land-Use By-Law amendments as required to construct a transit terminal on the Willet site.

BACKGROUND

The current Lacewood Terminal, located near the corner of Lacewood Drive and Willet Street, is deficient in passenger amenities, safety, and overall capacity. The current terminal does not meet the current or future needs of transit passengers. It is not possible to undertake substantial improvements on the current site, which is located primarily on private property. In addition to improving the delivery of conventional transit service, the construction of a new Lacewood Terminal is a requirement and the catalyst for future introduction of MetroLink service to the Clayton Park area.

Transit terminals require a relatively large parcels of land and as such can be difficult to insert into previously developed neighbourhoods. Recognizing this difficulty, the importance of choosing the best location for the terminal, and the public sensitivities around the placement of these facilities, Metro Transit staff engaged consultants Delphi-MRC to execute a site selection study for the new Lacewood Transit Terminal. Their report is attached as Appendix A.

DISCUSSION

The study considered four site options:

- Site 1 - Lacewood Drive
- Site 2 - Willet Street
- Site 3 - Dunbrack Street (Northcliffe)
- Site 4 - Thomas Raddall Drive

These are illustrated in Appendix B.

The analysis was conducted in two stages based on the following factors:

Stage 1

- Incremental Operating Costs
- Capital Costs
- Construction Practicality

Table 2 of the consultant's report illustrates the differences in capital costs of the four sites above and beyond basic terminal construction. These costs are summarized below:

Candidate Site	Estimated Extra Costs	Notes
1. Lacewood Drive	$3,000,000	Imported fill
2. Willet Street	$2,750,000	Rock breaking and removal
3. Dunbrack Street (Northcliffe)	$400,000	Building demolition and removal of debris
4. Thomas Raddall	$2,200,000	Road widening and driveway

There is an allowance of $400,000 to demolish the Northcliffe Centre if that were chosen as the preferred site. However this does not account for the fact that this $400,000 cost will be incurred by HRM regardless of what site is chosen when the Northcliffe site is closed. This additional $400,000 difference in cost to HRM should be considered when comparing the capital costs of each site.

Upon completion of the Phase 1 review the Thomas Raddall site was found to be too far from existing transit services to be feasible. As a result only sites one, two and three were carried forward for more detailed analysis in Phase 2.

Stage 2

- Operational Suitability - Customer Convenience
- Operational Suitability - Traffic Planning Implications
- Population and Adjacent Uses
- Active Transportation and Pedestrian Access
- Land Use Controls
- Expandability
- Personal Safety & Security (Crime Prevention Through Environmental Design)

After completion of the report and further analysis by staff, two modifications were made to the consultant's findings. The "zoning" rating for the Lacewood site was downgraded from Good to Fair since use of a parcel within Schedule K zoning would require Land-Use bylaw amendments similar to any of the parcels zoned P. The "Expansion Capability" rating for Willet was downgraded from Good to Poor as expansion would be relatively costly and similar to the Lacewood site due to required excavation.

The revised stage 2 site evaluation summary table is provided in Appendix C.

The report concludes that the most suitable site for the new Lacewood Transit Terminal is Site 2, Willet Street. The Willet Street site received the highest number of "good" ratings in the stage 2

evaluation and the fewest "poor" ratings. The Willet site was also generally preferred by those people who provided feedback at the public consultation session held as part of this project.

It should be noted that the Willet Street site has higher projected operating and capital cost than Dunbrack, which is the second ranked site. The difference in projected operating costs between the two sites is approximately $105,000. The difference in projected capital costs is approximately $2.75 million when considering the future cost of demolishing the Northcliffe Centre regardless of what site is chosen as described above.

However, if the terminal were located at the Dunbrack site, transit route patterns in the area would have to be significantly altered to serve the terminal. This alteration would require significant service deviations away from Willet Street which is a very busy transit corridor, with approximately 575 passenger movements per day over a short stretch of roadway (this excludes any passengers from Willet Street who currently board at Lacewood Terminal). The result would be a significant reduction in convenience for transit passengers (and potential passengers) in the area. As a comparison, the parallel Dunbrack corridor has approximately 75 passenger movements per day.

As a result of this consideration and the overall evaluation of the potential sites, the study concludes that the extra cost of the Willet site is reasonable given the benefits of the Willet site over the Dunbrack site.

Appendix D illustrates early concepts for the Willet Street site. These concepts show one possible site development scenario for a terminal on this site and will be subject to significant refinement through the design process.

Following completion of the consultant's site selection study, staff commenced an environmental review of the Willet site. This review revealed that there are small wetlands on the property. Staff are in the process of working through this with the Provincial Department of the Environment. However it is not expected that this will prevent development of the site as a transit terminal.

BUDGET IMPLICATIONS

There are no budget implications.

FINANCIAL MANAGEMENT POLICIES / BUSINESS PLAN

This report complies with the Municipality's Multi-Year Financial Strategy, the approved Operating, Project and Reserve budgets, policies and procedures regarding withdrawals from the utilization of Project and Operating reserves, as well as any relevant legislation.

COMMUNITY ENGAGEMENT

A public consultation session was held January 25, 2010 at the Halifax West High School. The results of this public consultation are documented in the attached report and generally favoured the Willet Street site.

Although not part of the site selection process, a Public Information Meeting was held on October 7, 2010 as part of the Land-Use By-Law Amendment process required to allow the terminal to be built on the Willet Street site. Members of the community raised concerns and were generally opposed to the use of the Willet Street site for a Transit Terminal. A smaller number of residents voiced concerns and opposition to the use of the Dunbrack site as a transit terminal.

The minutes from this meeting (including comments from the meeting and all written submissions received) will be officially noted in the Planning Services staff report on this Land-Use By-Law amendment request. At the meeting, Metro Transit staff informed the audience that public input would be sought as part of the overall terminal design in order to minimize the concerns raised by the community.

ALTERNATIVES

There are no recommended alternatives.

ATTACHMENTS

Appendix A - Lacewood Terminal Siting Study Final Report
Appendix B - Map of Potential Site Options
Appendix C - Revised Stage 2 Site Evaluation Summary Table
Appendix D - Willet Street Preliminary Site Concepts

A copy of this report can be obtained online at http://www.halifax.ca/commcoun/cc.html then choose the appropriate Community Council and meeting date, or by contacting the Office of the Municipal Clerk at 490-4210, or Fax 490-4208.

Report Prepared by : Dave Reage, MCIP, LPP, Coordinator of Project Planning, Metro Transit, 490-5138

Report Approved by: Lori Patterson, A/General Manager, Metro Transit, 490-6388

Report Approved by: Peter Bigelow, Manager, Real Property Planning, 490-6047

Appendix A - Lacewood Terminal Siting Study Final Report

delphi MRC

Lacewood Terminal Siting Study

Project Description: Evaluation of candidate sites for a new transit transfer station in the Clayton Park area of Halifax Regional Municipality

FINAL REPORT

Prepared by: Delphi MRC

Prepared for: Metro Transit

June 2010

TABLE OF CONTENTS

List of Figures

List of Tables

Appendices

1 EXECUTIVE SUMMARY

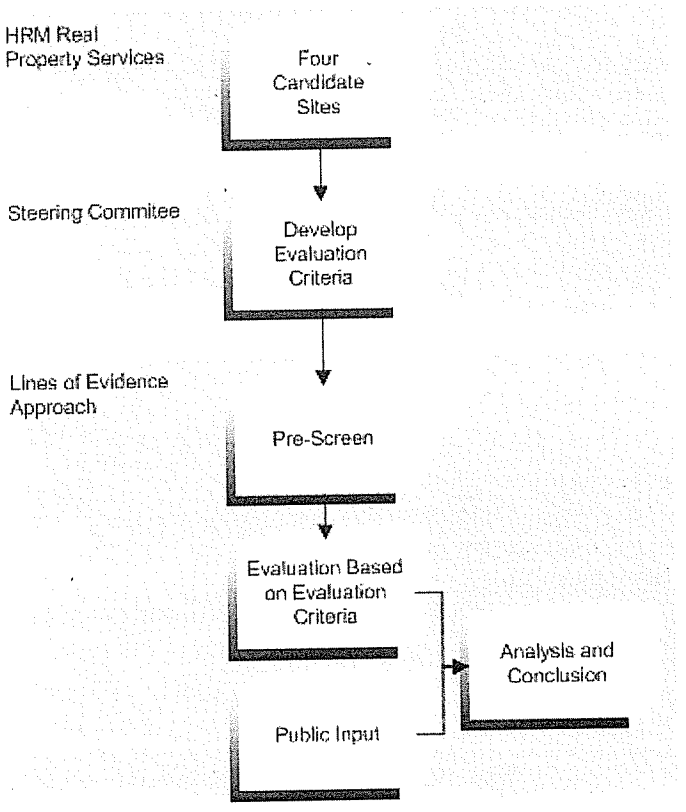
1.1 Purpose

Delphi MRC was engaged by Metro Transit, a department of the Halifax Regional Municipality, to recommend a preferred site to locate a new transit terminal in the Clayton Park area. The terminal will replace the current facility at the corner of Lacewood Drive and Willett Street, which is currently operating at its capacity and is not capable of being expanded. The purpose of this report is to document the process used to select a preferred replacement site.

1.2 Approach and Methodology

A variety of factors need to be considered when selecting the location of a new transit transfer terminal. The evaluation procedure must be clear, reasonably comprehensive and defensible. The following diagram illustrates the lines of evidence approach used to undertake this analysis.

Figure 1 Lines of Evidence Approach



As illustrated in the diagram, four candidate sites were originally identified by Halifax Regional Municipality staff for consideration. The sites are all owned by the Municipality. The Project Steering Committee developed an initial list of evaluation criteria, expressed in the Terms of Reference for this study,

and Delphi MRC used these criteria as the basis of a "lines of evidence" approach to the evaluation process. This included a review of factual data and consideration of public input about the options. The four publicly-owned sites identified by HRM were:

1. Lacewood Drive (undeveloped portion of Mainland Common)
2. Willett Street (undeveloped open space)
3. Dunbrack Street (Northcliffe Centre)
4. Thomas Raddall Drive (cleared portion of Mainland Common)

All are situated reasonably close to the existing terminal and all present challenges.

1.3 Conclusions and recommendations

In urban settings such as Clayton Park it is difficult to find a large site, such as that required for a new transit terminal, which is ideal in all instances, which rates well in all criteria, and which satisfies all needs. This is certainly true of a new transit terminal in that none of the candidate sites is entirely free of deficiencies. However, despite the challenges presented at each site, our analysis suggests that the Willett Street site is the most suitable for use as a new terminal location to serve Clayton Park, based on the following:

- Operationally, it has the least impact on current bus routes and stops. All the other sites required significant changes either to routing, operating cost or both.
- The synergy between walk-up population and higher density dwellings: it is conveniently situated near the largest population of current and potential users. No other site analyzed appears to be capable of attracting as many patrons within its walkable catchment area.
- Only minimal impact on traffic, given its situation on a relatively low volume, high capacity road.
- It is adjacent to existing active transportation facilities including sidewalks on Willett Street and the Mainland Linear Park to the west.

The one factor among all those considered most important in the current context is that of customer convenience. While it is probable that the Willett Street location would have a higher capital cost than the candidate site on Dunbrack, it offers a good example of value for investment: of the candidate sites, the Willett site is best suited to the purpose and, it can therefore be argued, is worth the expenditure. Additionally, the operating cost differences between the two sites are insignificant within Metro Transit's operating budget. They are warranted given the net benefits in passenger convenience/customer service.

For the reasons cited in this report, we recommend that efforts should immediately be taken to secure the Willett Street site for use by Metro Transit.

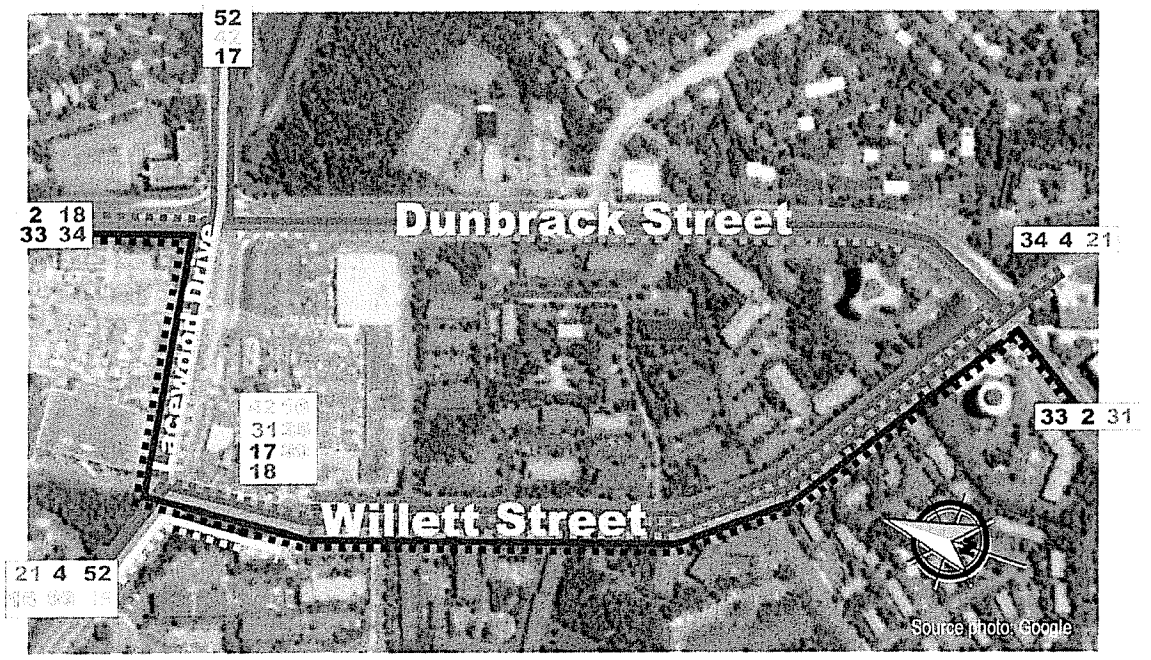
2 THE NEED FOR A NEW TERMINAL

2.1 Existing Conditions

The existing transit terminal at the corner of Lacewood Drive and Willett Street currently accommodates 13 routes, five of which terminate there. Approximately 2,000 passengers board buses throughout the day at the terminal, about half in the peak periods (6 AM to 9 AM and 3 PM to 6 PM). There are more boardings in the AM peak (600) than the PM peak (400). Therefore it is reasonable to size the terminal using AM peak volumes. The use of the terminal by walk-in customers outweighs its use as a transfer facility.

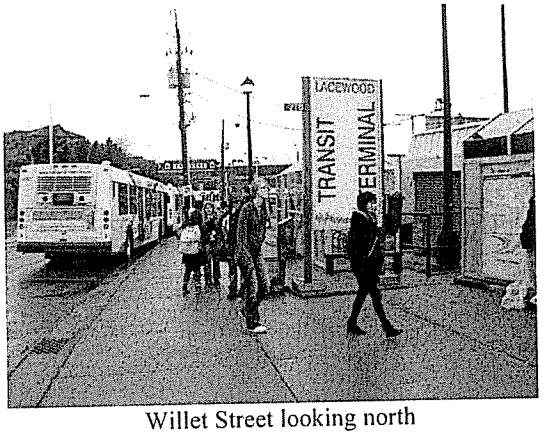
There are approximately 50 bus departures from the terminal in the busiest hour (7 AM to 8 AM). The terminal consists of three bus stops, two on Willett Street with shelters and one in the adjacent shopping centre just east of Willett. There is also a lay-up spot on the east side of Willett Street, located just south of the terminal.

Figure 2 Major routings of buses through the terminal

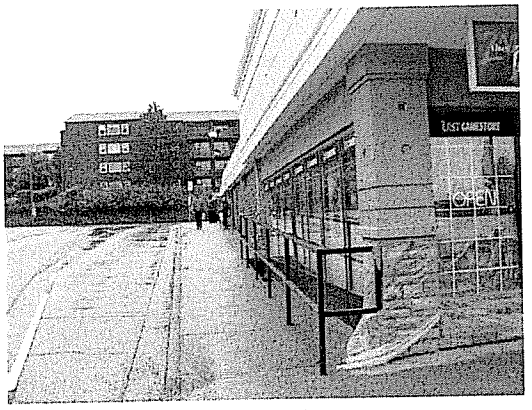


Buses arriving from the west on Lacewood enter the terminal by turning right into the shopping centre east of Willett Street. From there the trips that travel southbound on Willett Street serve the stop east of Willett on the south side of the shopping centre before heading south on Willett Street. Buses terminating at Lacewood or continuing east can serve stops on Willett Street. Buses arriving from the north turn right on Lacewood and turn into the shopping centre. Buses travelling northbound on Dunbrack turn left at Lacewood and left at the shopping centre. Other northbound vehicles from the south travel along Willett Street and stay on Willett to serve the terminal.

Figure 3 Photos of existing Lacewood Terminal



Willet Street looking north



Parking lot looking west.

2.2 New Requirements

Current ridership data indicates that six hundred passengers board in the three-hour morning peak period. This could imply about 300 boardings occur in the peak hour. If it is assumed that each passenger waits 10 minutes, there could be up to 50 passengers waiting at any one time. To be comfortable, a space of at least 1 m^2 per person should be used for the terminal building (LOS B)[1] calling for a passenger waiting area of 50 m^2. Doubling this to provide for ample circulation space would mean 100 m^2 for passengers to wait.

Ideally this waiting space would be consolidated in one area as close as possible to the bus stops. This would allow passengers to wait in a heated environment in winter and also make the terminal operation safer late at night, since passengers would wait together in an area that could be well-covered with CCTV and other security features such as high-grade lighting and e-phones.

2.3 Other Facilities to be Included in the Terminal Building

It is our understanding that a separate contractor is developing a new modular terminal design for Metro Transit that would presumably be employed at the new Lacewood terminal. In this light, in addition to the passenger waiting area, at a minimum there should be space as follows:

- Space for a lease concession, ticketing and information booth, storage – 60 m^2
- Operator waiting area and washrooms – 45 m^2
- Security office – 15 m^2
- Mechanical, electrical, maintenance/janitorial, computer/security camera equipment room, waste/recycling room – 50 m^2.

[1] TCRP Report 100: *Transit Capacity and Quality of Service Manual* 2nd Edition

This suggests a total area of about 300 m^2 for the terminal building. The space for the lease concession, ticketing and information booth and the associated storage should be part of, or adjacent to the passenger waiting area.

2.4 Circulation Requirements

The circulating roadway and bus storage area must be sized to accommodate current and anticipated routes serving the Lacewood area. As noted above, there are currently 13 routes and five terminate at the terminal. The terminating routes need lay-up spaces. It is also desirable that the buses stop as close to the passenger waiting area as possible and it is proposed to provide 4 stops on either side of the terminal building, each with the capacity to accommodate one standard or one articulated bus. The following template in figure 5 satisfies these requirements.

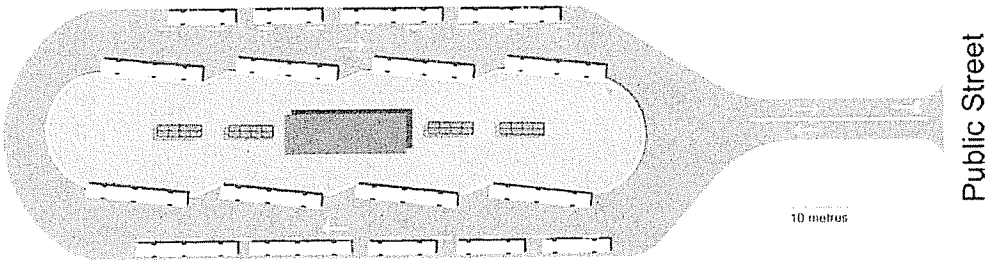


Figure 4 Design template for planning purposes.

2.5 Future Role of MetroLink

As a related near-term initiative, Metro Transit intends to introduce a new MetroLink express service for the Clayton Park area. It is assumed that the start location will be at the new terminal. The service will include an intercept park-and-ride facility at the intersection of Northwest Arm Drive and Highway 102. Because of the inter-related aspect of these two projects, it is necessary for Metro Transit to select a new terminal site, finalize a design and construct the facility in tandem with the new MetroLink service. It is hoped that both will be operational in 2012.

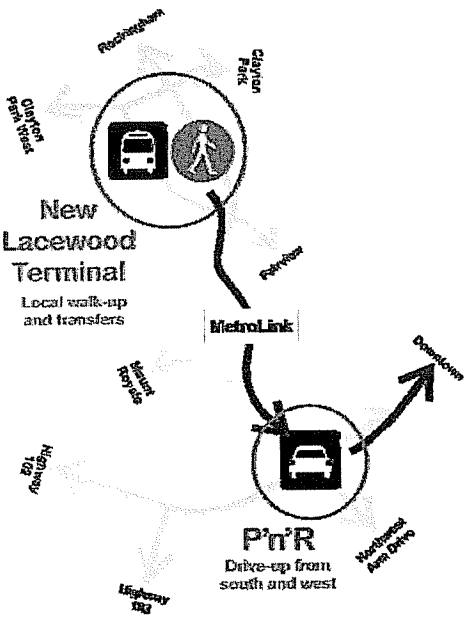


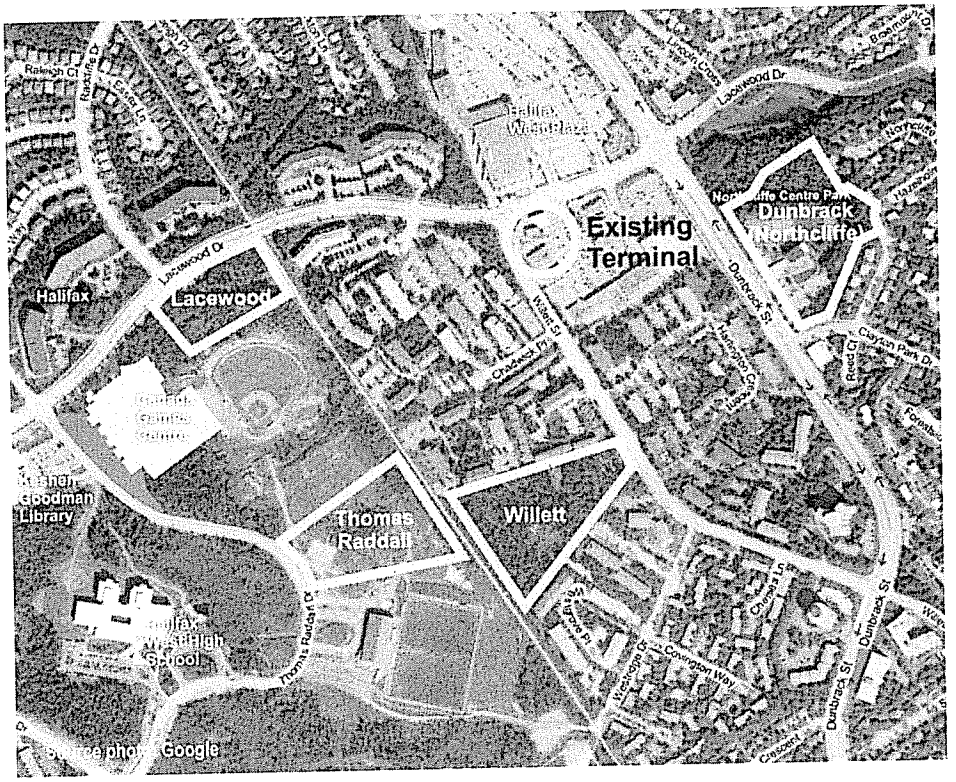
Figure 5 General relationship of terminal to proposed Park and Ride.

3 CANDIDATE SITES

3.1 Overview

As shown in Figure 6, four sites were originally identified as potential locations for a new terminal. These are described briefly in this section. All are relatively close to the existing terminal and all present challenges.

Figure 6 Candidate Sites



3.1.1 Site 1: Lacewood Drive

A site on the south side of Lacewood Drive west of the Mainland North Linear Trail and east of the new Canada Games Centre has been identified. It is located across from the T-junction of Radcliffe Drive with Lacewood Drive. This site is depressed by about 8 metres from the road level and would require significant fill were it to be selected. Lacewood Drive is a 4-lane divided road with no break in the centre median in the vicinity of the site.

Figure 7 Photos of Lacewood Site

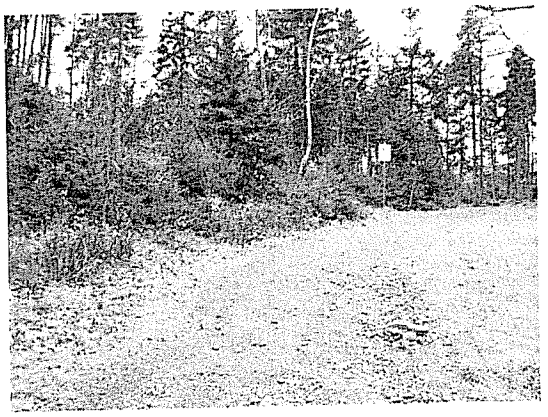
Lacewood looking west

Fill condition on Lacewood, vicinity of site

3.1.2 Site 2: Willett Street

A wedge of land on the west side of Willett Street, south of the existing terminal, has been identified. This is situated between residential developments with high transit usage. It is occasionally used for passive recreational purposes such as nature appreciation.

Figure 8 Photos of Willett Site



Willet site

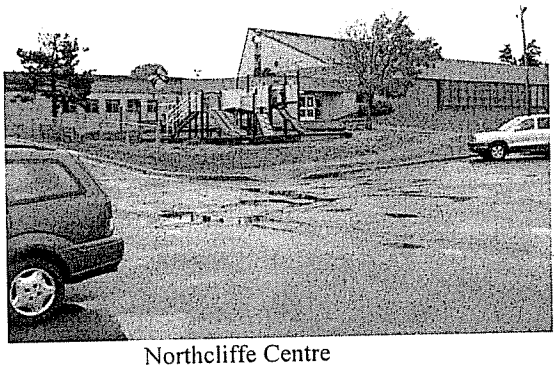
Looking north on Willett

3.1.3 Site 3: Dunbrack Street

A site on the east side of Dunbrack Street south of Lacewood Drive is currently in use as a sports and recreation facility - Northcliffe Centre. Also on the site are four tennis courts, basketball courts and a children's play equipment as illustrated in the photo. HRM has determined that the buildings on site are at the end of life span, and need to be removed. The Municipality has plans to move these facilities to the new Canada Games Centre in 2011. Dunbrack Street is a four lane divided road with no median break in the vicinity of the potential site. There are sidewalks and bicycle lanes on either side. The site is adjacent to lands controlled by Halifax Water for a

stormwater retention pond. The Halifax Water property would not need to be affected by the development of a terminal.

Figure 9 Photos of Dunbrack (Northcliffe Centre) Site



Northcliffe Centre

Parking area (looking north)

3.1.4 Site 4: Thomas Raddall Drive

This site abuts the Mainland North Linear Trail. Thomas Raddall Drive was constructed as a low speed, low volume road with low turning radii and a narrow cross section. Part of the road has been upgraded for access to the new Canada Games Centre at the corner of Thomas Raddall Drive and Lacewood Extension. As a result, approximately 350 additional metres of Thomas Raddall Drive would need to be upgraded were this site to be selected. The site is on the Mainland Common, a recreational area currently under development.

3.2 Evaluation factors

A series of evaluation factors was provided by the Steering Committee in the project Terms of Reference. As the study progressed the criteria were modified and adjusted as information became available to the study team. It was the conclusion of the steering committee it that there was more value in having a well-placed facility with reasonable operating costs than one that offered low costs but was inconvenient for customers. Therefore, a pre-screening process was employed to consider factors first related to cost and second related to service and customer convenience.

Following are the evaluation factors and criteria used for the study, sorted into the pre-screening and final screening stages.

Stage 1 – Pre-Screening

The following factors were considered in Stage 1:

- Incremental Operating Cost
- Relative Capital Cost

- Practicality

Stage 2 – Final Evaluation

The Stage 2 screening addressed the operational suitability and service potential of the remaining sites.

- Operational Suitability – Customer Convenience
- Operational Suitability – Traffic Planning
- Active Transportation and Pedestrian Access
- Population and Adjacent Land Uses
- Land Use Controls
- Expandability
- Personal Safety and Security (CPTED)

The next two sections discuss each of these factors in detail. Section 6 will present the results of a public discussion of the options, and Section 7 presents a summary and recommendation. There are several appendices which provide supplemental data and analysis.

4 PRE-SCREENING (STAGE 1) EVALUATION

4.1 Introduction

The Stage 1 pre-screening of each site is presented below based mainly on cost related criteria.

4.2 Criteria

4.2.1 Incremental Operational Costs

The existing bus route servicing plans were modified to connect these routes to each of the proposed sites using the most efficient route possible. We were then able to identify the difference in daily kilometers over and above the existing route service plan. The results are tabulated below, while the background information and assumptions are provided in Appendix A. Cost differences are shown in Table 1. These costs are provided simply for the purposes of comparing the locations of the terminals. It is assumed that the operating and maintenance costs of the terminal will be the same, no matter where it is located. So, from the standpoint of incremental costs to detour buses, the Thomas Raddall location is an order of magnitude higher than the other three.

Table 1 Incremental Cost - Operation

Terminal	Daily travel in vicinity of site (km/day)	Difference from existing (km/day)	Difference from existing (km/year)	Approximate additional annual operating expense [2]
Existing	767	-	-	-
1. Lacewood Drive	893	126	37,800	$140,000
2. Willett Street	925	158	47,400	$180,000
3. Dunbrack Street (Northcliffe)	831	64	19,200	$75,000
4. Thomas Raddall	1,446	679	203,700	$775,000

4.2.2 Capital Cost

As each site would typically employ the same basic design, the only capital cost consideration is those elements that would be necessary for comparative purposes. That is – the cost of making the site ready for construction. It has been roughly estimated that the cost of filling Site 1 (Lacewood Drive) to bring it to grade with the adjacent road would be $3 million. Similarly, there would be ground preparation and rock removal costs for Site 2 (Willett) which is estimated to cost $2,750,000. The cost of demolition and removal of debris of the Northcliffe centre (Site 3) is

[2] Assumes an average operating speed of 19 kph and hourly costs of $76.30

estimated for planning purposes to be about $400,000.[3] Similarly, an allowance of $2.2 million has been estimated for widening Thomas Raddall Drive as it is assumed that the entire section from south of the Canada Games Centre to the intersection with Regency Park Drive would need to be widened, allowing for unimpeded traffic flow. Sidewalks would also presumably need to be extended to the site. For each site, we estimate the amounts shown in the following table.

Table 2 Capital Cost Comparison

Candidate site	Estimated extra costs	Notes
1. Lacewood Drive	$3,000,000	Imported fill
2. Willett Street	$2,750,000	Rock breaking and removal
3. Dunbrack Street (Northcliffe)	$400,000	Building demolition and removal of debris (see footnote)
4. Thomas Raddall	$2,200,000	Road widening and driveway

4.2.3 Practicality

This criterion considers the practical aspects of construction that could impact on capital cost and other concerns.

Table 3 Practicality Comparison

Candidate site	Practical considerations	Issues
1. Lacewood Drive	Treed, open space. Deep fill requirement. Underlain by storm sewer at base of fill area.	Imported fill necessary; cost implication.
2. Willett Street	Treed, undeveloped area. Grading would be required; with care, boundary trees could be retained for buffer.	Blasting and rock removal; cost implication
3. Dunbrack Street (Northcliffe)	Established recreation facility. Buildings on site are at the end of life span, need to be removed. Possible boundary tree retention for buffer.	User inconvenience.
4. Thomas Raddall	Need to upgrade roadway; intrudes into lands slated for recreation use.	Cost and user inconvenience.

4.2.4 Conclusion

Based on the pre-screening analysis, the Lacewood Drive, Willett Drive and Dunbrack Street locations were carried forward to the final evaluation stage The Thomas Raddall site was excluded from further analysis. In discussions with the project management team, it was agreed that the high operating cost of $775,000 per year over the current costs for this route is cost-prohibitive for Metro Transit. It should be noted that all of the candidate sites

[3] This may be considered an external cost not related to the transit terminal since the buildings are considered at the end of their lifespan and would need to be removed in any case. We have retained them lacking any specific advice to do otherwise.

would add to some extent to the annual operational cost of providing transit in the Clayton Park area.

5 STAGE 2 EVALUATION

5.1.1 Introduction

This analysis of the Lacewood Drive, Willett Drive and Dunbrack Street locations addresses the operational suitability and service potential of each.

5.1.2 Operational suitability: Customer convenience

Customer convenience is related to bus routes and stops and being able to best-serve the current patrons. This means that having the least impact to current routes and stops is very important and is one of the key evaluation criteria in choosing a site for a terminal.

The transit routing analysis discussed in Section 4.2.1 permits the additional consideration of service impacts on walk-up patrons. The Dunbrack location would result in significant realignment of existing routes, thus creating a major inconvenience by pulling five routes from Willett Street.

The other two locations, Lacewood and Willett would require little change to existing routes and therefore little inconvenience to patrons. This is significant.

In reviewing the current routes in the Lacewood area, it is noted that service would be lost from Willet Street on routes 2, 4, 21, 33, 34 if the terminal were relocated to the Dunbrack site. There would be no practical way to re-route these buses to service a Dunbrack terminal while still serving Willet. Those passengers currently accessing these routes from Willett would be forced to go to Dunbrack or to make a transfer down-line. It is estimated that close to 600 passenger movements on Willett Street per day would be affected, not including the people boarding at the current terminal that would now have to walk further to Dunbrack. Further, due to inconvenience it is likely that some of these trips would be lost as riders choose alternative modes. In addition, it is not likely the Dunbrack would capture enough new passengers to counter the potential loss. As will be discussed further in 5.1.4, the Dunbrack site contains a smaller walk-up population than the Willett location. This population is housed mainly in low-density single family dwellings. Residents of low density areas such as this typically demonstrate fewer propensities to use transit than those of higher density areas.

Table 4 Changes in Customer Convenience

Candidate site	Customer convenience
1. Lacewood Drive	Largely unchanged
2. Willett Street	Largely unchanged
3. Dunbrack Street (Northcliffe)	Significant rerouting impacts / inconvenience

5.1.3 Operational suitability: Traffic planning implications

Another aspect of operational suitability is the potential impact on traffic operations of adjacent streets. Technical analyses were conducted for each candidate site. We carried out a high-level two-part evaluation: first, an initial operational review that quantified the forecast terminal access operations to

ensure that the proposed access could operate at acceptable levels of service; and second, a more comprehensive, qualitative evaluation of the operational impacts of the proposed access on traffic flow along the major street. The following table offers a summary comparison of the sites.

Table 5 Traffic Implication Comparison

Candidate site	Strengths	Weaknesses
1. Lacewood Drive	Opportunity to combine the trail crossing and the terminal access at one signalized intersection. No adjacent accesses or intersections due to access controls and centre median on Lacewood.	Increased delay to major street traffic (relative to other sites) due to higher volume on Lacewood. Lacewood has been designed as an arterial roadway (4-lane divided) and is intended to move vehicles – additional signals along this corridor will have a negative impact.
2. Willett Street	Least amount of delay added to major street traffic due to relatively lower volumes on Willett.	Traffic signals at the proposed terminal access will be in close proximity to other accesses and Harlington Crescent – adding to operational concerns
3. Dunbrack Street (Northcliffe)	Lower delay added to major street traffic relative to Lacewood. Potential to relocate existing pedestrian crossing to signalized terminal access to minimize delay to major street traffic. No adjacent accesses or intersections due to access controls and centre median on Dunbrack.	Dunbrack has been designed as an arterial roadway (4-lane divided) and is intended to move vehicles – additional signals along this corridor will have a negative impact.

In summary, there is very little difference between the Willett and Dunbrack sites. HRM staff has confirmed this finding, noting that Traffic Services has no preference, operationally, to either the Willett or Dunbrack site. The Willett and Dunbrack sites have less impact on traffic operations, compared to the Lacewood site.

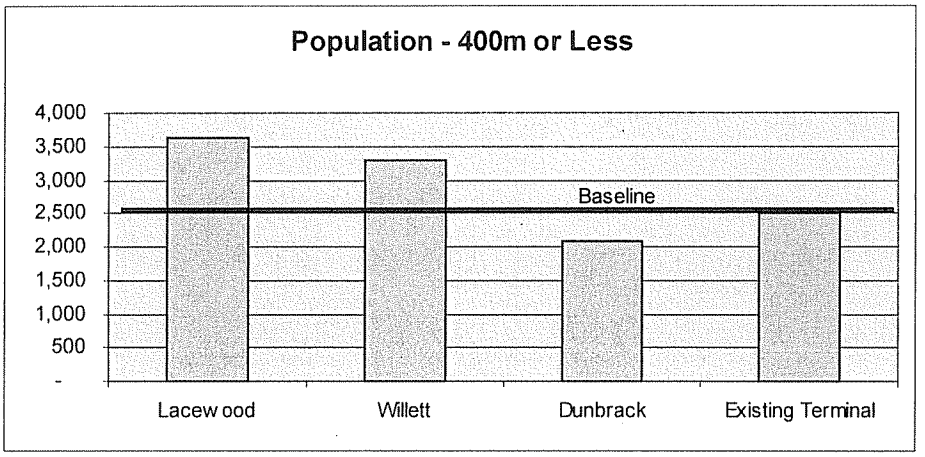
A summary of the planning level review is included in Appendix B.

5.1.4 Population and adjacent land uses

These criteria consider the adjacent land uses and population served by each of the candidate sites. For planning purposes, Metro Transit considers the typical walking distance to a transit terminal to be 400 metres. Under this definition, the current terminal at the corner of Willett and Lacewood serves a walking distance population of approximately 2,500 people, based on 2006 census data. For comparative purposes, this may be considered a performance baseline. Sites 1 and 2, Lacewood and Willett, are expected to serve populations of 3,634 and 3,305 people respectively, which are substantially higher than is currently served by the existing terminal. The

Dunbrack site, on the other hand, serves about 400 fewer people than the baseline.

Figure 10 Population within 400m



In analyzing the residential land use types within walking distance of each site, Sites 1 and 3 were found to be located closer to single family and higher priced homes than Site 2, which contains predominantly medium density apartments. Such land uses typically contain a greater proportion of residents likely to depend on transit. Therefore, the Willett site best satisfies this criterion.

Table 6 Population and Land use Comparison

Candidate site	Population within 400m	Adjacent residential land uses	Other adjacent land uses
1. Lacewood Drive	3,634	Medium density apartments, single and attached dwellings; adjacent new Canada Games Centre, library.	Canada Games Centre; Mainland Commons park, library
2. Willett Street	3,305	Medium density apartments; shopping centre; adjacent Mainland Commons recreational area	Mainland Commons park
3. Dunbrack Street (Northcliffe)	2,097	Low density single and attached dwellings; shopping centre	Open space (stormwater detention pond); telephone switching building.

The Lacewood and Willett sites rate more favourably than the Dunbrack site when considering non-residential adjacent uses. Lacewood is adjacent the new Canada Games Centre and the Thomas Raddall Library, and the Willett site is adjacent the Mainland Commons. On the other hand, while the

Dunbrack location is situated near shopping centres, it is likely to displace existing recreational facilities.

5.1.5 Active transportation and pedestrian access

As noted earlier, a large proportion of users at the current terminal are walk-in customers. Many of these customers would typically be residents of the surrounding neighbourhood. Therefore, it is critical that active transportation (AT) access to the site be safe, well marked and well maintained. Each of the sites has AT access as shown in the following table.

Table 7 Active Transportation Access Comparison

Candidate site	AT facilities	Notes
1. Lacewood Drive	Sidewalk, linear trail, pedestrian actuated crossing signal	Granular surface trail is maintained in winter
2. Willett Street	Sidewalk, linear trail, pedestrian actuated crossing signal at Westridge Drive and Chadwick Place,	Granular surface trail is maintained in winter; would likely require extension into transit area; would require additional pathways from adjacent apartment areas.
3. Dunbrack Street (Northcliffe)	Sidewalk, bike lanes on Dunbrack, pedestrian actuated crossing signal at Clayton Park Drive; signalized intersection at Lacewood Drive.	Pedestrians from west would use private sidewalk facility on Harlington Crescent to connect to Dunbrack Street.

Based on this evaluation factor, each site offers reasonably good connections for pedestrians via sidewalks or the linear park facility. Connectivity between the Willett Street site and the North Commons is poor at the present time. There is an obvious opportunity to improve this connection during site development.

5.1.6 Land Use Controls (Zoning)

The Mainland North Land Use Bylaw indicates that the Willet and Dunbrack sites are located within a park and institutional (P) zone. According to HRM planning staff, it may be reasonable to amend the Land Use By-law to add transit terminals to the list of permitted uses in the P zone. There will probably need to be a public hearing and a decision of Council; however, the property itself would not need to be rezoned. The Lacewood site is situated in a "Schedule K" (development agreement) zone. According to staff, development resolutions already exist for the site. These agreements indicate the intent to use the lands for public purposes. As a result, it is likely that a development permit could be provided without further action.

5.1.7 Expandability

The capital costs identified earlier in this report are based on an eight-bay transit terminal. This criterion examines the potential for expanding the

terminal to a 12-bay terminal by lengthening the facility. All of the sites offer space for expansion; however, we deem the Lacewood site to be prohibitively expensive to expand due to the need for costly rock fill.

5.1.8 Personal Safety and Security (CPTED)

CPTED refers to Crime Protection through Environmental Design, a concept which recognizes the way facilities are designed can influence the way they are used, for good or for bad. For this study, analysis focused on two basic design concerns: the potential for surveillance and for access control. Due to its location away from residences and on a relatively high speed road, combined with its position possibly below the road grade, the Lacewood site has the lowest potential for surveillance control. As its eastern end would abut the linear trail, it also has a low potential for access control. The Willett Street location has a medium to high potential for surveillance and a high potential for access control. The Dunbrack location has the highest potential for surveillance (as the most open site as viewed from the road, and has a high potential for access control.

Table 8 CPTED Comparison

Candidate site	Surveillance	Access Control
1. Lacewood Drive	Relatively low potential for surveillance	Relatively low potential access control
2. Willett Street	Medium to high potential for surveillance	High potential for access control
3. Dunbrack Street (Northcliffe)	High potential for surveillance	High potential for access control

5.1.9 Summary and Analysis

Table 8 offers a picture of the relative merits of one site over another. It summarizes the Stage 2 findings. The table uses colour to provide a visual representation of the relative merits or limitations of each site. For each site, factors were qualified as being good (GREEN), fair (YELLOW) or poor (RED). Based on this analysis, the Willett site emerges as the superior option, with six good scores and two fair scores. The other sites each have two poor scores and as few as two good scores out of eight possible.

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Table 9 Site Evaluation Summary

Site Evaluation Summary *Stage 2 Service-Related*

Site No.	Name/ frontage	Operational suitability		Pedestrian / active transportation compatibility			Zoning	Expansion Capability	Personal security (CPTED)
		Traffic planning implications (from Table 5)	Customer Convenience (from Table 4)	Pop. within 400m (based in 2006 census) (from Table 6)	Adjacent land use (from Table 6)	AT and Pedestrian access (from Table 7)			(from Table 8)
1	Lacewood	Impacts on Lacewood traffic flow	Largely unchanged	3634 (an increase over existing)	Medium density apartments, single and attached dwellings; adjacent new Canada Games Centre, library.	Sidewalk, linear trail; ped. actuated crossing signal nearby	Schedule "K"	Yes, though costly due to fill requirements	Relatively low potential for surveillance and access control
2	Willett	Minimal traffic impacts	Largely unchanged	3305 (increase)	Medium density apartments; central to recreational area and shopping centre.	Sidewalk, linear trail; ped. actuated crossing signal nearby	P Zone	Yes	Medium to high potential for surveillance and high potential for access control
3	Dunbrack	Minimal traffic impacts.	Significant impacts due to rerouting	2097 (decrease)	Low density single and attached dwellings; shopping centre	Sidewalk, bike route; ped. actuated crossing signal nearby	P Zone	Yes	High potential for surveillance and high potential for access control

Evaluation Rating Method : Good / Fair / Poor

Based on this evaluation, the Willett Street site has the least number of "poor" ratings (denoted in red) and the Dunbrack Street site has the least number of "good" ratings (denoted in green). Therefore, using the HRM evaluation criteria, the Willett Street site appears to be preferred. The next section considers the responses we heard from members of the public.

6 PUBLIC COMMENTARY

A draft version of this evaluation was presented to members of the public at a meeting held on Monday evening, January 25, 2010.

There were about 40 people in attendance at the duly advertised meeting that was held at Halifax West high School. All the participants were residents of the general area of Clayton Park. Based on those who filled in a hand-back survey response (21 were received), participants had lived in the area on average 20 years, with the median being 16 years. Though people were not asked directly, it was apparent in conversations that many of the participants were transit users curious as to what the implications were for transit service in their area. As one person commented, "There are many rumours floating around and it helped to have the options clarified". A summary of the comments received is provided in Appendix D.

Having viewed the presentation materials and having listened to the discussions held at the meeting, ten respondents declared their first choice to be the Willett site; four preferred Lacewood and four preferred Dunbrack. As for sites they liked least, Lacewood was the least preferred of the three sites. Three respondents said they didn't like any site. One of these respondents wrote, "I don't like any. Too many trees to be cut down for sites 1 and 2. This is valuable green space (potential parkland) which we desperately need in this area. Site 3 involves destroying Northcliffe, a valuable community resource."

This concern about the possible loss of open space and the Northcliffe Centre was also reflected in other responses, including by those who favoured one site over the others. Examples included, "[Site 2] - Beautiful existing park with deer and other animals." "Sites 1 and 3 are parkland that should maintain the integrity of those spaces." "An independent public discussion should take place regarding the use of the Northcliffe Centre. Should it be retained and used as an alternate community resource, meeting rooms, drop in centre, etc. Let the public decide on it independent of new terminal building."

Also notable were several comments about parking. One person said, "With Site 2, side streets in area will become parking lots for riders." Another said, "Regardless of the location, new terminal should have a "kiss 'n' ride" - otherwise the neighbourhood will have an increase in traffic."

Overall, the Willet site was favoured by attendees at the public information session by a ratio of two to one over the other two sites. The Lacewood site fared marginally better than the Dunbrack site.

7 CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

In urban settings such as Clayton Park it is rare to find a large site, such as that required for a new transit terminal, which is ideal in all instances, which rates well in all criteria, and which satisfies all needs. This is certainly true of the Lacewood Terminal in that none of the three candidate sites is entirely free of deficiencies. However, when all factors are considered, one site does fares notably better than the others.

7.2 Summary and Conclusion

Table 9 reveals that the Willett Street site has the best potential of the candidate sites for use as a new terminal location to serve Clayton Park.

Key benefits of the Willett site are:

- The synergy between walk-up population and higher density dwellings: it is conveniently situated near the largest population of current and potential users. No other site appears capable of attracting as many patrons within its walkable catchment area.
- No significant alteration to current routes in a way that would inconvenience patrons.
- Only minimal impact on traffic, given its situation on a relatively low volume, high capacity road.
- Situated adjacent to sidewalks and the Mainland Linear Park, which support its main strengths.

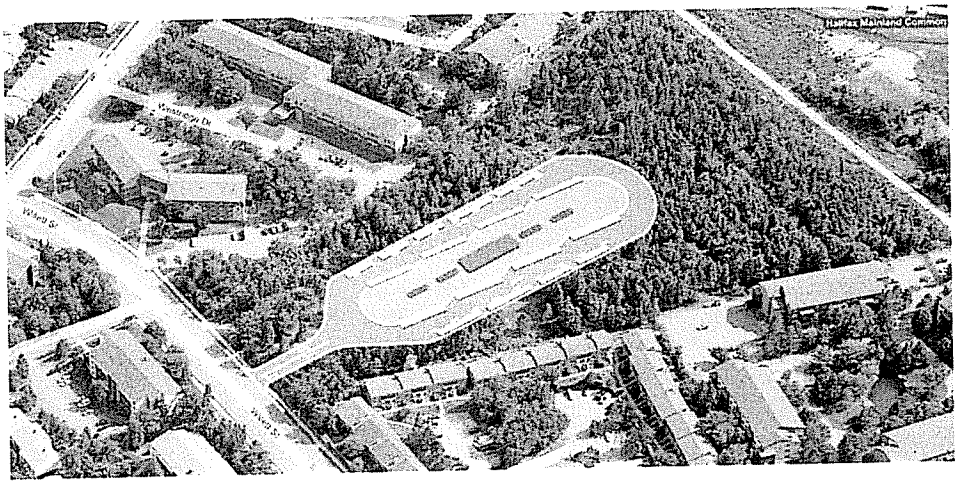
While it is probable that the Willett Street location would have a higher capital cost than the Dunbrack location (even if the cost of demolitions are included) The Willett Street location it offers a good example of value for investment when considering all of the evaluation criteria results. Additionally, the operating cost differences are insignificant within Metro Transit's operating budget. As discussed earlier, one of the key considerations is customer convenience and maintaining the current routes and stops as much as possible. The Willett Street site best meets this criterion.

Finally, in contrast to the other two Stage 2 evaluation sites, none of the service factors for the Willett site rated poorly. Both of the other sites rated poorly in a number of ways. In addition to the potentially excessive costs of expansion, the Lacewood site rates poorly due to its impacts on traffic on Lacewood Drive and by the expected difficulty in maintaining a secure facility. The Dunbrack site is deficient in its service to a smaller walk-up population and by its potential to cause significant inconvenience to a large existing user base.

7.3 Recommendations

For the reasons cited in this report, we recommend that efforts should immediately be undertaken to secure the Willett site for use by Metro Transit. From our review of public comments, it is our conclusion that the Willett site should receive reasonably good support.

Figure 11 Photo-illustration of preferred location



Source photo: Bing

Funding should be included in the site development program for providing proper illumination including pedestrian linkages to adjacent sidewalks and the linear trail.

HRM's intended upgrades to the linear trail and illuminated pedestrian linkages to and across the Mainland Common will need to be completed to coincide with the terminal opening. We would also refer readers to the feedback received during the public consultation process (Appendix C) that an environmental (diesel odor) / noise impact study should be undertaken as part of the implementation program. Such a program, combined with appropriate mitigation measures, would help allay the kinds of public concerns expressed at the public meeting.

APPENDIX A
Transit Routing Assumptions

delphi MRC

Memo

To:	David Reage	**Date:**	December 8, 2009
From:	Jeff Ward, Project Manager Helen Gault P. Eng.	**Our File:**	7770
Subject:	Lacewood Terminal Siting Study: **Transit routing for alternative Lacewood sites**	**Copies:**	File

Discussion

How the four potential terminal sites would likely be served by the routes that serve the existing terminal has been examined to determine the relative impact on operating costs. For each site likely service plans have been developed and the additional daily kilometres over and above the existing site. It is recognized that there may be different routings, but it is not anticipated that minor changes would change the result significantly. The overall results are tabulated below and the background information and assumptions are provided in Attachment A.

Terminal	Daily kms. in vicinity of site (km/day)	Difference from existing (km/day)	Difference from existing (km/year)	Approximate additional annual operating [1]
Existing	767	-	-	-
1. Lacewood Drive	893	126	37,800	$140,000
2. Thomas Raddall	1446	679	203,700	$775,000
3. Willett Street	925	158	47,400	$180,000
4. Dunbrack Street (Northcliffe)	831	64	19,200	$75,000

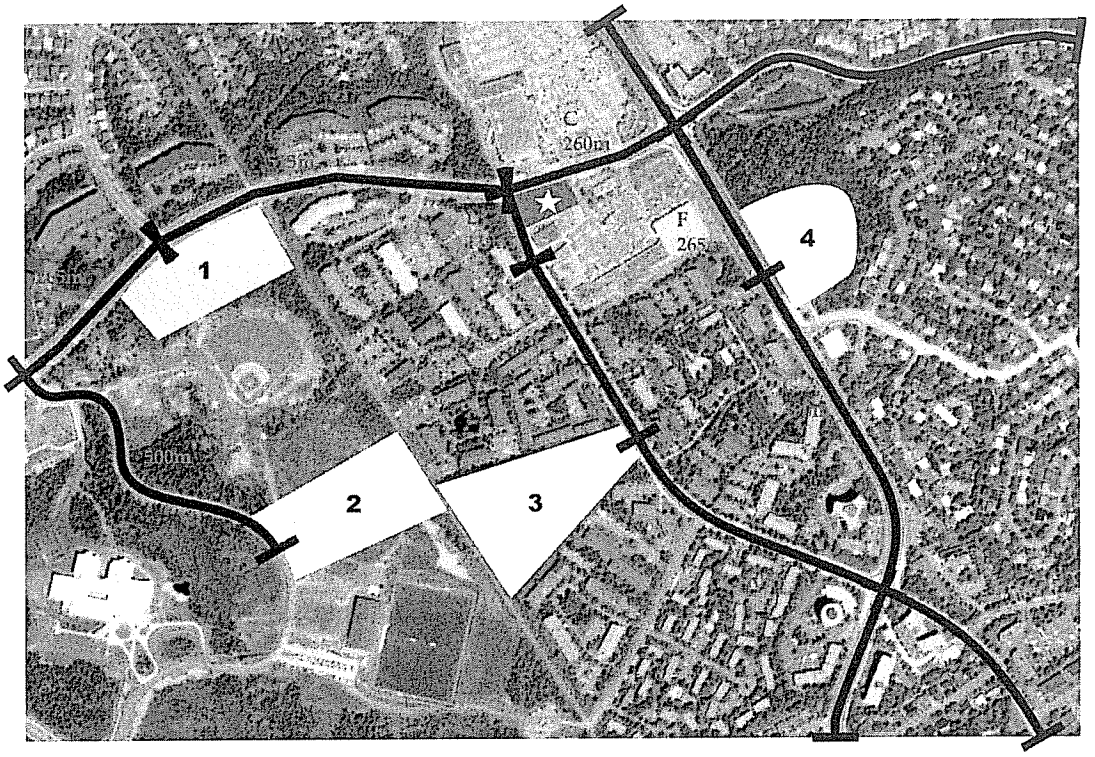
These cost differences are simply for the purposes of comparing the locations of the terminals. It is assumed that the operating and maintenance costs of the terminal will be the same, no matter where it is located. So, from the point of view of additional costs to detour buses, the Dunbrack location (4) is the best and the Thomas Raddall (2) location is the worst.

We would appreciate hearing from you whether the assumptions used are reasonable.

[1] Assuming average operating speed of 20kph and hourly costs of $76 30

Appendix

Length of Transit Segments the Vicinity of the Terminal (m)



Length of Transit Segment

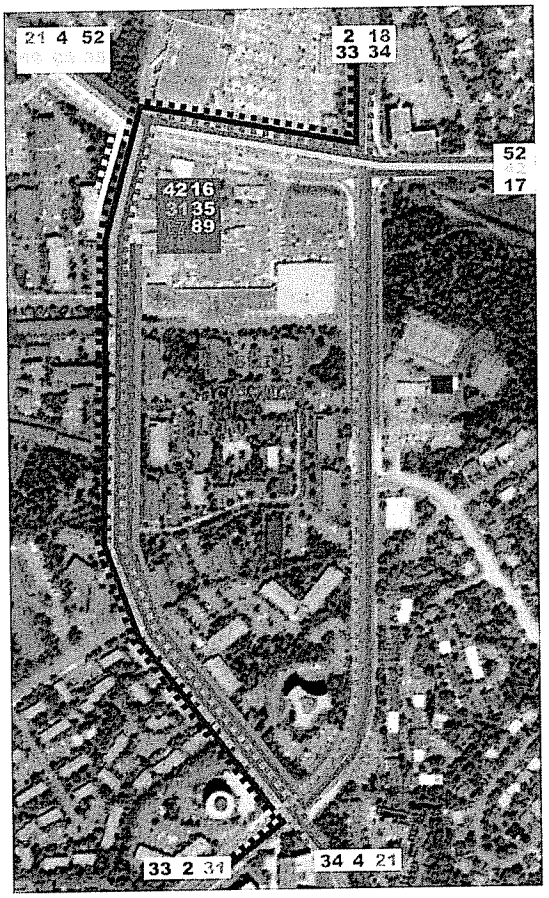
segment	length (m)
A	265
B	515
C	260
F	265
G	490
J	410
K	310
L	110
M	500

Alternative Sites

1) Lacewood Drive
2) Thomas Raddall
3) Willett Street
4) Dunbrack Street

Existing Transit Terminal

Existing Lacewood Terminal (Route Length (m) in the Vicinity of the Terminal)													
Segment	Routes												
	2	4	16	17	18	21	31	33	34	35	42	52	89
A		265	265			265				265		265	265
B		515	515			515				515		515	515
C	260						260	260	260		260	260	
F				265	265		265						
G				490	490		490						
J	410	410		410	410	410		410	410				
K	310	310		310	310	310		310	310				
L		110	110			110	110	110	110	110		220	110
Grand Total	980	1,610	890	1,475	1,475	1,610	1,125	1,090	1,090	890	260	1,260	890

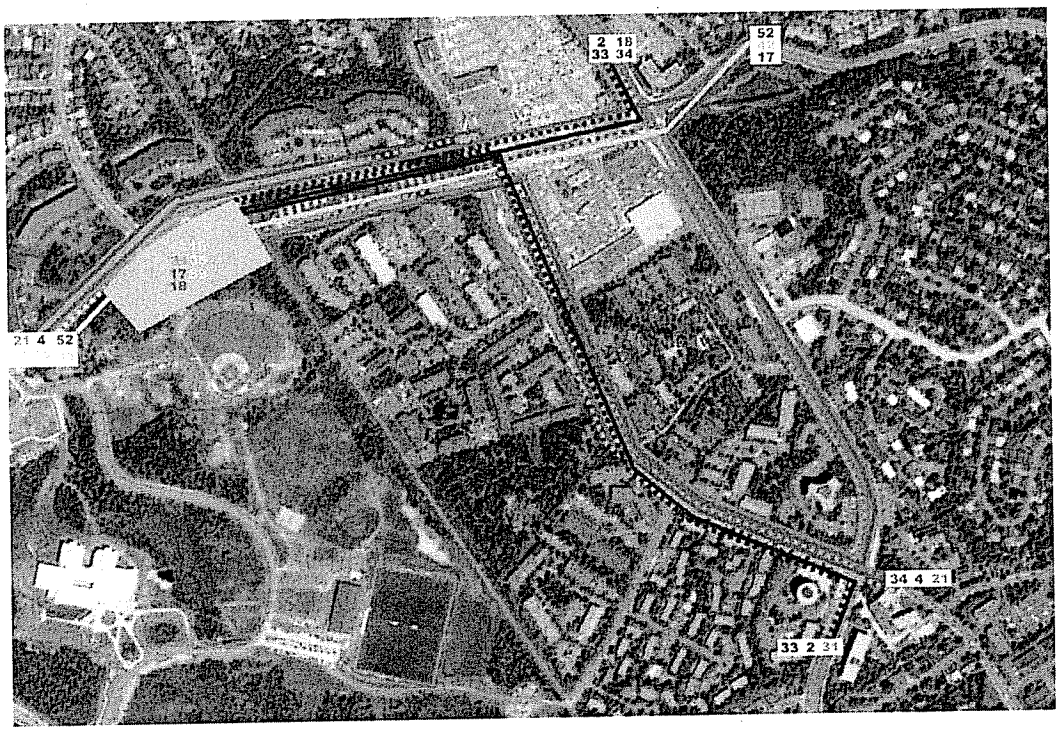


Existing Number of Daily Transit Trips
(Weekday)

Route	in Trips / Day	out Trips / Day	Trips / Day
2	32	32	64
4	32	32	64
16	30	29	59
17	27	24	51
18	41	40	81
21	38	38	76
31	4	5	9
33	5	5	10
34	8	8	16
35	4	5	9
42	34	31	65
52	55	46	101
89	22	24	46

Alternative 1 - Lacewood Drive

Lacewood Terminal **Alternative 1** (Route Length (m) in the Vicinity of the Terminal)													
	Route												
Segment	2	4	16	17	18	21	31	33	34	35	42	52	89
A		265	265			265				265		265	265
B	1,030	515		515	515	515	515	1,030	1,030		515	515	
C	260						260	260	260		260	260	
F				265	265		265						
G				490	490		490						
J	410	410		410	410	410		410	410				
K	310	310		310	310	310		310	310				
L	110	110		110	110	110		110	110				
Grand Total	2,120	1,610	265	2,100	2,100	1,610	1,530	2,120	2,120	265	775	1,040	265



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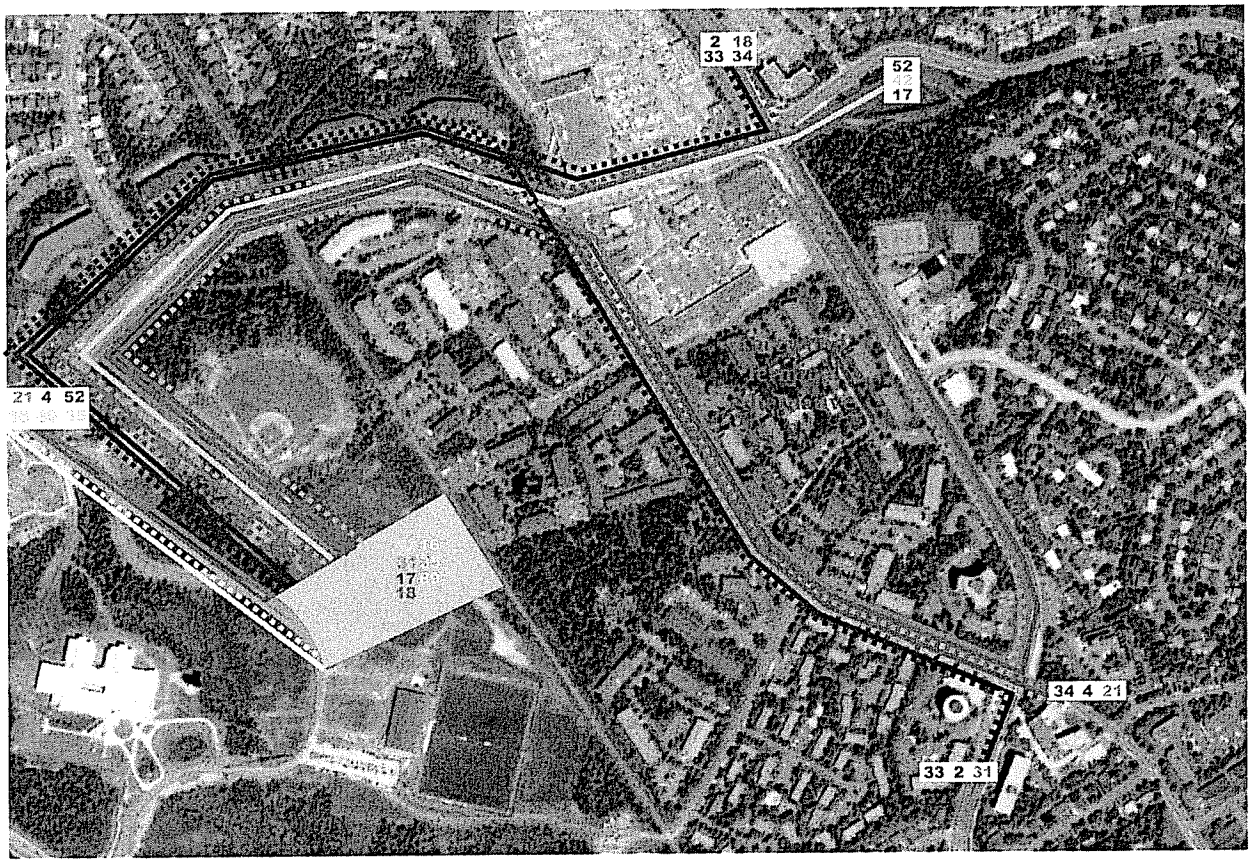
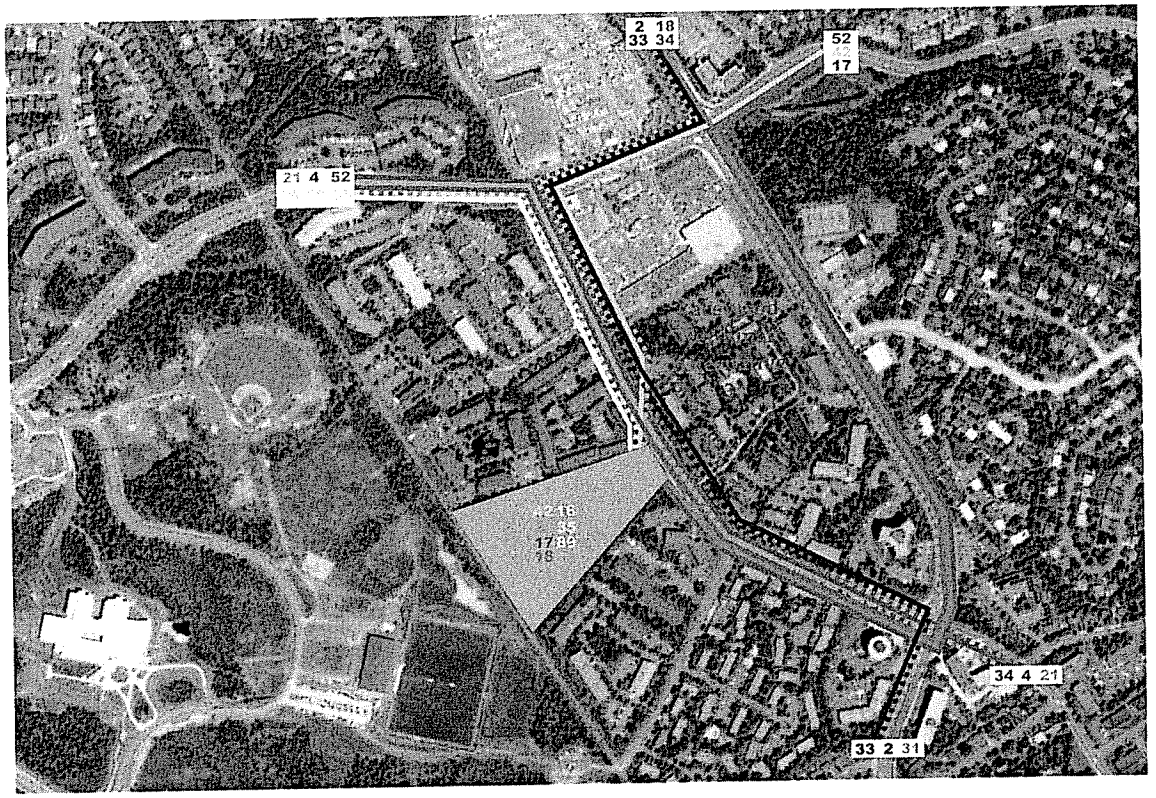
Alternative 2 - Thomas Raddall

Lacewood Terminal **Alternative 2** (Route Length (m) in the Vicinity of the Terminal)													
	Route												
Segment	2	4	16	17	18	21	31	33	34	35	42	52	89
A	530	265		265	265	265	265	530	530		265	265	
B	1,030	515		515	515	515	515		1,030		515	515	
C	260						260	260	260		260	260	
F				265	265		265						
G				490	490		490						
J	410	410		410	410	410		410	410				
K	310	310		310	310	310		310	310				
L	110	110		110	110	110		110	110				
M	1,000	1,000	500	500	500	1,000	500	1,000	1,000	500	500	1,000	500
Grand Total	3,650	2,610	500	2,865	2,865	2,610	2,295	2,620	3,650	500	1,540	2,040	500



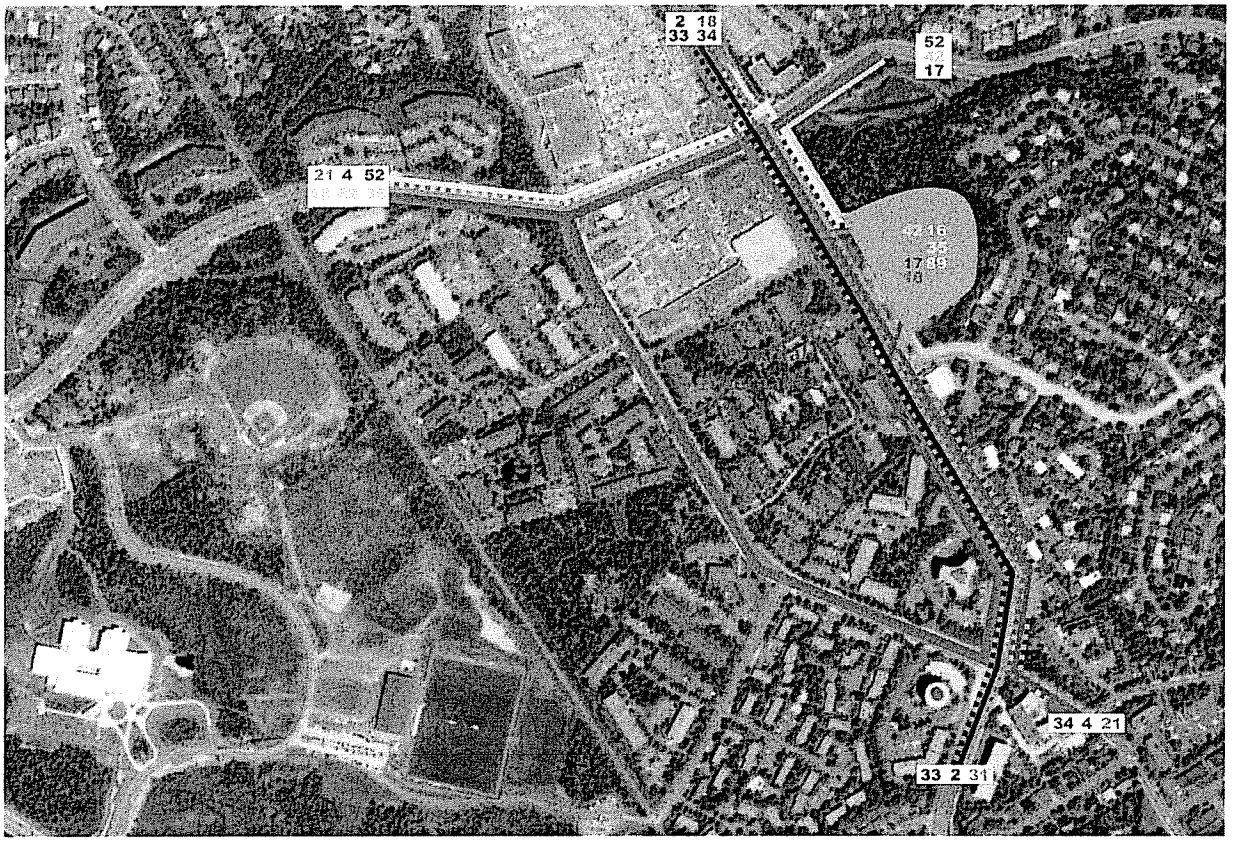
Alternative 3 - Willett Street

Lacewood Terminal **Alternative 3** (Route Length (m) in the Vicinity of the Terminal)													
	Route												
Segment	2	4	16	17	18	21	31	33	34	35	42	52	89
A		265	265			265				265		265	265
B		515	515			515				515		515	515
C	260						260	260	260		260		
F				265	265		265					265	
G					980		490					490	
J	410	410		410	410	410		410	410			410	
K	310	310	310			310	310	310	310	310	310	310	310
L	110	110	110			110	110	110	110	110	110	110	110
Grand Total	1,090	1,610	1,200	675	1,655	1,610	1,435	1,090	1,090	1,200	680	2,365	1,200



Alternative 4 - Dunbrack Street

Lacewood Terminal Alternative 4 (Route Length (m) in the Vicinity of the Terminal)													
	Route												
Segment	2	4	16	17	18	21	31	33	34	35	42	52	89
A		265	265			265				265		265	265
B		515	515			515				515		515	515
C		260	260	260		260				260			260
F	265	265	265		265	265		265	265	265	265	265	265
G	490	490		490		490	490	490	490			490	
J				410								410	
K				310								310	
L				110								110	
Grand Total	755	1,795	1,305	1,580	265	1,795	490	755	755	1,305	265	2,365	1,305



Summary of Alternatives

Route Length (m) in the Vicinity of Lacewood Terminal

Route	Alternative				
	Existing	Alt 1	Alt 2	Alt 3	Alt 4
2	980	2120	3650	1090	755
4	1610	1610	2610	1610	1795
16	890	265	500	1200	1305
17	1475	2100	2865	675	1580
18	1475	2100	2865	1655	265
21	1610	1610	2610	1610	1795
31	1125	1530	2295	1435	490
33	1090	2120	2620	1090	755
34	1090	2120	3650	1090	755
35	890	265	500	1200	1305
42	260	775	1540	680	265
52	1260	1040	2040	2365	2365
89	890	265	500	1200	1305

Considering the number of Daily Trips per route, the following table shows the additional daily vehicle-Km for each alternative compared to the existing:

Route	Trips / day	Alternative				
		Existing	Alt 1	Alt 2	Alt 3	Alt 4
2	64	63	136	234	70	48
4	64	103	103	167	103	115
16	59	53	16	30	71	77
17	51	75	107	146	34	81
18	81	119	170	232	134	21
21	76	122	122	198	122	136
31	9	10	14	21	13	4
33	10	11	21	26	11	8
34	16	17	34	58	17	12
35	9	8	2	5	11	12
42	65	17	50	100	44	17
52	101	127	105	206	239	239
89	46	41	12	23	55	60
Grand Total		767	893	1,446	925	831

APPENDIX B
Traffic Planning Review Findings

delphi MRC

Memo

To:	Jeff Ward	**Date:**	March 18, 2010
From:	James Copeland	**Our File:**	7770
Subject:	**Lacewood Transit Terminal Siting Options Study – Traffic Planning Review Findings**	**Copies:**	file

1.0 Introduction

Metro Transit is exploring opportunities to relocate the existing Lacewood Transit terminal at the corner of Willett and Lacewood Streets. The study initially identified four potential sites to relocate the existing Lacewood Drive terminal. However, through an initial screening process, and a decision by the Project Steering Committee, one site was eliminated due to the significant costs associated with inefficiencies of bus re-routing. The remaining three sites were subject to a traffic planning review and these were:

- Lacewood Drive – immediately east of the Radcliffe Drive intersection;
- Willett Street – between the two Harlington Crescent intersections; and
- Dunbrack Street – north of the Clayton Park Drive intersection.

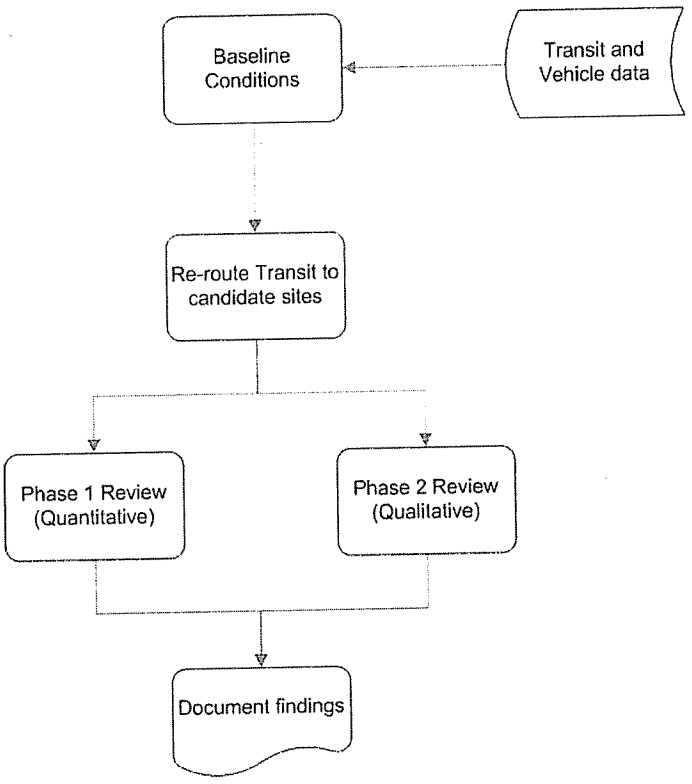
One of the evaluation criteria identified to evaluate each of the candidate sites was the traffic operations in the vicinity of each of the terminal accesses. This memo summarizes the findings specific to the traffic operations criteria.

It should be understood that this traffic planning review is not the only criterion against which each candidate terminal site will be assessed and that it is necessary to consider all of the other criteria as a whole during the decision-making process. In addition, typical planning-level traffic assessments are not as rigourous as a traffic impact study – a type of review that identifies detailed impacts to traffic flow characteristics, infrastructure requirements such as turning lanes, impacts to pedestrian flows, and so forth. Therefore, the discussion and reporting of the findings for this study are of a general nature to assist in the site selection process. A more detailed traffic impact study can be carried out later in the development process and provide valuable assistance to the preliminary and detailed design stages.

2.0 Our Approach

Our planning level review followed a two phase process that is illustrated in Figure 1.

Figure 1: The analysis approach



The two key steps in the work plan are described below:

- *Phase 1*: an initial planning review that quantified the forecast terminal access operations to ensure that the proposed access could operate at acceptable levels of service; and
- *Phase 2*: a second, more comprehensive, qualitative evaluation of the operational impacts of the proposed access on traffic flow along the major street.

To enable us to assess the candidate site accesses – both quantitatively and qualitatively – we applied commonly used traffic operational tools that are widely used and accepted across North America. The Highway Capacity Software (HCS version 5.3) and SIDRA (version 3.2) were applied to the Phase 1 review of access operations. During Phase 2, a sophisticated micro-simulation software (Vissim 5.1) was utilized to explicitly model public transit vehicles, and their routing details (i.e. departure, headway and dwell times). The technique of using two independent analysis tools added confidence to our findings.

3.0 Phase 1 – The access operations

The initial step in our review was to look at each of the three proposed transit terminal accesses in isolation – both as unsignalized (i.e. stop control) and signalized intersections. This provided us with an understanding of the general wait times for buses exiting the terminal (the critical movement at the access) and the need to provide traffic signals at the access locations.

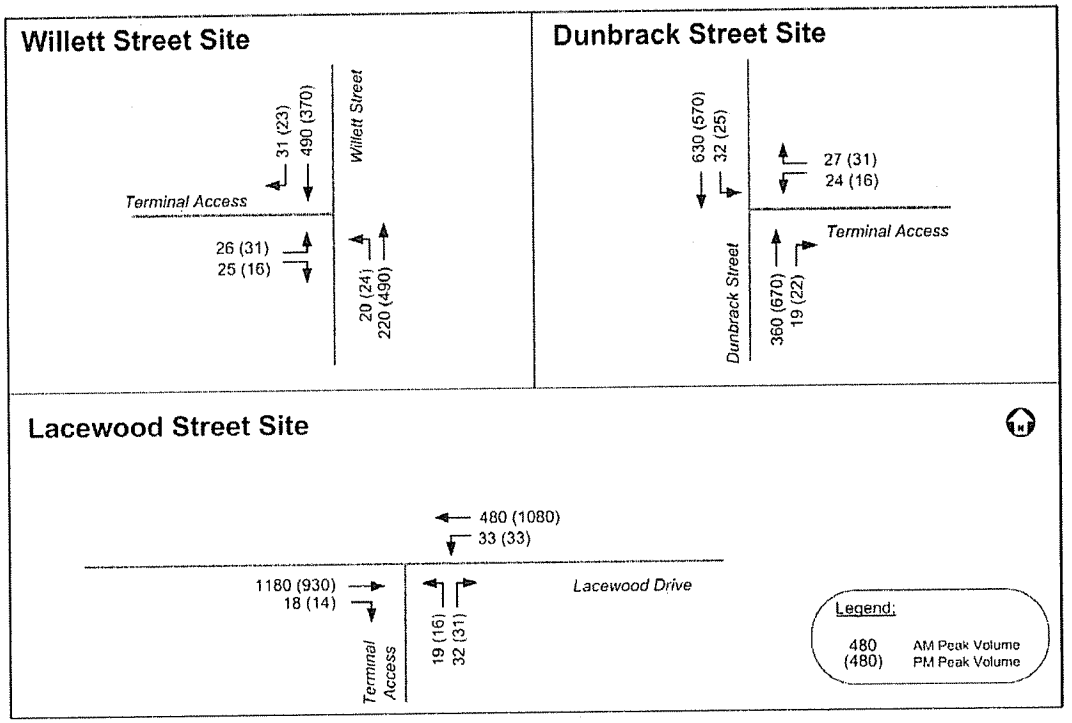
Current traffic volume data was provided by HRM for the weekday morning and afternoon peak periods at the following locations:

- Lacewood Drive / Willett Street (December 2008)
- Lacewood Drive / Dunbrack Street (June 2009)
- Dunbrack Street / Willett Street (November 2008)

Data regarding the current transit bus route numbers, route direction, headways and stop locations in our study area was provided by Metro Transit. Both of these data sets were combined to establish baseline traffic scenarios that represented current conditions during the weekday morning and afternoon peak hours.

The next step in the process was to re-route each of the transit buses in the study area from the existing Lacewood Drive site to each of the three candidate sites. The resulting peak hour traffic volume at each of the candidate terminal accesses is illustrated in Figure 2.

Figure 2: Terminal access traffic volumes



Each of the access locations were evaluated using the HCS and SIDRA intersection analysis tools. The results that flowed from both tools were similar at each candidate site, and as such, we have only provided the HCS results in Table 1 – assuming two-way Stop-control at all locations.

Table 1: Terminal access operational results – assuming Stop-control

HCS+ Unsignalized Intersection Capacity Analysis							
		Lacewood Terminal Site		Willett Terminal Site		Dunbrack Terminal Site	
Movement	Measure of Effectiveness	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Left in from major street	Level of Service	D	C	C	B	B	B
	v/c Ratio	0.18	0.12	0.04	0.04	0.05	0.06
	Average Delay (s/veh)	26.5	19.1	11.9	10.8	10.8	14.1
	95% Queue Length (veh)	0.63	0.42	0.13	0.13	0.17	0.20
Left or right out from minor (stop-controlled) street	Level of Service	F	F	C	C	C	D
	v/c Ratio	0.90	0.78	0.19	0.21	0.21	0.27
	Average Delay (s/veh)	196.5	159.9	20.7	23.5	22.4	30.9
	95% Queue Length (veh)	4.22	3.58	0.70	0.76	0.79	1.05

Two key findings flowed from our review:

- Buses exiting the Lacewood Drive site under stop-control (i.e. no traffic signals) were forecast to experience levels of service F – an unacceptable delay – and be nearing capacity. Therefore, this proposed access will require traffic signals to facilitate the outbound bus movement during the weekday morning and afternoon peak periods due to the high volume of eastbound and westbound traffic on Lacewood Drive.

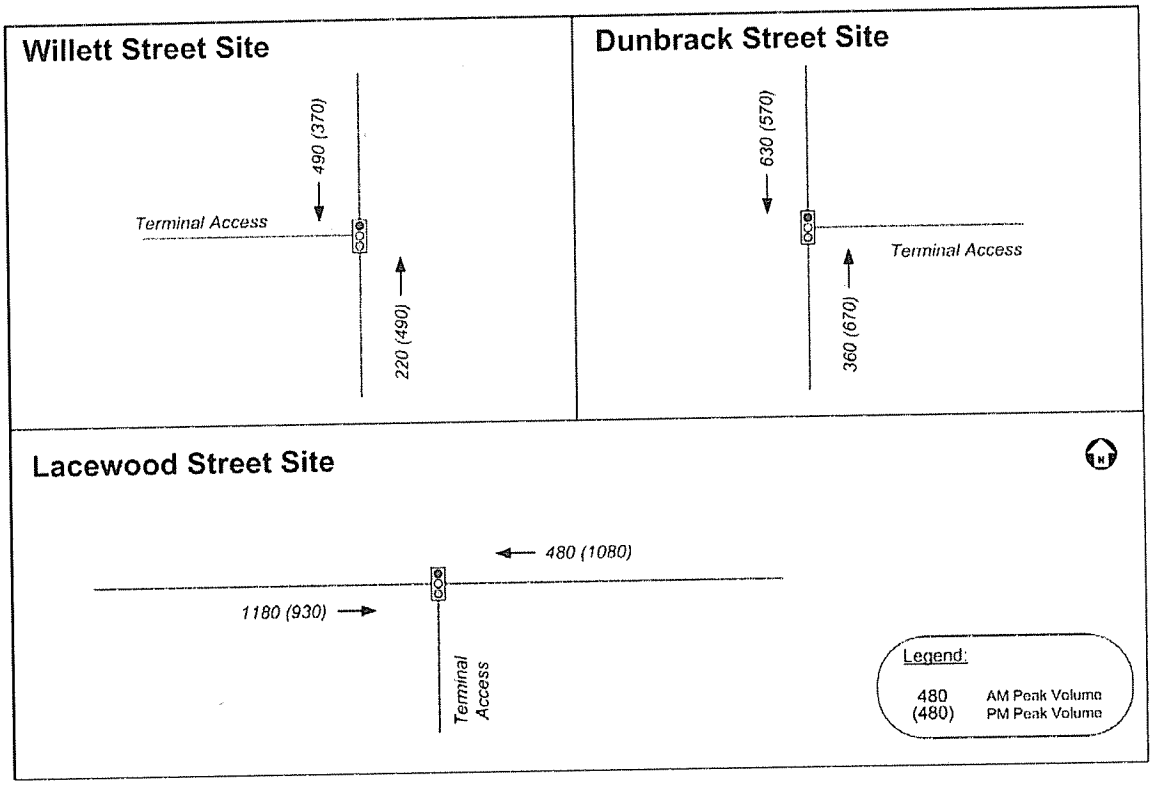
- The Willett and Dunbrack Street sites are forecast to operate at acceptable levels of service (LOS), delay times, and low volume-to-capacity ratios during the weekday peak hours. The delay times expected for a bus exiting either terminal will be similar or slightly more than the delay times expected under signal control. As shown in Table 1, the unsignalized delay times are expected to be an average of 20-30 seconds.

Therefore, it appears that traffic signal control would provide improved delay time management into the future (i.e. the minor street delay times will continue to increase as the major street traffic volumes grow) and it would provide additional positive guidance to buses entering and exiting the proposed transit site (as they transition from driving on the right-side of the roadway to the left-side within the terminal). Given the positive guidance and road safety concerns and the minimal differences in delay times for transit buses between signalization and no signalization (particularly at the Willet and Dunbrack Street sites) it appears appropriate to provide traffic signals at the terminal access – regardless of the site location.

4.0 Phase 2 - Major street traffic flow impacts

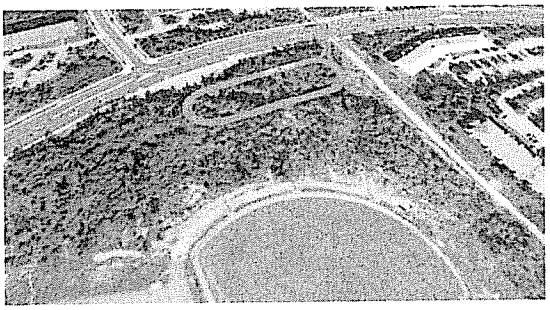
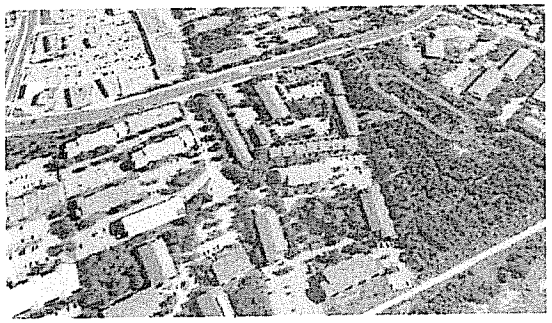
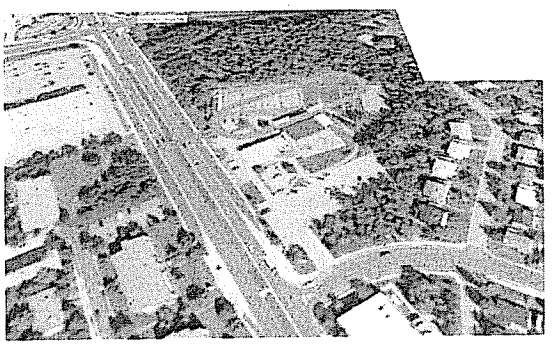
Based on our findings of the Phase 1 analysis, a qualitative assessment was carried out to determine the impacts on traffic flow on the major street (due to the implementation of new traffic signals). We constructed a micro-simulation model of the bus and traffic operations in the vicinity of all three sites to replicate and visualize the traffic patterns. Figure 3 illustrates the weekday morning and afternoon peak hour traffic volumes used in our analysis.

Figure 3: Major street peak hour traffic volumes



A summary of the key observations for each candidate site is provided in Table 2.

Table 2: Summary of the Phase 2 qualitative review

	Strengths	Weaknesses
Lacewood Dr. Site 	• Opportunity to combine the trail crossing and the terminal access at one signalized intersection. • No adjacent accesses or intersections due to access controls and centre median on Lacewood.	• Increased delay to major street traffic (relative to other sites) due to higher volume on Lacewood. • Lacewood has been designed as an arterial roadway (4-lane divided) and is intended to move vehicles – additional signals along this corridor will have a negative impact.
Willett St. Site 	• Least amount of delay added to major street traffic due to relatively lower volumes on Willett.	• Traffic signals at the proposed terminal access will be in close proximity to other accesses and Harlington Crescent – adding to operational concerns
Dunbrack St. Site 	• Lower delay added to major street traffic relative to Lacewood. • Potential to relocate pedestrian crossing at Clayton Park Dr. to proposed signalized terminal access to minimize delay to major street traffic. • No adjacent accesses or intersections due to access controls and centre median on Dunbrack.	• Dunbrack has been designed as an arterial roadway (4-lane divided) and is intended to move vehicles – additional signals along this corridor will have a negative impact.

5.0 Conclusion

Based on the results of the Phase 1 and 2 reviews it appears that there is very little difference in operations expected between the Willett and Dunbrack Street candidate sites. The key findings associated with the Willett and Dunbrack Street candidate sites are summarized below.

- Given the lower volumes traveling on Willett Street there is likely to be less overall delay incurred due to new traffic signals, relative to the Dunbrack Street site.

- Conversely, there are numerous residential accesses and unsignalized intersections in close proximity to the proposed traffic signal on Willett Street and issues such as vehicle queues (due to a red light) blocking these locations is an operational concern.

- Based on the animated simulation results, the Dunbrack site experiences manageable vehicle queues at the proposed traffic signal (despite higher traffic volumes than Willett Street) and there are no operational conflicts occurring with the Clayton Park Drive intersection to the south or the Lacewood/Dunbrack intersection to the north.

The technical analysis results indicate that the traffic impacts associated with a new transit terminal will be greatest at the proposed Lacewood Drive site. The Dunbrack and Willett Street sites have a similar degree of impact (much less than Lacewood Drive). In our opinion, the Dunbrack site would likely experience marginally better operations compared to the Willett Street site.

Traffic signals are recommended at all of the candidate terminal access locations, both to manage delay times for buses now and into the future, as well as to provide enhanced positive guidance to buses entering/exiting the site (as they transition from driving on the right-side of the roadway to the left-side within the terminal). Metro Transit must keep in mind that traffic signals alone will not minimize the road safety risks associated with the buses traveling on the opposite side of the driveway and that additional positive guidance and road safety measures will be required and these should be identified at the design stages of the project.

APPENDIX C
Comments Received
January 25, 2010 Open House

Lacewood Terminal siting Study

Summary of Public Comments (January 25 Open House)

	1a Local?	1b Resident (yr)	2a Preferance	2b Most	2c Why	3a Least	3b Why	4a Other
1	Yes	12	Yes	1	Site 1 offers easy walking distance of Wembly Place; Near Canada Games site Comment: may require "park and ride"	2		Northcliffe (Site No 3) is second choice Any site requires pick-up and drop-off area
2	Yes	2	Yes	3	Site 3 is already developed; make it a bus terminal Dunbrack Street is a divided facility able to handle the extra bus traffic Closest to shoping centre that riders may visit before or after bus trip Impacts fewest people at this location - only a few houses nearby	2	At Site 2 the entrance is too confined Willett is not as good as Lacewood or Dunbrack for traffic Beautiful existing park with small park, deer and other animals It is also linked to the longitudinal park/path There are apartments on 2 sides and across the street where people will be negatively impacted by the noise and smell	Site 1 is another natural (park-like) setting (like Site No 2) and we don't like seeing such spaces destroyed 3 to 4 million dollars seems an extreme amount of money to spend on a parking lot with a bathroom!! We enjoyed having an opportunity to participate
3	Yes	35	No		Dangerous siting - roads to cross / traffic to contend with	All	All options compromises our green spaces - look for some existing paved areas and take over that space Try the large parking lots at Canadian Tire / Sobeys that are empty all day	For the next meeting, choose a facility on a bus route with a mic Have public speaking training before calling a meeting More consideration for AT routes and walkability Bike parking - secure This needs to be fast-tracked - the existing terminal is a joke - an insult to all users This terminal should be a priority ahead of both the bridge and Highfield upgrades presented in the Transit Report to Council Jan 26 Also bring the MetroLink foward in 2010 - the ferry can wait I applaud the transit 3 minute idling policy - now please have the policy forwarded to all HRM staff and residents ASAP, in particular HRM facilities and HRSB buildings Go back to the drawing board
4	Yes	12	No		Not enough time to consider the options I like proximity to linear trail as it is the major AT trail in this area	2	Site 2 is too far removed from Clayton Park/Clayton Park West Mainland Common/ Canada Games centre is a major destination	How does HRM propose to link all existing walkways and trails to the new terminal? I ask specifically as I have been asking for the past 4 1/2 years for the paved walkway on my street - Berkshire Close - to be reopened and the footpath beyond that (which is over HRM park lands) to be properly developed to link to the HRM trail
5	Yes	35	No		I don't like any Too many trees to be cut down for sites 1 and 2 This is valuable green space (potential parkland) which we desperately need in this area Site 3 involves destroying Northcliffe. a valuable community resource	All	An independent public discussion should take place regarding the use of the Northcliffe Centre Should it be retained and used as an alternate community resource, meeting rooms, drop in centre, etc Let the public decide on it independent of new terminal building	None of these proposed sites is appropriate Consider siting the terminal in Bayers Lake Business Park or maintain the status quo HRM could rent one or two or more small storefronts in the present terminal and use these for washroom facilities etc
6	Yes	30	Yes	3	[no comment]	2	With Site 2, side streets in area will become parking lots for riders	Good luck
7	Yes	15	Yes	1	Site 1 would have the least least amount of impact on a residential area	3	Our property borders on the back side of Northcliffe Noises, bright lights, fumes, security issues	We hope city council will give thought to the location which least impacts a residential area and will keep the small green areas which currently exists in the area
8	Yes	52	Yes	2	Site 2 offers more space; best for students - our present and future citizens - train them young to use transit	1	Site 1 has too much traffic	I love Metro Transit - best bargain in town!
9	Yes	19	Yes	2	Site 2 is safer - green belt (tree buffer) can be left - high school, library, soccer field, Canada Games Centre Can put it in place sooner than Dunbrack			Question and answer - best for public
10	Yes	25	Yes	2	Site 2 is safer - green belt (tree buffer) can be left - high school, library, soccer field, Canada Games Centre Can put it in place sooner than Dunbrack			Question and answer - best for public Better than the crazy way it was done for tax reform
11	Yes	50	Yes	2	Site 2 is convenient for students	1	Site 1 has too much traffic on Lacewood	
12	Yes	5	Yes	1	Site 1 is across the street from me I also like Site 3 as it has half the operating cost.	2	Site 2 isn't a good site for getting off to shop on my way home	
13	Yes	16	Yes	2	Site 2 is a good for high school kids; high traffic area anyway; closer to high population-dense population; lower capital cost; future growth is likely in this area; note re operational costs for site 2: not necessarily as high as incicated - buses that go along Dunbrack today and go up to the existing terminal would travel the same distance with Site 2	3	Site 3 is a poor choice due to increase in traffic in residential area; additional noise in quiet residential area, reduced park space (or park space next to diesel fumes); potential change in bus routes in future could go in residential area; increased diesel fumes in residential area; would take at least a year longer than other sites	Regardless of the location, new terminal should have a "kiss 'n' ride" - otherwise the neighbourhood will have an increase in traffic Was high school population considered?

14	Yes	13	Yes	1	Site 1 is closer to me [Glenbourne subdivision] I would like to take the Link bus and this would mean I would spend less time on a regular bus; closer to pool / rec centre, future development, school; apartment renters are more likely transit users [than site 3]	3	Site 3 is too far from centre of population of users	I got the impression that density and users as opposed to just population within 500 metres was not given enough weight 1 kilometre walk should be another consideration
15	Yes	13	Yes	2	Site 2 is close to the people least likely to have cars to get to a terminal My concern, though is safety [read security], as it is not as "open" as the others	1	Site 1 - concerned that the distance from high density. lower inclome complexes	I would have preferred Site 3 if it wasn't causing such a delay in moving forward with this much-needed facility
16	Yes	25	Yes	2	Site 2 is best provided that there is no substantial noise or air pollution impact. the site is close to existing users who depend on it most Sites 1 and 3 are located closer to single family and higher priced homes who most likely have vehicles and don't depend on buses	1	Sites 1 and 3 are a parkland that should maintain the integrity of those spaces	I would like to see an environmental / noise impact study as well as a traffic study
17	Yes	7	Yes	2	Site 2 is in close proximity to Halifax West High School and the present Lacewood [terminal] There would also be less environmental, noise and lighting impacts because of the treed location It also has better future expansion capabilities and possibly park and ride considerations would provide traffic signals for pedestrians and would be safer than what now exists	3	The replacement of Northcliffe Recreation Centre property by something else may be more valuable in the future Limited to future expansion Increase of injury to pedestrians because of buses tavelling from each side of Dunbrack Street This is a residential area of single family homes and the environmental polution and noise would be in the backyard of these residences lights from the terminal would detrimental to the quiet living of this neighbourhood - possible legal action by citizens - re noise and pollution and lighting of terminal	There appears to be a date for implementation (a shotgun approach), therefore the future planning, environmental pollution, lighting intrusion [and] possible civil litigation have not been well thought out There should be tremendous focus on the 'park and ride' provision as well It appears that the plan and sites chosen are for *today's* needs and not the future planning of this city There is *no vision* in this city!
18	Yes	23	Yes	2	Handy to the high school - good for students Room for expansion, noise buffers - accessible to future developments on north side of Commons Option 3 (a close second) is close to my home but it won't interfere with my enjoyment of my property as long as Clayton Park drive remains cliqsed to left turning traffic As a negative. I really like having that 'greenspace' nearby to use Lacewod	1	I think that due to the need for lot of infill, it is the most costly option - Lacewood Drive is already too congested for much of the day It is not handy for my family to use	There are many rumours floating around and it helped to have the options clarified I love having the Northcliffe Centre so close with its 'greenspace' All of my children have spent a lot of time there playing In many ways it would be a shame for the area to be developed (for housing/bus depot) excpt for park space: there is no other in the area
19	Yes	3	Yes	2	We live between sites 2 and 3 [and prefer them over 1] Although site 2 would not involve crossing over a major road (Dunvbrack) both are acceptable	1	site 1 - [problem is] location Plus more involvement and expense in readying this site	If site 1 or 2 was chosen I feel that Site 3 would make a lovely park and pond area Maybe with benches andround the pond and equipment for multi-aged children to use We need this in our neighbourhood
20	Yes	23	Yes	3	Site 3 would not require levelling and destroying any existing green space It is also fairly close to my home It isn't too far away and is accessible from the nearby shopping centre Also the surrounding green space has already has trails which would integrate nicely into the terminal	1	site 1 is too far away from the original location off the terminal It is also an uphill walk from the terminal It is also a different area Instead of serving Clayton Park it is serving Clayton Park West - that hill represents a significant geographical barrier from what people consider Clayton Park and Clayton Park West	If site 2 or 3 is chosen there will ned to be some arrangement made for pedestrians in terms of a more direct route to the terminal - instead of having to walk all the way around to willett or Lacewood - ideally through Harlington Currently, there is a path owned by Killam Properties Also there is no park and ride There needs to be one
21	Yes	8	Yes	3	in essence, the space is closer to being ready for a terminal that the others As Northcliffe is going to be demolished, anyway, it would not bemuch effort to and pave the new site Also, as it is on a major thoroughfare, it would be easier to get buses in and out without causing traffic issues	1	Lacewood beyond sobeys is already overcongested during the shopping season, to xxx more buses and more cars dropping off could be problematic Also, filling in what appears to be an effective rainwater and snow runoff gully seems irresponsible As a driver. adding yet another traffic light to Lacewood would simply be painful	Looking forward to the terminal and new services Keep in mind that if "green" space is a concern, why would we bulldoze 2 green spaces - Willett or Lacewood, to place a terminal, just to bulldoze Dunbrack to create a green space?

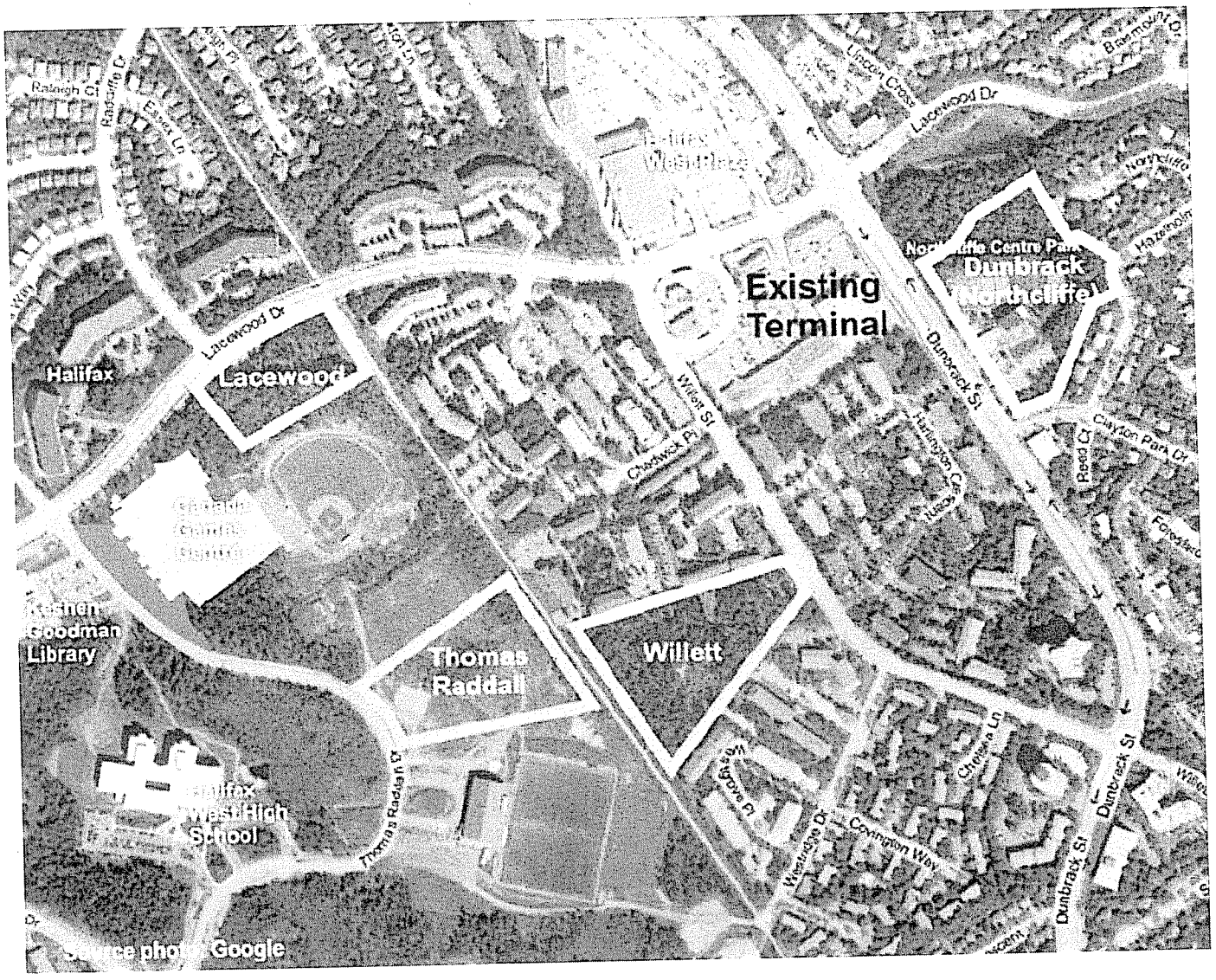
Avg 20
Medi: 16

Freq:

1	4
2	10
3	4

1	8
2	5
3	4

Appendix B - Map of Potential Site Options



Appendix C - Revised Stage 2 Site Evaluation Summary

Site No.	Name/ frontage	Operational suitability		Pedestrian / active transportation compatibility			Zoning	Expansion Capability	Personal security (CPTED)
		Traffic planning implications (from Table 5)	Customer Convenience (from Table 4)	Pop. within 400m (based in 2006 census) (from Table 6)	Adjacent land use (from Table 6)	AT and Pedestrian access (from Table 7)			(from Table 8)
1	Lacewood	Impacts on Lacewood traffic flow	Largely unchanged	3634 (an increase over existing)	Medium density apartments, single and attached dwellings; adjacent new Canada Games Centre, library.	Sidewalk, linear trail; ped. actuated crossing signal nearby	Schedule "K"	Yes, though costly due to fill requirements	Relatively low potential for surveillance and access control
2	Willett	Minimal traffic impacts.	Largely unchanged	3305 (increase)	Medium density apartments; central to recreational area and shopping centre.	Sidewalk, linear trail; ped. actuated crossing signal nearby	P Zone	Yes, though costly due to cut requirements	Medium to high potential for surveillance and high potential for access control
3	Dunbrack	Minimal traffic impacts.	Significant impacts due to rerouting	2097 (decrease)	Low density single and attached dwellings; shopping centre.	Sidewalk, bike route; ped. actuated crossing signal nearby	P Zone	Yes	High potential for surveillance and high potential for access control

Evaluation Rating Method : Good / Fair / Poor

Appendix D - Willet Street Preliminary Site Concepts