HALIFAX
REGIONAL MUNICIPALITY

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Item No. 3
Halifax Regional Council
November 9, 2010
Committee of the Whole
November 30, 2010

TO: Mayor Kelly and Members of Halifax Regional Council

SUBMITTED BY: Original Signed by

Wayne Anstey, Acting Chief Administrative Officer

Original Signed by

Mike Labrecque, Deputy Chief Administrative Officer

DATE: October 20, 2010

SUBJECT: Metro Transit Strategic Ferry Operations Plan

ORIGIN

This report originates from staff.

RECOMMENDATION

It is recommended that Halifax Regional Council approve in principle the Metro Transit Strategic Ferry Operations Plan and direct staff to use the plan on a go-forward basis as guidance in the planning and operation of the existing Harbour Ferry system.

BACKGROUND

On February 9, 2010, Regional Council approved in principle the Metro Transit Five-Year Strategic Operations Plan. This plan provides a roadmap to aid staff in improving the Conventional transit system over the next five years. During the process of completing this study, staff identified a need to conduct a similar analysis for the Access-a-Bus and Ferry systems. On December 8, 2009, Regional Council approved an increase to the contract with consulting firm IBI Group to complete these studies.

DISCUSSION

The final report for the Metro Transit Strategic Ferry Operations Plan is attached to this report. The report is broken down into six key areas:

- Background/Current Situation;
- Needs Assessment;
- Peer Review;
- Future Strategic Operations Plan;
- Recommendations; and
- Implementation Plan.

The report generally found that the ferry service is an integral, efficient part of HRM's overall transit network. It provides very reliable service and the ferries are very well maintained, particularly for their age. Further it notes that recent organizational and staffing changes in the Ferry Services department have better positioned Metro Transit to grow the service and further improve system operations and maintenance.

Required capital work and analysis related to the ferry terminal buildings has been identified and staff is currently undertaking this work within existing budget allocations.

The recommendations in the report are broken down into the short and long-term and are described below:

Short-term – 2010 to 2014

It is recommended that:

1. The Metro Transit Strategic Ferry Operations Plan be adopted in principle as the basis for a 10-year plan for renewing the Ferry operation;
2. New design specifications for up to two additional vessels for the existing service area be developed incorporating the key operational and customer design features outlined within this report and that the vessels be acquired for delivery and commissioning by 2013 to expand the Woodside service;

3. Metro Transit undertake an alternatives analysis to determine the need for a fifth vessel for upgrading the Woodside service to 15 minutes in peak hours and as a maintenance and operations spare;
4. The Dartmouth and Halifax ferry terminals be refurbished at an estimated cost of $6 to $8 million to address design deficiencies but also to cosmetically refresh and update the image of the buildings and extend their life for up to 10 years;
5. Metro Transit/HRM lead a team with HRM Planning and Halifax Waterfront Development Corporation staff to re-design and rebuild the Halifax and Dartmouth ferry terminals with the objective of turning the terminals into a major design focus for the ferry operation and tourism and as a catalyst for the harbourfront redevelopment;
6. To prepare for the longer term, Metro Transit should conduct further investigations and analysis of alternative vessel designs specifically with regard to speed and side-loading in concert with any consideration of new, longer ferry routes; and
7. The ferry strategic operations plan be updated in 2014.

Longer Term – 2015 to 2020

It is recommended that:

1. HRM/Metro Transit rebuild/replace the existing ferry terminals with architecturally significant designs;
2. Acquire additional vessels suited to future route needs; and
3. Acquire vessels to replace the existing fleet suited to the needs of either the existing or new services.

In order to achieve the recommendations of the plan, a recommended implementation plan is included and is illustrated below.

Implementation Plan and Action Steps

Step	Initiative	Timeline
Short Term – 2010 to 2014		
1	Undertake repairs to Halifax and Dartmouth terminal jetties	2010
2	Develop design and specifications for two new vessels	2010 – 2011
3	Undertake an alternatives analysis to determine the need for a fifth vessel to upgrade the Woodside ferry service	Winter 2010/11
4	Issue RFP for construction of the new ferry(ies)	Spring 2011
5	Refurbish Halifax and Dartmouth terminals	2011 – 2012
6	Award tender for construction of the new ferry(ies)	Summer 2011

7	Construct new ferry(ies)	Fall 2011 – Spring 2013
8	Accept and commission new ferry(ies) for service expansion	Summer 2013
9	Introduce expanded Woodside Ferry service including hiring of additional staff	Fall 2013
10	Update strategic ferry operations plan	2014
Longer Term – 2015 to 2020		
1	Develop new and replacement ferry designs and specifications based on needs of any new services	2015 – 2016
2	Finalize design details for new Halifax and Dartmouth ferry terminals	2017
3	Issue RFP for design of new terminals and prepare construction documents	Spring 2018
4	Issue RFQ and RFP for construction of new Halifax and Dartmouth ferry terminals	Summer 2018
5	Construct new Halifax and Dartmouth terminal buildings	Fall 2018 – Summer 2020
6	Finalize design specifications and issue RFP for new ferries to expand service (as necessary)	2018
7	Finalize design specifications and issue RFP for ferries to replace existing fleet; award tender to construct ferries	2019
8	Commission new terminal buildings, Halifax and Dartmouth	2019
9	Construct replacement ferries	2020 – 2021

It should be noted that while the consultant's recommendation is for the fourth ferry to enter service in the Fall of 2013, staff's current plan would see the ferry enter service in early 2014.

BUDGET IMPLICATIONS

There are no budget implications at this time. All recommendations in the plan that have budget implications will be brought forward in future annual budgets for consideration by Regional Council.

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 survey was completed to allow the public an opportunity to provide feedback on the ferry system and potential improvements. This survey was available for completion at ferry terminals, onboard the ferries and online for people who are not currently ferry passengers to complete. The results from this survey were used to inform and confirm recommendations in the Plan.

ALTERNATIVES

There are no recommended alternatives.

ATTACHMENTS

Metro Transit Strategic Ferry Operations Plan Final Report.

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

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Halifax Regional Municipality

METRO TRANSIT STRATEGIC FERRY OPERATIONS PLAN

FINAL REPORT

SEPTEMBER 2010

TABLE OF CONTENTS

TABLE OF CONTENTS (CONT'D)

Exhibits

Appendices

IBI GROUP

1. INTRODUCTION

The Halifax-Dartmouth ferry is the oldest continuously operated salt-water passenger ferry system in North America having celebrated its 250th anniversary in 2002. Although an important part of the Halifax Regional Municipality's transportation system, the service has not been reviewed in some 20 years, the last one being conducted by the City of Dartmouth in 1991 prior to municipal amalgamation.

The recently completed Metro Transit Five-Year Strategic Operations Plan calls for increased use of the ferry service, particularly an upgrading of the route between Halifax and Woodside, as part of the long term strategy to significantly increase public transit use throughout the Halifax Regional Municipality (HRM) area and avoid the need for a third harbour crossing at a potential cost of $1.4 billion.

Accordingly, over the next five years, ferry ridership is targeted to increase from 1.4 million (estimated for 2010) to 1.75 million by 2014. Adding to the value of the service is the location of the Halifax, Dartmouth and the Woodside terminals which present important opportunities to increase use of the ferry system since they are in the vicinity of core business areas with the Woodside terminal adjacent to existing and planned major new residential, commercial, health and education developments.

With growing emphasis on the ferry operation as an integral part of HRM's transportation system there is strong interest in positioning the ferry service to be able to handle increased demand and recognition of the importance of the service within the overall HRM transportation system context going forward. At the same time, with an aging infrastructure and new marine guidelines and standards which could influence ferry operating and vessel maintenance practices, a review of the Ferry Service is timely to both address the existing and emerging issues and to identify future needs – areas for improvement and investment to meet future demands. Thus, there is an opportunity to revitalize and strengthen the role of the ferry service in HRM's transportation system.

The following report provides both a ***short term (5 year) plan*** for improving the ferry service as well as a ***longer term strategy*** for enhancing the purpose, effectiveness and image of the ferry service as an important component of HRM's transportation system.

1.1 Study Objective

In view of the history of the ferry service, existing conditions and its enhanced role in future, the overall objectives of this study are to:

- Review operations and staffing in light of existing and proposed marine legislation and regulations to ensure that the ferry operation is in compliance and will be in compliance with proposed regulations and to recommend changes in operations where necessary;
- Review vessel maintenance programs, practices and facilities to ensure that the fleet is being maintained in compliance with regulations and in a cost-effective manner; and

- Review the infrastructure needs of the ferry service including development of a replacement strategy for the existing fleet and specifications for future ferry acquisitions, docks and maintenance facilities.

The overall objective is to position the ferry service to play an increased role in HRM's transportation system by revitalizing the service in terms of operations and infrastructure.

Specifically, this report addresses:

- The regulatory landscape to ensure that any replacement vessels and supporting ferry staffing and organization structure will meet requirements today and, as far as possible, into the future;

- Operations including:

  - Operations;
  - Organization structure;
  - Infrastructure maintenance; and
  - Policies and procedures.

- Vessels in terms of :

  - Existing conditions;
  - Future needs in terms of capacity, speed, hull type, customer amenities;
  - Passenger loading; and
  - Other general characteristics.

- Terminals

  - Condition, attractiveness, customer amenities, passenger control and fare collection;
  - Impact of any change in future vessel design;
  - Office space;
  - Storage space; and
  - Maintenance workshop.

1.2 Study Process

The approach and work plan for this study has involved close consultation with Metro Transit Ferry staff, Metro Transit planning and senior management, HRM planning staff and consultation with various marine regulatory and safety people including Transport Canada and the Harbour Master. Reference was also made to the recent ferry survey conducted by Metro Transit and feedback from public consultation associated with the preparation of the Metro Transit 5-Year Strategic Operations Plan.

A review of industry best practices through a peer review was undertaken to provide context for the Halifax's ferry service and to provide an indication of future trends in operations and vessel design. In addition, a review of current and emerging Canadian and International marine legislation and regulations was undertaken. Site visits to the three ferry terminals and sailings on the ferries were undertaken on several occasions to gain a thorough understanding of current operations and facilities.

The study was directed by Metro Transit's Service Development staff to whom the consulting team reported.

2. BACKGROUND/CURRENT SITUATION

The current Metro Transit ferry service consists of two routes – the original route between downtown Halifax and downtown Dartmouth, and a second route added in 1987 linking Halifax with the Woodside area of Dartmouth. There are three vessels used for the service, two constructed in 1978 and one in 1986 with two utilized on the Halifax-Dartmouth route and one for the Halifax-Woodside link. The ferries are expected to carry some 1.4 million passengers in 2010.

The Halifax-Dartmouth service is operated 18 hours per day, seven days a week at a peak frequency of 15 minutes (30 minutes during evenings and Sundays) while the Halifax-Woodside service operates every 30 minutes in peak hours only, Monday to Friday. The service has an on-time and safety record which is second-to-none.

There are three terminals, one each in Halifax, Dartmouth and Woodside, which include docking facilities for two vessels and passenger waiting areas. There are convenience counters (Tim Hortons) at Dartmouth and Halifax. Staff offices are located at the Dartmouth and Woodside terminals and general office space in the Halifax and Dartmouth terminals although not occupied by Metro Transit. Vessel maintenance is undertaken at the Woodside terminal where there is a wood shop and small parts area. The Halifax and Dartmouth terminals were both constructed in 1976-78 as part of a renewal of the ferry system at that time while the Woodside terminal was constructed in 1986 for the inauguration of that service.

A staff of 31 operate, manage, supervise and maintain the ferry service, vessels and terminals in the following positions:

1 – Manager of Ferry Services
1 – Service Supervisor
1 – Vessel Maintenance Supervisor
1 – Security Officer
5 – Captains
10 – Mates
4 – Relieving Mates
1 – Shore Eng
5 – Eng/Deckhand
2 – Relieving Eng/Deckhand

Although the last review of the ferry service was undertaken in 1991 and the ferry service has generally operated unchanged since the addition of the Woodside route and vessel in 1986-7, Metro Transit has been proactive in updating policies and staffing levels to meet regulatory changes as well as vessel and facility maintenance practices. Specifically, gaps in policies and procedures and documentation were identified and have been addressed and critically needed management resources added. Staff levels have increased from 21 to 31 largely to meet new crewing requirements under Transport Canada regulations and there is now a Ferry (Operations) Supervisor as well as a Maintenance Supervisor thereby allowing the Ferry Manager to focus on managing the broader needs of the service.

At the same time, Metro Transit management has identified the need to acquire an additional vessel to provide a resource for upgrading ferry service levels to Woodside and to provide greater flexibility in handling vessel maintenance. In view of the work undertaken by Metro Transit staff, the following report provides a further review and assessment of the ferry operation as a guide to meeting system needs over the short and longer term.

3. NEEDS ASSESSMENT

As a basis for identifying the future needs of the Metro Transit Ferry service, a comprehensive review of the existing operation, vessels, maintenance practices, condition of terminal buildings, capital budget program and the regulatory environment in which the ferry service operates was undertaken. This work consisted of site visits to the ferry terminal buildings, interviews and meetings with HRM and Metro Transit staff, regulatory staff from Transport Canada (TC) and the Harbour, review of operational and vessel maintenance records and a review of terminal building drawings as well as rides on the ferries. Reference was also made to a recently completed ferry survey and feedback from stakeholders as part of the Metro Transit 5-Year Strategic Operations plan work. The following section presents the results of this review and analysis and identifies future needs.

3.1 Operations and Staffing

The ferries operate primarily between Dartmouth and Halifax with additional runs to Woodside during peak times. There are periodic "charter" operations of the ferry for special events, usually during off-peak hours using an out-of-service vessel. Although ferry ridership had declined over the past few years, largely the result of new express bus services, it did increase in 2009 by 2.96%. With greater emphasis on the ferry and proposed improvement to the service to Woodside as recommended in the Metro Transit Five-Year Strategic Operations Plan, further increases in ferry ridership are projected with an estimate of 1.75 million annual rides by 2014.

Service on the Dartmouth-Halifax route is provided 18 hours per day, six days a week, 8.5 hours on Sundays, while the Woodside-Halifax route operates peak hours only, Monday to Friday. One vessel operates 18 hours per day (6AM to Midnight) six days a week, one nine hours (6AM – 9AM, 12 Noon to 6PM) five days a week and one peak hours only (630 to 930 am and 2:30pm to 6:30pm) Monday to Friday.

Management and supervision of the operation is the responsibility of the Manager of Ferry Services and Maintenance Supervisor who are involved in all aspects of the operation. However, until recently, there have been limited resources to document all work undertaken with few supporting management systems in place although this is being addressed. On-going data collection is important for trend analysis particularly with regard to facility and vessel maintenance as well as for documenting maintenance work undertaken. In view of changing environmental conditions and marine regulations, good management reporting systems and a higher level of supporting documentation needs to be a priority.

Current crewing levels of four people per watch (shift) per vessel are the base minimum acceptable to Transport Canada, having been recently increased from three people. Transport Canada crew requirements are normally for six people but this is under review with a proposal for a Board Ruling (directive from the Marine Safety Board) to permit four-person crews expected. Pending a decision, a temporary exemption to use a four-member crew has been given.

With regard to training, all crew members have the requisite training and certification for their positions and these records are kept by the Manager in personnel files. These records detail the certification level for each employee and when their respective certificates, medical clearances, first aid/WHIMIS/confined space training expires and must be renewed. However, these documents do not presently list other expected training schedules for such things as overboard or fire drills, or the level of training each employee has received to date, but could be amended to include this

information. A standard list and management report should then be developed that states what training each crew has received. [Amended November 3, 2010.]

Work schedules provide for adequate hours of rest and the collective agreement enables the workforce to be managed with minimal calls for overtime. In addition, the use of a Masters' limited ticket (the authority to operate a marine vessel) provides for good internal promotion and low loss of trained/certified Captains to other ferry operations. Pay and work conditions are competitive. As a result, with the addition of the one crew member per watch there is now some additional flexibility to the overall crewing options and in the training of new Masters. The situation is somewhat different for Captains with non-limited tickets, or engineers. These resources are in short supply globally, which could be an issue given the need to have a qualified engineer on each watch. At this time only the most senior Captain in the service has his ocean-going Masters' certificate and it is not expected, nor required, that this certification be part of new hire credentials. That being said there is an argument that this senior position should have this certification thereby providing an opportunity for relevant experience and knowledge to be shared with the Ferry Service Masters. Engineers on the other hand are in high demand and the ticket required for watch keeping is something that is highly sought after. Engineers in industry are very competitively compensated and this could cause some issues in having adequate numbers to meet the crewing requirements in future.

With the current number of crew for the operation there is little capacity to do anything extra, and therefore activities like continuous improvement are not undertaken within normal operations. The greatest impact of this situation is in developmental training. Finding time to undertake the required continuous training is difficult and in some cases causes either an imposition on the employee, or an increased cost because training one or two people at a time requires overtime.

In reviewing current crewing arrangements and particularly planning for the future, it was observed that the "Team" environment of the Master and Mate is working well in developing new Captains for the service and effectively provides for succession planning of these positions. Given the success of this approach, it would be useful to try to stabilize the crews as "teams". Adopting this practice would enable a cohesive training system to be developed, executed by the Master and Mate, which would then demonstrate investment in the growth and retention of all hands. Given the challenges with training crew members, this approach could provide some relief to the Captain in future.

Training of engineering staff should focus on effective and efficient removal and replacement of the equipment and the competencies that enable them to be put into operation in the least amount of time. Typically, Engineering Sea-Going tickets are not the required competencies, but more likely Marine Mechanics would be more appropriate.

3.1.1 SAFETY

With regard to marine safety, the ferry service has two designated individuals who sit on the Metro Transit Occupational Health and Safety Committee. However, from the Marine perspective, there is no designated safety officer identified on the organization chart. There is no formal, documented safety program in place. The current safety management system is in the form of largely undocumented protocols and procedures relating to such things as maintenance of the vessels and equipment, safe practices in vessel operations and safety focused skills-development for the crews. In addition, documented protocols and procedures are in place, which are supported by the HRM corporate program, based on meeting the requirements of relevant labour legislation. It is recommended that the safety management system be improved, formalized and documented more clearly. [Amended November 3, 2010.]

While there is no requirement to take on International Safety Management (ISM) Certification (required only for vessels over 500 gross tonnes), this approach should be looked at as a good framework for Safety Management and would go a long way to secure a long standing positive

relationship with Transport Canada, and a supporting framework for marine safety as the ferry service grows. Given the specific nature of the ship operations, and the unique regulations for safety in ships carrying passengers, it is highly recommended that the Ferry Operation itself have a Safety Committee which deals only with the ferries. This will be a requirement when Transport Canada directs that small vessel operators move to the concept of delegation.

3.1.2 SECURITY

A dedicated position is now in place meeting the International Ships and Port Facility Security (ISPS) code which came into effect on April 1, 2010. A security plan has been completed and approved including supporting processes. Security training for all crew members has been completed. However, the Security Supervisor presently reports to the Manager of Ferry Operations. This relationship could create a conflict with the Manager in the event operations need to be shut down in the event of a safety or security concern. This organizational arrangement should be reviewed.

3.2 Vessels and Vessel Maintenance

3.2.1 VESSELS

Of the three vessels, two were built in 1978 and the third in 1986. Each is approximately 80 feet in length and have a passenger capacity of 395 although this capacity is only reached a few times each year. Their design is simple providing the perfect platform for the routes and reflecting specifically the needs of the HRM operating environment and passengers (speed, schedule and ride comfort). Simplicity of design in this case also equates to ease of maintenance, and low failure rates or high utilization. The double ended configuration enables good transit time without having to turn the vessel. The vessel's steel construction is relatively inexpensive to build, but does have a downside in the weight which increases the cost of operation; given the rising cost of fuel and a 35 year lifespan, this should be considered in any replacement. They are simple, easy to maintain and robust. The Voith Schneider transmission and propeller system coupled to a Caterpillar diesel engine makes the manoeuvring of vessels very simple and responsive. The maximum speed of the vessels is 8 knots/hour.

Exhibit 1: Woodside I Vessel

Depending on potential new routes and route lengths in future, the existing vessel design is well suited to the current operation and could be replaced essentially as is although with modern technology, systems, lighter-weight materials and access panels to optimize maintenance. Certainly the existing vessels, known for their unique shape, have established a brand and awareness in Halifax of the ferry service. The first two vessels are nearing their original design life of 35 years which can indicate increased maintenance costs and decreased availability due to age. However, given their good condition, these vessels may be capable of continued reliable operation for a

minimum of five years although it should be noted that they are at their optimal operational profile for the current routes they were designed to serve.

3.2.2 VESSEL MAINTENANCE

As indicated above, the ferries are in excellent condition and are well-maintained. Each have had new engines installed within the past few years. The maintenance plan is preventative and is well-managed by the Maintenance Supervisor and is based on a three-year docking cycle (four is the maximum under regulations) where major items are dealt with, supported by routine maintenance.

Vessel and facility maintenance has been well organized by the current team – which is comprised of a Supervisor, watch personnel and a small maintenance team. The simplicity of the items being maintained is reflected in the maintenance approach which is also simple – but effective. The philosophy is based purely on time and is built around dockings every third year (requirement is every four years). The maintenance duration is segmented on 250 hours, 500 hours, 750 hours, 1000 hours and 6 months and reflects the manufacturers recommended running maintenance. Although readings are recorded, there currently is no data collected for analysis. Maintenance decisions are either the time-base or failure based approach. With a minor increase in sophistication some trend analysis will enable some performance based assessment to be included with the current approach.

Although the current vessels were designed with simplicity in mind – they were not designed to easily permit the change out of critical pieces of equipment. The main engines for example need to be dismantled to be removed. In the event of a failure of any critical equipment the vessel would be out of service for an extended period of time.

New vessels should be enablers to more proactive maintenance – data collection, data analysis, management and most importantly design that facilitate ease of access and repair by the replacement of major components. Suitable access panels should exist to ensure that key equipment can be easily removed and replaced in minimal time. A sufficient supply of critical spares should be in stock and maintenance agreements for these items should be put into place to ensure the most economical overhaul of equipment. With modern technology and maintenance systems there should be a movement to more a conditioned-based approach rather than a time-based approach which is more expensive[1]. Most maintenance will be done outside of the major docking, which should be limited to hull inspection, and repair. Given this approach it is important to ensure that there is adequate storage for spares (onsite or close at hand), lifting appliances and tools and a shop to undertake the work.

3.3 Terminals

The ferry operation includes three terminals - in Halifax, Dartmouth and Woodside. The Halifax terminal serves at the terminus for the routes to Dartmouth and Woodside. The Halifax and Dartmouth buildings were constructed circa 1978 and Woodside in 1986.

Each of the terminals includes the following features:

- A dock or jetty with ramps to the vessels;

[1] http://www.marineengineeringmanagement.com/index.php/archieves/71; http://www.scitopics.com/Predictive_Maintenance_Techniques.html
Condition-based maintenance: a systematic method for counting the cost and assessing the benefits: proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering: Volum214, No. 2/2000.

- A ramp to the jetty;
- A customer waiting area prior to boarding the vessel. This area is controlled by locked doors which are unlocked once disembarking passengers have exited the ramp area;
- A fare payment area at the entrance to the waiting area. The payment area is staffed by Commissionaires (security staff); and
- A concession area where food and non-alcoholic drinks are sold. In Halifax and Dartmouth, these are Tim Horton's restaurants.

Halifax Terminal, view from George Street

The main offices for the ferry staff are located in Dartmouth while there are additional offices, a staff lunchroom and rest room, and a small maintenance area and stock room at Woodside.

The following section provides a limited review and assessment of each of these terminal buildings in terms of their condition, aesthetics and suitability for future operations based on observations by the consulting team.

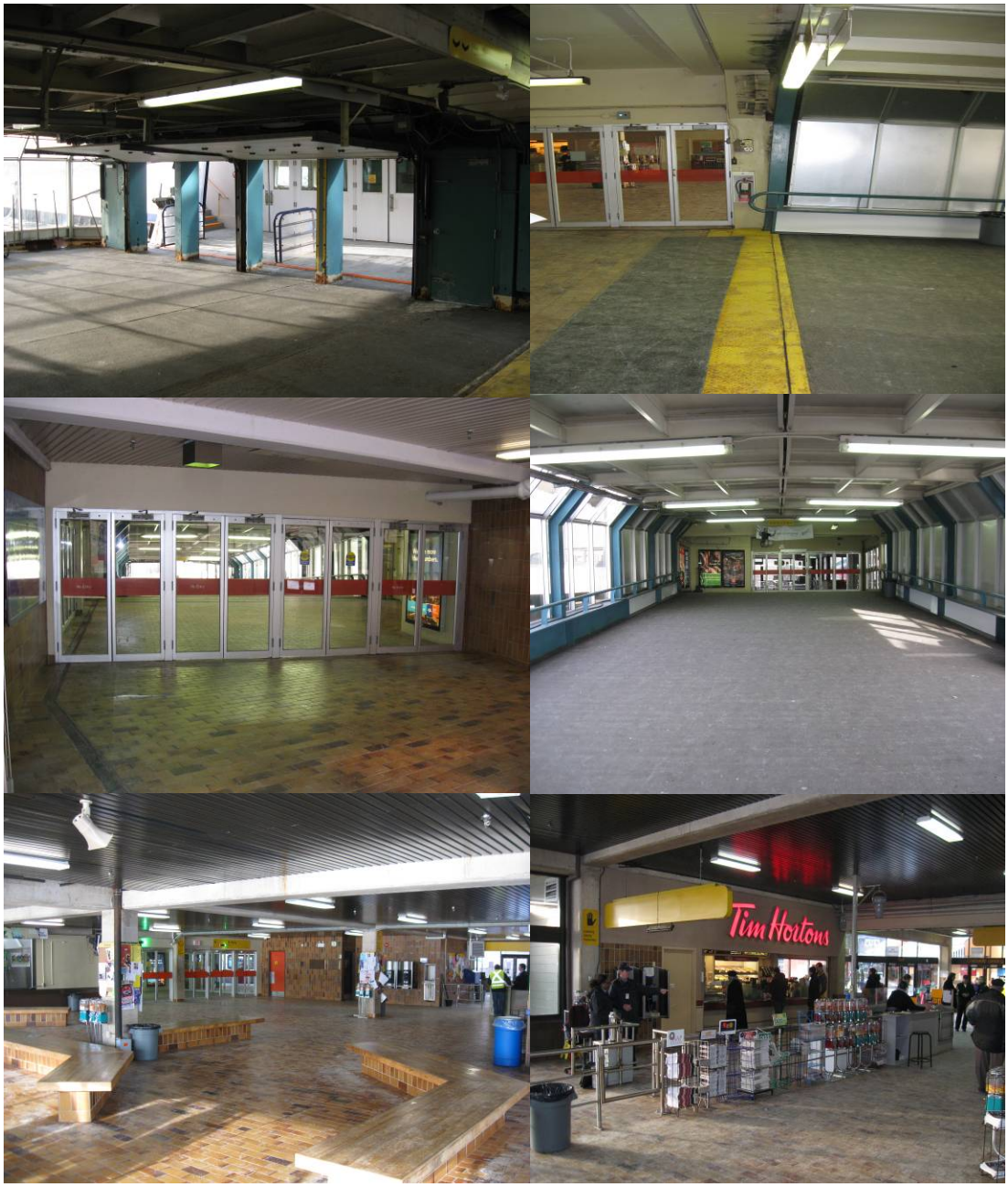
3.3.1 HALIFAX

With its downtown location the Halifax terminal is the busiest of the three terminals and as such its transformation will have the most significant impact from a visibility and ridership perspective.

Located at the bottom of George Street, between the harbour seawall and Lower Water Street, this low, wood-sided series of opaque, geometric planes is a clear expression of late modernism from the1970's. Unfortunately, the terminal is not visible from Lower Water Street as the bulk of the Supreme Courts' eight storey, pre-cast structure effectively separates the City from the terminal and the waterfront. However, once the ferry passengers enter the waterfront plaza and car turn-around area south of the terminal, access to the ferries and the terminal's harbour viewing deck is apparent.

Interior of Halifax Terminal showing stairs to upper offices.

Unlike the other two terminals, the Halifax facility does not depend on a third, off-shore dolphin to stabilize the floating, pontoon loading ramp but is simply constructed with an on-shore dolphin on each side of the pontoon ramp that act together like a hinge for the floating, pontoon loading ramp. This has resulted in more wear on this 'hinge' as the tidal flow moves the pontoon from side to side.

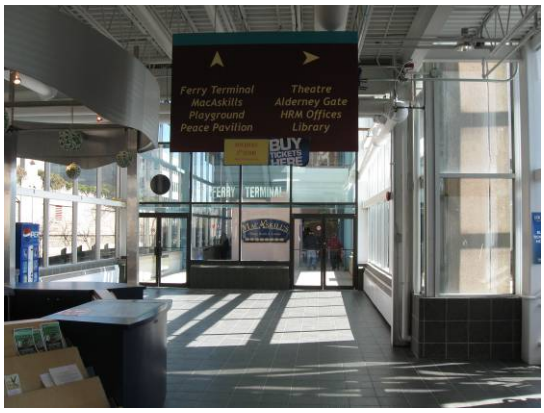


Ferry Terminal features, from upper left - jetty loading area and ramps to ferry, ramp to jetty, passenger security doors at entrance to ramp, passenger waiting area, convenience restaurant and fare collection area.

Long-term planning initiatives by both HRM and the Waterfront Development Corp. have identified this terminal and adjacent City lands as having re-development and intensification potential. Two other factors add to the attractiveness of the re-development option. The Justice Department has determined that the current 1960s law courts are out-dated and suggest amalgamation within a new building on that or another site. As well, the City wants to create a re-development plan for the road system at the Cogswell Interchange and Chebucto Landing waterfront area, north of the terminal.

With the Halifax Terminal's location in the centre of the downtown waterfront it appears that a new facility could become part of a comprehensive re-development plan for this area. Direct bus access to and from the terminal should become a priority to facilitate transit passenger movement. The terminal could become the first viewing 'portal' and harbour icon and be seamlessly integrated into a new building complex and the downtown community. A major glazed entry to the terminal could be planned for Lower Water Street that would lead commuter passengers and tourists directly to the transparent harbour viewing bridge and ferry loading facility.

3.3.2 DARTMOUTH



Interior of Dartmouth terminal looking south towards ferry entrance.

The Dartmouth Terminal, like the Halifax facility is invisible from the adjacent community and access is circuitous and unclear, whether by car, transit or by foot. The at-grade rail line that services the industries in Woodside and Eastern Passage effectively separates the terminal from the shore and requires that ferry passengers must climb up and over the tracks or cross at one of two controlled grade crossings. From Alderney Drive, the entry to the ferry terminal is shared with a lobby at street level and a glazed atrium. The lobby is a point of egress to and from the parking structure below and the mid-rise office building above. The atrium roof is two storeys above street level and is accessed by stairs and an escalator. It crosses the rail spur and then passengers can descend back to grade and enter the ferry ticket and waiting area. North of the terminal, and on the water side of the rail spur, a relatively new building, Alderney Landing, is connected to the terminal. This complex includes a farmers market, food service outlets, and an outdoor, covered event space and offices. A large surface car parking area is located on the north entry side of Alderney Landing, adjacent to the harbour, although daily rail movements cause delays in entering and leaving.

Pedestrian access from Alderney to the ferry is lengthy and convoluted.

Pedestrian access to the terminal as well as the bus-ferry interface with the terminal across the railway spur should be improved to reduce the difficulty, barriers and lengthy walk to the ferry as well as to intensify development along the water's edge.

3.3.3 WOODSIDE

Woodside terminal is the most recently constructed of the three ferry terminals and the broad area around the terminal has been identified in the Regional plan as an Urban Local Centre. While it is currently under-utilized, it is seeing growth in passenger use. The new community college and the

concentration of health care facilities is the foundation for the intensification of this area. The building has very little office or storage space and no meeting room for staff while the maintenance workshop is rudimentary and not overly useful even though this is the primary location for ferry maintenance activities. The employee area is very small and not functional.

Woodside Terminal

Access to the terminal building is excellent, with bus drop-off and pick-up adjacent to the main terminal entry and large scale car parking area within walking distance. There are traffic bottle-neck problems at the entry to the terminal area at Pleasant and Atlantic Streets affecting bus entry access to the site that will need to be addressed in order to minimize delays to buses especially in future as transit service to the terminal increases.

The opportunity at this location is for the terminal to become a catalyst in a large-scale, waterfront residential development that can take advantage of the ferry link to the Halifax downtown. The terminal building should also be expanded and enhanced through the construction of a larger workshop, expanded employee area and the addition of a supervisor office and meeting rooms.

3.3.4 MAINTENANCE OF TERMINALS

Site visits to the terminals indicated that while the buildings are in need of refurbishing, the ramps are in poor condition and there has been no maintenance program in place to monitor the condition of the bottom of the floating structure. While the surface treatment with asphalt gives the appearance of good condition, it masks the under-structure which has deteriorated. Regular inspections are needed which have been instituted by HRM.

The jetties are not a traditional jetty. In essence these are “barges” tethered at one end by the pivot joint on the land side and a “dolphin” (a fixed bollard) on the sea side (except at the Halifax terminal). There has been no inspection program for these although they are now part of regular facility inspection routine. Since the Halifax and Dartmouth barges have dry (concrete) ballast then there is a need to make sure they remain dry by regular inspections as any intake of water through the tank tops or vents could result in internal corrosion that will go undetected until failure. The Woodside barge has water ballast. Given the operational implications of a failure (ie. the need to shut down the terminal) of these two systems, there is a need to inspect them as a priority.

View looking east across railway crossing towards Ochterloney Street.

The **Halifax terminal** is ostensibly a building on a jetty. Currently the HRM Facilities Department maintains this structure which has been an ongoing issue of cracking, leaking and repairing. This will continue until the “jetty” aspects of the building are addressed by a qualified marine structural engineer and limits the ability to expand the building.

Woodside - An important issue at this terminal (now being addressed) was an underground waste oil tank which is directly adjacent to the sea wall. The tank was being emptied regularly but there was no information regarding how the tank was designed. All tanks that are underground and hold oil must be registered with the Province (Department of the Environment) and any tank that doesn't have protection, such as with a suppressed current or anode ground, must be replaced after 15 years. If the tank has protection then the only action required is that it be registered and that there is a documented maintenance program on the corrosion suppression system.[2] There had been no information available regarding the installation and protection of this tank. The tank is being replaced.

In the immediate term, all comprehensive assessment of the structural and mechanical condition of the buildings should be undertaken to identify needed repairs and improvements and to establish a repair budget.

3.4 Capital Program

The recently completed Metro Transit Five-Year Strategic Operations Plan recommended increasing the current peak-hour service on the Halifax-Woodside route to all day operation. In order to do this, one ferry would need to be acquired as an operations and maintenance spare since the three existing vessels would be fully utilized leaving no opportunity to undertake vessel maintenance without reducing route service frequencies. In addition to upgrading the service from peak hours only to all day operation, Metro Transit plans to increase peak hour service to a 15-minute frequency in view of the anticipated level of development in this area of Dartmouth. As a result, a further fifth vessel will be required.

Apart from the requirements for additional vessels, the Metro Transit Strategic Operations Plan also noted the need to prepare a long term plan to replace the aging ferry vessels.

Until recently, HRM's long term capital program had not included provision for either additional ferries, replacement of the existing three vessels or for the renewal or refurbishment of the three terminal structures. However, the 2010 – 2014 capital budget includes funds for the acquisition of one ferry to increase the Woodside service to all-day operation, as noted above as well as funds for refurbishing or upgrading the ferry terminals as identified in this study. Additional funds for a fifth vessel need to be earmarked although Metro Transit should undertake a detailed analysis of alternatives to the acquisition of a fifth vessel including the potential positive impact on vessel maintenance requirements of new modern vessels and selective temporary reductions in ferry service levels to undertake vessel maintenance. In the longer term (> 5years) funds to replace the three vessels need to be included.

3.5 Regulatory Environment

The operation of Ferries is subject to numerous regulations which stem from the Canada Shipping Act[3], the Canada Labour Code[4] and the Marine Transportation Security Act[5] which cover the following areas:

1. Canada Shipping Act: the safe operation of vessels; crewing requirements; training, competencies and certification; emergency equipment and situation management;

[2] Discussions with Scott Morash Department of the Environment 424-7002
[3] "The Canada Shipping Act", http://laws.justice.gc.ca/PDF/Statute/C/C-10.15.pdf
[4] "The Canada Labour Code", http://laws.justice.gc.ca/PDF/Statute/L/L-2.pdf
[5] "The Marine Transportation Security Act", http://laws.justice.gc.ca/PDF/Statute/M/M-0.8.pdf

requirements in construction, installation and inspection of marine equipment; and reporting;

2. The Canada Labour Code: the safety of employees and the workplace, along with management expectations;

3. The Marine Transportation Security Act: the security of vessels and supporting infrastructure in a manner that contributes to the security of strategic Port infrastructure; and

4. Domestic Ferry Security Regulations: specific regulations required for the operation of domestic ferry services in Canada.

The Canada Shipping Act, domestic ferry regulations and the Canada Labour Code have been part of the Canadian legislative framework for many years and there is an expectation by regulators that practices and processes are well-entrenched in any Ferry operation. In some cases, the Canada Labour Code recognizes the special nature of vessel operation and refers direction on these operations to Transport Canada through the Marine Safety Branch. It should be noted however that the Canada Labour Code continues to apply to all land based infrastructure of the ferry operations and the two acts regarding safety should be regarded as supportive of each other.

The most recent change to the Canada Shipping Act was related to Marine Personnel Regulations which provide direction on the crewing of passenger vessels. These regulations require a crew of six given the specific size (tonnage), power and numbers of passengers carried by the Halifax ferries. Recognizing the limited operations, and the fact that the maximum number of passengers is rarely experienced, Transport Canada has interpreted the regulations in favour Metro Transit and authorized a reduced crew size of four, with the understanding that should there be an expectation that if the number of passengers exceeds 300 then an additional crew member will be assigned. Although local Transport Canada management has the authority to interpret regulations in some circumstances it should be noted that these interpretations rest with the Manager of Record, and could be reinterpreted as new managers are appointed.

There is only one potential shift in regulations anticipated for small vessel operations in the near future. Currently large vessel operations are under the concept of “delegation” enabling third party or internal inspection to be undertaken. The role of Transport Canada under the delegation concept is to audit vessel owners’ safety management systems, or audit the third party execution of safety inspection and management. The shift that is currently being evaluated by Transport Canada is to enable “delegation” for small vessel operators as well.[6] Key to success in this delegation will be a “Safety Management System” that recognizes the context and simplicity of small vessel operations, while at the same time meets all of the management, documentation and internal audit that is expected in large vessel operations.

Current operations were assessed against the regulations governing them and were further substantiated through discussions with the local manager of Transport Canada Marine Inspection[7]. There were high levels of conformance to the regulations and supporting certifications for safety and equipment inspection. As well, the ferry staff were praised for their knowledge, dedication to providing a safe service and their cooperation with authorities in meeting the requirements. One area requiring attention was noted, that of conducting fire and boat drills to ensure that the crews maintain the necessary skills in emergency management and leadership. These drills are to be recorded, and the frequency is once every two weeks.[8] This has been implemented.

[6] Discussions – Rob Gair/Transport Canada Marine Safety Maritimes Region – 25 March 2010
[7] Conversation Mr. William Vickerie, Transport Canada, Marine Inspection – 19 Mar 2010
[8] “Fire and Boat Drill Regulations” - http://canadagazette.gc.ca/rp-pr/p1/2009/2009-10-10/html/reg4-eng.html

One other observation was made that management files have been developed to enable vessel and operations records to be kept, although written documentation is limited. However, the files should be collated into specific manuals such as: Operations; Maintenance; Safety and Security. These instructions should be supported by a Management Manual that indicates management's expectations for inspection, reporting and action in the event of some non-conformance to a regulation. Metro Transit is proceeding to develop a management manual as described.

In addition to growth, which will emphasize the need for management systems and manuals, there is every indication that these systems will be required in the near future. A Safety Management System complete with internal inspection, non-conformance tracking and management oversight is expected to become a requirement should the concept of delegation, as indicated in discussions with Transport Canada[9], be expanded to small vessel operators sometime after the completion of the pilot project in the spring of 2011.

3.6 Summary of Needs

3.6.1 FERRY OPERATION AND STAFFING

To become a recognized and popular commuter and tourist transportation system that maximizes and integrates the potential of the harbour, it is critical that the vessels are fast and efficient, the terminals easy to access and the facility design compelling and iconic. The opportunity exists to celebrate the appeal of water and the harbour and to position the ferry service as an attractive and effective part of the regional solution to highway congestion, as well as a green symbol of Halifax's future.

In view of recent changes to staffing levels and organization structure, the ferry operation appears properly staffed and with appropriate authorities and responsibilities in place. However, there is a need for a specific safety officer, as required by marine regulations, to be designated. Upon delegation, there will be a need for a formal documented safety program to be in place as well as a designated individual as the ferry system Safety Officer.

3.6.2 TERMINALS

The ferry infrastructure is aging and in need of reinvestment. The Halifax and Dartmouth terminals are, in particular, dated and unappealing. Beyond routine maintenance, there has been limited investment in the terminal buildings to refurbish or upgrade them in the 20 to 30 years since they were constructed. Based on site visits and a preliminary inspection, there appear to be maintenance issues with the jetties at the Halifax and Dartmouth terminals. Potentially, there are similar issues with the Woodside terminal. There also may be structural issues with the Halifax terminal structure related to its design as essentially a floating dock. A detailed structural and mechanical assessment of the Halifax and Dartmouth buildings should be undertaken to confirm needed repairs and establish a potential refurbishing budget.

At a minimum, and subject to a detailed assessment of the physical structure and mechanical systems, they will require a major investment to refurbish them and address any structural or mechanical issues.

[9] Discussions Rob Gair/Transport Canada Marine Safety Maritimes Region, 25 March 2010

We suggest that HRM/Metro Transit take the following action:

- A ramp inspection by a qualified inspector (under way) – the Ferry Maintenance Supervisor may be able to undertake the repair; however, it may be best to utilize an outside contractor; and

- A prioritized fix – replace the barges rather than attempt to repair (although any identified issue or immediate concern may require an interim repair).

3.6.3 VESSELS

Two of the three vessels, built in 1976-8, are approaching the end of their 35-year economic life. The third vessel is now 24 years old. Although the vessels are in good condition and could continue to provide reliable service for another 10 years, a long term plan to replace the three vessels is required beginning with an additional and potentially a fifth vessel, subject to an analysis of alternatives, for service expansion and as a maintenance spare within the next 5 years. Subject to future decisions regarding new and longer routes, the existing vessel design, with updated materials and technology, would be satisfactory for the existing services.

4. PEER REVIEW

To place the existing Halifax ferry operations into context and as a basis for identifying any trends in the industry, five urban ferry operations in North America were surveyed. These included: New York Waterways, Boston, Quebec City, Toronto and Vancouver. A summary of the results of the research undertaken is included in Appendix A.

After reviewing this material, observations were identified that reflect operations and best practice. To determine if the trends were unique to these operations further research was undertaken into the following urban ferry systems: New York Water Taxi; Bermuda; Amsterdam; Sydney Australia; Melbourne; San Francisco; Seattle and San Juan (Puerto Rico)[10]. Along with the detailed information gathered on the five peer reviews, these additional data points supported convergence of the observations as follows:

- The most successful operations follow these important premises: **the ferry is integral** to the transportation network; the size is established to reflect desired demand; and the speed represents the business case for best return;

- The value propositions for each ferry service is different, that being said; each urban ferry service representative stated that people just generally **like the boat ride**;

- Safe operations is not best practice, it is a given. Best practice is reflected in areas such as ease of intermodal connectivity, ticketing systems, and the provision of **on-board** and **terminal services**;

- The New York Waterways is a large non-funded and profitable operation. Although their market may be very large, the fact that there are no subsidies, and competition, means that they focus on bottom-line profit which can only be achieved from best practice. Areas of significance in approach are that all their vessels are front end loading, there has been much effort taken to work on the vessel/terminal interface, terminals are regarded as infrastructure worth investing in amenities for commuters, and technology and training are essential to safe, efficient and effective operations. This service actually runs their own bus service in Manhattan designed to provide specific runs that connect to commuter preferred destinations. What is clear is that the New York Waterways has built a **service that respects the needs of the commuter** from the start of the commute to their final destination;

- All new urban ferry systems are moving to **front end loading**. This is primarily to remove the ramp mechanisms from the vessel eliminating a high maintenance load to the shore side where it is not subjected to the same weather and enables easier access for maintainers. In addition, front end loading provides quick loading and off-loading of passengers;

- For services that include multiple runs of varying distances the operators have not limited vessel choice to a single vessel type, or speed. Generally shorter distances use vessels that transit from 7 to 12 knots, and anything further than 2 or 3 nautical miles the speed jumps to in excess of 22 knots. The combination of vessels enables **greater flexibility in servicing multiple runs**;

- Taking a lead on recent investment of the Quebec/Levis ferry service – there has been great attention to **commuter amenities**. This run is not much greater in time than the

[10] The data for this work was not recorded, but used simply to further substantiate the comments.

Halifax Dartmouth run, but the ferry is more like a bistro than a bus. Services include vending machines, bistro tables, information video displays, tourism booths and wireless internet connection. These changes are not unlike what is happening to other operations where the comfort and the needs of commuters are being looked at much more carefully. A common direction of all urban ferry services is to provide wireless connectivity;

- Maintenance is undertaken differently in each of the operations. Generally, however, all but one service, contracts out dockings. New York Waterways is the exception where they own their own docking facility. The only way in which the return on investment (ROI) can work is by keeping that dock busy – and New York Waterways is the only service with adequate numbers of vessels to achieve this, thereby enabling them to have a comprehensive maintenance philosophy which is tied inextricably to operations where they control all variables. The result is **high utilization and the ability to maintain schedule**. This service also has a spare vessel that shifts into service to address vessel breakdowns; and

- There are two significant financial concerns in operating ferries – the first is that **fuel costs** as they rise can have a dramatic effect on the bottom line as fares do not tend to increase at the same rate, and second the need to **re-capitalize** or add new infrastructure.

Based on the peer review, the following key trends and issues were identified for consideration in the future Halifax ferry operation:

1. Utilizing the ferry system to its fullest potential as an alternative to auto use and to avoid the need for a 3rd bridge;

2. Front passenger loading for future ferry design;

3. Selecting a future vessel design that provides flexibility in terms of speed; and

4. Utilizing ferry terminals to their fullest as more than just a location for users to access the ferries.

For application in the Halifax ferry environment, the main variation from current practice, namely front end loading and the impact on terminal design, and vessel speed should be the subject of further study and analysis at a future date.

5. FUTURE STRATEGIC OPERATIONS PLAN

This section outlines a future improvement strategy and operations plan for the ferry service including a discussion of vessel design options and terminal design concepts. It is based on the assessment of the ferry service summarized in the previous sections and HRM's long term transportation goal to increase transit use and avoid the need for a 3rd crossing of the harbour. In view of immediate needs as well as longer term issues related to vessels and terminals, a short term (5 year) and a longer term (5 to 15 year) strategy is outlined for the ferry system.

5.1 Vision for Ferry Service

Ultimately the overarching business goal of public transportation is to increase ridership in all modes of transportation. For the ferry service, a re-statement of its value within HRM's transportation system is useful for positioning the strategy ferry operations plan. The following role and vision for the ferry system was developed through discussions with Metro Transit staff and encompasses the following:

- Developments in transportation should provide an opportunity to improve **integration of all modes**. To the commuter, the trip should be seamless from one mode to another;
- The commute should be **convenient** and not add to frustration. As the mode and integration points are developed, the value to the commuter should be apparent. For example the transition between vehicles or modes should be planned to **minimize wait times**, and the full use of facilities should be reflective of providing value-add services to the commuter (e.g. shopping, child care, medical);
- Investing in the ferry should take advantage of **moving the brand forward** so that it reflects the contemporary attitudes of the commuters – examples may include onboard and terminal comfort and services, leveraging the use of technology, reflective of the growing concern for the environment;
- The replacement/addition of vessels should reflect **"smart" decisions** – technology, interconnectivity of modes, commuter information, ticketing technology;
- Investment in ferry development should reflect opportunities to develop the **"hubs"** of the hub and spoke models of intermodal connectivity – for example land use, housing and retail combinations. Creating demand through development of housing in the immediate area; and
- Progress should reflect **innovative partnerships** – leveraging the land developers to provide the necessary capital to renovate, invest and innovate.

5.2 Operations and Staffing

Operations

The key influence in ferry operations within the next five years will be the planned increase in Woodside service to all-day and evenings Monday to Saturday and to 15 minutes in peak hours. This service increase is subject to the delivery of two additional vessels as described previously. Until then, the Woodside ferry would continue to operate every 30 minutes during peak hours Monday to Friday while the Halifax-Dartmouth services would continue as at present.

Beyond the five-year term, additional ferry services such as to Bedford and Eastern Passage may be added which could impact vessel design decisions, ferry operations as well as changes to the design of the terminals themselves.

Staffing

The crewing levels for the vessels are appropriate and consistent with the current regulations particularly in terms of 4-person crews, on the basis of an exemption granted by Transport Canada personnel. However, the exemption could be potentially subject to future legislative changes. They could also be subject to any future change in Transport Canada personnel who could initiate a change in this understanding. Accordingly, this is an issue that Metro Transit/HRM must monitor closely through continued contact with Transport Canada.

For the increased Woodside service, additional staff will be required both for the operation of the ferry as well for the operation of the ferry terminal. An estimated total of ten to twelve staff (eight to ten for vessel operation and two for terminal operations) would be required. Depending on final service schedules and hours of operation, an additional maintenance staff person may be required to handle increased vessel maintenance.

Additional staff for vessel operation and maintenance and terminal operations will be required when other routes are added and service levels increase in the longer term. The specific staffing needs for these services would be defined at the time new services are proposed.

5.3 Future Vessel Design Options

The choice of a future vessel design will need to reflect the services operated as well as meet the goal of increased ferry use through enhanced customer appeal. The acquisition of one to two vessels to upgrade the Woodside service is a priority. Also, HRM needs to adopt a long term plan to replace the existing ferries and to consider the needs of potential future service and route options and the influence they may have on any future vessel design.

The existing ferry service characteristics are well-established and the current vessels are well-suited to this operation. No change in the current route patterns or operating characteristics are envisioned such that any replacement vessel could be of a similar design but incorporate updated materials and mechanical technology to reduce weight, improve maintainability and enhance the customer experience and appreciation for the ferry operation. However, future service and route options beyond the existing limits will have different operating characteristics (length, timing) compared to the current services. As a result, it is timely to consider the design options for future vessels in terms of flexibility to handle future routes while incorporating any design changes to improve operations and enhance the customer experience on board.

The case study (peer review) of selected other ferry operations in Canada and the United States outlined in section 4 identified three key vessel-related characteristics that should be considered in any future vessel design:

1. **Higher speed** for operational flexibility;

2. **Front loading/unloading**, compared to the current side-loading; and

3. Advanced on-board **customer amenities** such as wi-fi, better seating and décor and snack service.

These design issues are discussed below.

5.3.1 SPEED

Ferry (and transit) operators have put a great deal of resources into new technologies to reduce engine emissions, increase efficiency and suppress wake, and especially to increase boat speed. But for reasonably short routes, which are the most competitive candidates for urban ferry routes, speed is not an issue. Also, higher speeds increase required propulsion power and thereby operating costs.

All costs associated with engines - initial cost, maintenance and operation - increase roughly with power. Therefore the "right" speed is generally the minimum speed that offers acceptable service. For the relatively short 5.6 mile route between Berkeley and San Francisco, for example, there is little incentive to reduce transit time to much less than 20 minutes. The operating speed of the new service is about 25 knots.[11]

A commuter ferry has another issue affecting optimum speed - vessel productivity. Though all vessel designs have to trade cost of speed versus capacity, there is about a two hour or so band of time each day, each way, during which there is substantial passenger demand. The ferry has to be fast enough to make as many trips as possible during the rush. If a run is fairly long, this requires substantial speed.

Apart from on-board customer amenities and loading procedures, the key issue to be considered in developing a vessel design to replace the existing fleet and for new additional vessels, is speed. From the “HRM by Design” report, other potential routes were identified – none of which could be effectively serviced by the current vessels. The table below compares the distance time of the commute by Ferry and Car – distances were measured by road or by water taking the most direct routes. Each of the other speeds on the table represents different technologies. The speed options are derived from the experience in other jurisdictions as well as discussions with Metro Transit ferry staff. The current 7 knot ferry is not on this list other than for servicing the Dartmouth/Halifax/Woodside routes. Essentially, the distance able to be travelled at each speed would be:

- 7 to 12 knots - current routes – Halifax/Dartmouth, Woodside
- 17 knots - Shannon Park and Purcell’s Cove
- Above 17 knots - all other identified routes

[11] San Francisco Bay Area Water Emergency Transportation Authority new vessel information pamphlet - http://www.watertransit.org/files/FullSpeedAhead/2008/FSAWinter2008.pdf

Exhibit 2: Summary of Vessel Maximum Speed and Range

From Halifax to:	Transit Distance (nm)*	Time @ 7 knots	Time @ 17 knots	Time @ 23 knots	Time @ 30 knots	Road Distance (km)*	Time to Commute by Car (min)**
Dartmouth (7 knots only)	0.9	12				3.8	11 + bridge
Woodside (7 knots only)	1.1	13.25				7.6	22 + bridge
Eastern Passage	5.1	49	22	18	14	9.0	26 + bridge
Shannon Park	2.2	23	12	10	8.5	6.0	17 + bridge
Rockingham (China Town)	4.2	40	19	15	12.5	9.4	25
Bedford	6.0	55	26	20	16	13.9	40
Purcell's Cove	3.3	32	16	13	10.5	10.7	31 + rotary

*Distances estimated using Google Mapping http://www.daftlogic.com/projects-google-maps-distance-calculator.htm and reflect distances to the Halifax Ferry Terminal. Four minutes were added to each run to represent reduced speed of manoeuvring. Times do not take into account variations due to tide, conflicting harbour traffic, and/or weather. The times for Purcell's Cove are considered low given that transit for this route will take the vessels into more open seas where swell will be a consideration in transit time.

**Average speed of vehicle during peak commute times used was 20 km/h

The 7 knot Option

This comparison is important as it emphasizes the need to understand the purpose and intended range of the replacement vessels. If there were only a need to replace the vessels on the current routes then this would lead to the recommendation to use the same, or similar, vessel design as is currently providing the service. This design already reflects the needs of this route as these requirements were considered in its development. The design is simple, robust, strong and capable. That being said, this design could be improved upon for maintenance purposes, providing for the changing needs of passengers (amenities), reflecting the brand through an updated design outline and in providing for differences in the loading/off-loading of the vessels.

Exhibit 3: New York Waterways 12 knot Ferry

If there were any intent at all to expand the routes provided, then this design has already reached its limit as an effective option. Some work has been done by the ferry management team to see if it

would be possible to increase the working speed of the vessels. Although the drive train manufacturers advise that 12 knots could be reached, this is not supported by the design architects.[12] Exhibit 3 is a 12 knot vessel currently in service between New Jersey and Manhattan. The design is a simple "crew" boat mono hull configuration, using front end loading. Carrying capacity is 250.

The 17 knot Option

There are various technical options for designs of this speed – either mono hulls or catamarans. Typically propulsion systems are propellers, which provide for ease of operation and good thrust. An option to use water jets is also possible, which would provide for increased manoeuvrability (e.g. ability to stop vessel in one boat length or less).

Of note is that the research did not find any examples of urban ferries that operate at a range of speed between 16 and 18 knots. Urban ferry systems use vessels between 7 and 12 knots, and then jump to speeds in excess of 22 knots. That being said, work boats such as the one illustrated in Exhibit 4 provide a vessel option but would have to be modified to transport the number of commuters required. The vessel shown transports 15 technicians and two crew to windmills in the North Sea.

Exhibit 4: Windcat Built by AF Theriault, Nova Scotia

The construction is aluminum and the vessel is powered by conventional diesel engines, sized to the particular loading. The drive train rotates propellers which have been specifically designed for maximum speed and thrust. As the number of passengers increase, so will the size of the propulsion system. As a point the current hulls are already maxed out with the propulsion plant fitted. Vessel size would need to increase, and design would naturally grow to compensate for increased number of passengers and size of propulsion system – in order that the 16 knots speed is achieved. This workboat is 57 feet long, 20 feet in beam with a draft of 6 feet 5 inches. This vessel is one of 21 which have been servicing the North Sea for ten years.

The 24 knot Option

This option includes a speed range up to 28 knots. The vessel examples are typically of aluminum construction; however some are constructed of advanced composites (sandwich foam/fibre combinations, or carbon fibre) which reflect tremendous strength to weight ratios. These vessels can be either mono-hulls or catamarans and their 28 knot speed range is based on the upper level of propeller use (with the exception of surface piercing counter-rotation propellers which have achieved greater speeds than 28 knots[13]).

Exhibit 5: New York Water Taxi - 149 Passenger 26 knots

[12] Telecon Gair IBI Team/Thompson EYE Naval Architects
[13] Counter rotational propellers is a technology that reduces the negative effects of cavitation and boosts the performance of the propeller. These are used in high performance racing vessels and are now being considered for other applications.

What is important to note is that regardless of the hull configuration (one or two hulls) there is a need to increase speed past the "hump" into the optimal design speed. Efficiency up to this point is extremely poor and, in the case of catamarans, produces a wake wash which can be disruptive to small vessels operating in the immediate area and, depending on the shoreline conditions, could accelerate erosion.

One advantage of a multi-hull design is more flexibility in the "length to number of passengers" ratio which tends to be very good given the beam of such vessels. To take full advantage of the operating efficiency of a mono-hull, the design needs to be long and slender which will introduce other challenges in areas such as loading capacity. It should be noted that the current Metro Transit vessels, which are mono hulls, are not designed for speed efficiency but rather to take advantage of the beam to maximize seating capacity. An equivalent-beam multi-hull design would be comparatively more efficient.

The vessel pictured in Exhibit 5 has a speed of 26 knots and operates as a New York Water Taxi. It is constructed of aluminum and can seat 149 passengers[14]. This service is augmented by smaller vessels seating 74 passengers and operating at 24 knots. The photo of the vessel clearly shows the brand image that connects instantly to the image of the New York City "Checker" cab. Similarly, with Metro Transit the ferry carries the transit corporate brand which links it with the other transit services.

Exhibit 6: Red Funnel 38 knot 190 Passenger Vessel

The 30 knot Option

Vessels that reach speeds in excess of 30 knots tend to be selected to meet specific applications where minimizing travel time is essential. The cost associated with their operation, when designed to optimize speed in excess of 30 knots, tends to be comparable with vessels of 24 knots although there are higher demands on the maintenance of the vessel's hull and equipment. Notwithstanding that, many harbours use vessels of higher speed. The value, of course, of higher speed operation is the ability to have a greater frequency of runs over the same distance compared to a slower vessel, enabling scheduling flexibility over shorter runs.

The Red Funnel Line, working the route between Southampton and the Isle of Wight in the United Kingdom, uses three turbo-jet ferries with speeds in excess of 36 knots to travel the 10 mile route[15]. Exhibit 6 shows a 190 passenger ferry which is relevant given the difficult weather conditions that these vessels are subjected to in the Solent which is not unlike Halifax Harbour. This service is a key business link providing daily commuter service between the island and Southampton.

Exhibit 7: FoilCat 400 passenger 50 knot Vessel

[14] Note that many urban ferry systems in the US are stated to be 149 passengers because of the classification by the US Coast Guard which reduces the cost significantly in production oversight and inspection, and not because of the market demand.
[15] http://en.wikipedia.org/wiki/Isle_of_Wight

It is in this category that many harbours are witnessing innovation in naval architecture evident in Exhibit 7 of the high speed ferry in Hong Kong harbour – moving passengers at speeds in excess of 45 knots.

5.3.2 HULL DESIGN

In consideration of vessel speed and operating efficiency, the choice of vessel hull design is of primary importance.

Although catamarans have gained in popularity for ferries, there may still be conditions in which other solutions are superior. The benefit of a catamaran is that the wave-making drag of a boat is roughly related to the beam-squared, so slender hulls are advantageous. However, the minimum beam of a mono hull is limited by stability concerns. The catamaran solves this problem with two widely-separated hulls providing the beam needed for stability. However, there is also frictional drag, due simply to the amount of wetted area, and here two slender hulls generally have more wetted area for the same weight than one broader one. As a result, catamarans are not necessarily better than mono hulls with regard to resistance, especially compared with a slender mono hull. A catamaran is better than the “equivalent” mono hull assuming the two hulls are “squished” into one sideways, but quite inferior if they are squished into one lengthwise. They also have an advantage of greater deck area per weight, but more structural weight per payload weight, and therefore tend to cost more per unit of structural weight.

The performance loss at the non-optimum speed of hull design can be significant – one can’t assume the best fast boat is the best slower boat. This is especially important for high speed craft, which can be very uneconomical at low speeds – not only are the hull forms wrong, and have tremendous wave-making at low speeds, but the propulsion systems are usually not optimum as well. Low speed propulsion usually is optimized by large diameter, fully submerged propellers; whereas high speed craft often have water jets (the change of propulsion method also requires changes in hull design).

Per/mile fuel consumption varies by the square of speed, so the 25-knot boat will burn about 93% more fuel per mile than its 18-knot counterpart (neglecting the increased weight of the larger engines) over the same route. This simple solution - slowing down the boat - allows low power engines that will tolerate emissions controls without as much added weight or cost. That is not to say “don’t go fast” but rather go the speed required to meet the needs of the transportation service.

5.3.3 ENGINE TECHNOLOGY

Ferry Transportation Authorities have directed considerable resources at new technologies to reduce emissions from ferry propulsion. Compared to the existing base of commercial and recreational marine diesels in daily service without any emission controls, this may be seen as a kind of drop-in-the-bucket environmental tokenism. Nevertheless, a clear objective for the Metro Transit ferry operation is that it be seen as environmentally clean by having a clean exhaust and a minimal wake. For example, currently available marine Roll-Royce Bergen engines meet stringent emissions standards without exhaust gas treatment, and have been installed in a new “green” Norwegian ferry.

5.3.4 FRONT END PASSENGER LOADING

Front-end passenger loading, as noted in the peer review, is common in other ferry applications. Although it represents a significant departure from current Metro Transit practice, it merits consideration in the context of future new ferry services and the potential adoption of a new ferry design for those services. The rationale for this approach is outlined below.

The front end loading vessel operation is a simple manoeuvre that would require some minor training for ships' Masters. It would require changes to the design of the terminals and jetties, or the construction of additional slips/jetties. Although there are challenges regarding the need to ensure that the doors can meet rigorous water ingress standards, this has not deterred other ferry operations from moving forward in this direction. The value of this approach has three important features that can outweigh this issue:

1. All ramp components are land side and are not subjected to the same weather impact as with vessel side ramps – thereby reducing the maintenance load and providing easier access;

2. It introduces enhanced flexibility of routes as the terminal/vessel connection is simple and easily put into place[16]; and

3. It reduces the shore side infrastructure imposed from side loading which requires side berths/jetties to gain access. In the current configuration the ramp to the floating pontoon is constantly under stress from weather and sea motion. In a front-end loading configuration, the ramp is subjected to these stresses only when it is in the load position across the bow of the vessel.

Exhibit 8: Front End Loading of New York Waterways Vessel

The benefits of front end loading include:

- Elimination of the issues associated with the current ramp systems which are subjected to continuous working forces, creating issues of maintenance, safety and potential operational stoppage;

- Reduced maintenance demand of the ramps as they would only be subjected to the loads when in the down position, loading and off-loading passengers;

- Improved maintenance access in that they are shore side and available 24/7, whereas the current ramps which are on the vessels are only available when the ferries are available for maintenance; and

- Provision for an easy interface to test various routes without a commitment to capital investment.

[16] New York Water Taxi has no covered terminals, and has been known to shift terminal points quickly in response to failed routes to routes with more promise.

5.3.5 CUSTOMER AMENITIES

Ferries also can offer amenities not often feasible on other transportation modes (including, of course, a pleasant boat ride). Even if food service is not provided on board, most ferries can allow people to bring on food, provide snack service at or near the terminal, and can provide space and a quiet area to consume food. Restrooms may be required on ferries especially as runs become longer. Spacious interiors are beneficial for some persons with disabilities, and open deck space (and benign weather) can allow riders to bring bicycles or companion animals on board, which are important issues for some riders.

The key challenge is to determine those features that contribute to a high enough level of service to attract new patrons which may produce surprises. Travellers eventually decide on modes based more on disutility (negative factors) than positive ones.

5.3.6 MAINTENANCE OF VESSELS

In future, the vessels should emphasize efficient maintenance capability. Specifically, they should incorporate access panels for easy removal and repair by replacement of critical components, for example main engines and generators. This approach would need to be supported by shore-side infrastructure features such as:

- A jetty for maintenance should be provided to ensure that there is ease of access of vehicles for the removal/installation of engines and other large pieces of equipment;
- A jetty crane of adequate capacity and that it be mobile to allow for flexibility in where the vessel is supported; and
- A maintenance shop designed to enable the maintenance team to undertake most repairs, with the exception of those items that should be undertaken by the original equipment manufacturer (OEM).

Maintenance shop space requirements will be dependent on the tasks undertaken by the maintenance staff, and the number of vessels being maintained. These tasks should be analyzed as part of the design of the vessel and, along with the design recommendations, there will be an opportunity to better understand the spatial needs.

Dry Dock

The alternative to “in situ” maintenance of the vessels, as is currently done, would be the construction of a formal, separate “dry dock” where maintenance work is performed. The capital and on-going maintenance cost associated with this option is difficult to justify either based on the experience in the peer systems, who do not have separate dry-docks, or for a small fleet such as Metro Transit’s. The cost of the dock is unlikely to be either offset by any maintenance time or cost savings or justified on the basis of the amount of time that vessels may use the dry-dock, which would be limited, given the specifics of vessel maintenance. Instead, it is the consulting team’s view that most maintenance can continue to be done shore-side without going to a dry-dock especially once a fourth vessel is acquired to improve the availability of vessels for maintenance. The only time a dry-dock would be required is for the mandatory overhaul requirement every three years but, again, with a fourth vessel this would provide sufficient back-up while a vessel is away for the overhaul thereby minimizing the need for a local dry-dock.

5.3.7 SUMMARY – VESSEL DESIGN

As can be seen from the foregoing discussion, there are a range of alternative vessel designs in use by other ferry operations today each with their own advantages. However, those designs are largely dependent on the service or route application.

The approach of passenger loading at the ends of the vessel (front or rear) would, for example, be a significant departure from current Metro Transit practice and would impact, to some degree, on ferry operations but more specifically, on terminal and jetty design. Selecting a suitable vessel design, either in terms of speed, hull profile or passenger loading, is beyond the scope of this report as it should entail more extensive analysis of future ferry needs and operations particularly as the specifics of future new ferry routes becomes better defined. Accordingly, Metro Transit should conduct more extensive analysis of the vessel design options and their impact within the next five years in preparation for acquiring either replacement vessels for the current fleet or vessels for new services.

5.4 Terminals

As noted previously, the ferry terminals are dated and in need of refurbishing and potentially, significant structural repair, particularly the Halifax building. Therefore, the opportunity exists to elevate the image of the ferry both in terms of the vessels themselves but also in terms of the terminal buildings to emphasize the importance of the ferries. The design of the ferry terminals can attract new users to the ferries and can also, because of their location on the waterfront, serve as a tourist attraction if their design is bold and imaginative. As part of a longer term strategy, the existing terminal buildings should be replaced by modern, attractive buildings that emphasize the harbour position of the terminals and their tourist potential, as well as enhancing the appeal of the ferry to regular, resident commuters.

Given the planning process and funding requirements involved, a major replacement of the terminal buildings would be a long term strategy. In the short term, the strategy would emphasize refurbishing the buildings to last up to 10 years while plans are finalized to replace the buildings.

5.4.1 SHORT TERM IMPROVEMENTS

Short term improvements to the terminal buildings would be designed to extend the life of the facilities for up to 10 years while plans for reconstruction are finalized and would concentrate on updating the décor. This would include repainting into contemporary, brighter, neutral colours, repair and replacement of worn components (doors, windows), adding or updating seating and lighting. Also, the opportunity could be taken to use the terminal venues as modern information centres for the benefit of both transit/ferry users and tourists by the installation of large HD screen displays. They would offer the following benefits:

- Provide advertising space to generate revenue for the Ferry Service as well as become a community information forum;
- Provide a forum/platform to market the Ferry Service itself, its plans and vision for the future, schedules, special events, even video streams from ferry cabin mounted cameras to show waiting passengers views from the bridge;
- Through the prominent use of hi-tech equipment, position the Ferry Service as a future / forward thinking group or element of HRM; and

- Locate the screens so that passengers waiting and flowing on and off the ferries would see them.

If purchased, the screens could be moved and re-installed in the new facilities to serve the same marketing/information purposes.

As well, the interior of the terminals could be re-structured from a fare collection standpoint to create "common" spaces where those not intending to use the ferries could access the terminal to view the harbour.

The estimated cost for refurbishing the Halifax and Dartmouth terminals is $3.0 to $4.0 million per building, depending on the extent of work undertaken.

5.4.2 LONGER TERM STRATEGY

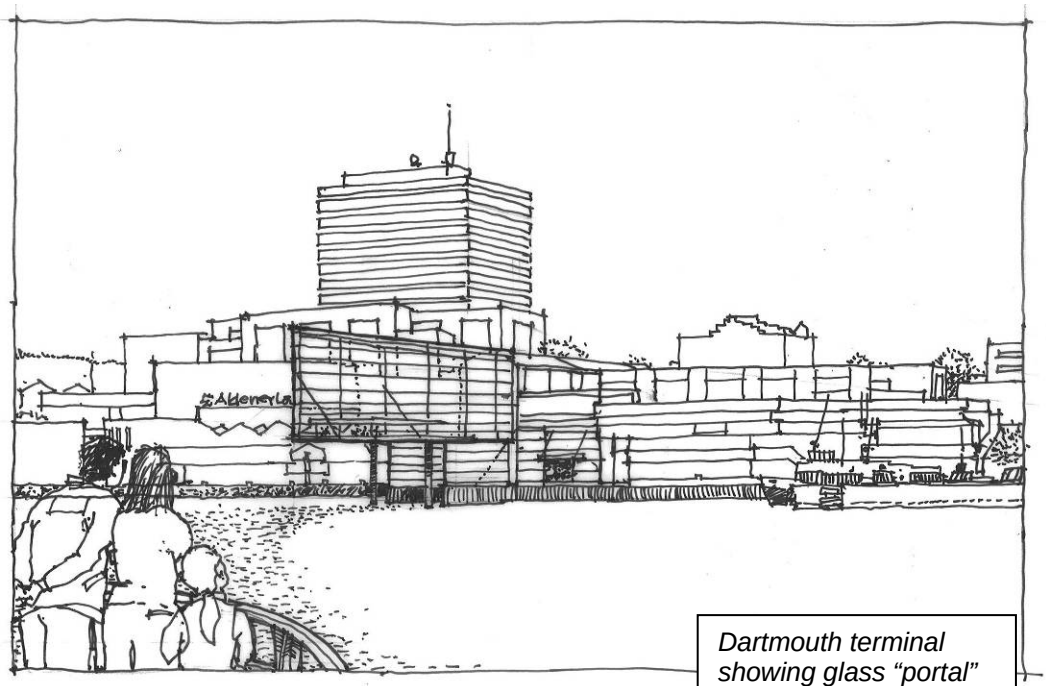
As an example of the potential for changing the imagine of the ferry service and the terminals, concept sketches for new terminal designs (Exhibits 9, 10 and 11) are offered as the basis for a long term strategy for revitalizing the ferry system and raising its profile in the community. The design concept utilizes a common design element of a glassed observation area protruding out into the harbour visible from the water. These glowing "portals" would welcome visitors and commuters to the diverse city precincts, and connect the ferry system to the community it serves. The glass observation decks suspended over the water would attract tourists to view the harbour and the city. This visual theme could be applied to each of the three existing terminals as well as any new terminals.

Each of the terminals would have a common design "theme" featuring, for example, a transparent viewing "portal". For the **Dartmouth Terminal**, in particular, this "portal" could be added to the water's end of the atrium, to project out over the water, as illustrated in Exhibit 9. This would re-align the ferry loading underneath it, north from its current position, closer to a potential parking structure that could be located in the north parking area. The roof level of the parking structure would be at the same elevation as a bridge over the rail spur so that cars and bus from Ochterloney Street could have unimpeded access to the parking structure. From this vehicle turn around, ferry passengers and tourists could enter a glazed, covered walkway at that parking structure elevation and walk to the realigned terminal's upper level. From there they could walk out to the end of the projecting harbour viewing area to have a coffee, look at the activity and the downtown across the water and wait for their ferry.

The three-storey building that is currently above the ferry ticket, waiting and loading area could be leased, or replaced with a larger, waterfront, residential development that could be accessed from the park and street to the south, as well as from the terminal and Alderney Drive. The terminal could become the second viewing 'portal' and harbour icon and be seamlessly integrated into this new building complex and the downtown Dartmouth community.

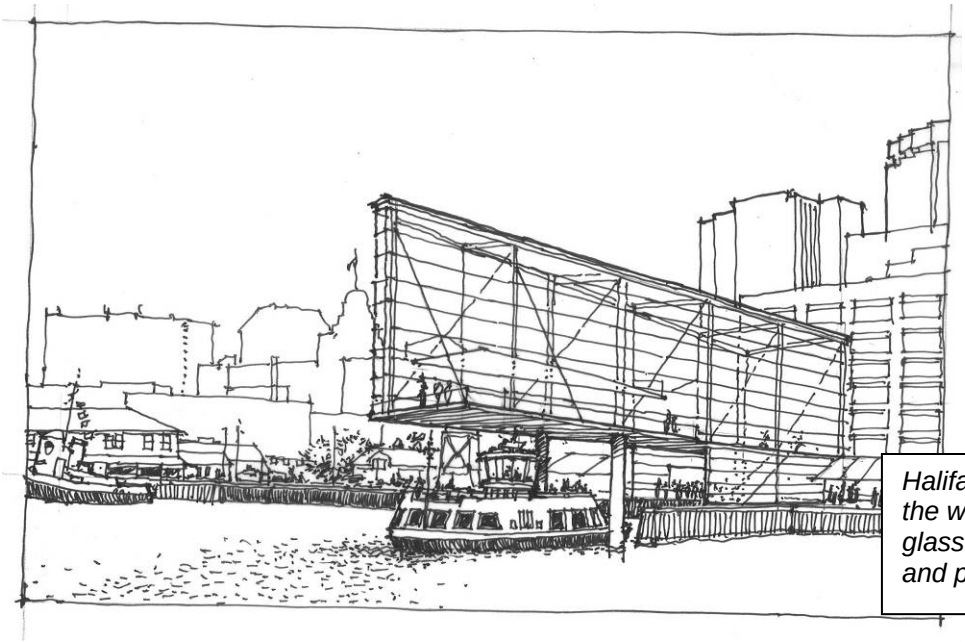
A similar approach could be followed for the **Halifax Terminal**, as depicted in Exhibit 10, as well as the Woodside Terminal, Exhibit 11. Construction of the new terminals could be part of other public or private sector initiatives to enhance the vision of the harbourfront.

Exhibit 9: Concept Design Applied to Dartmouth Terminal

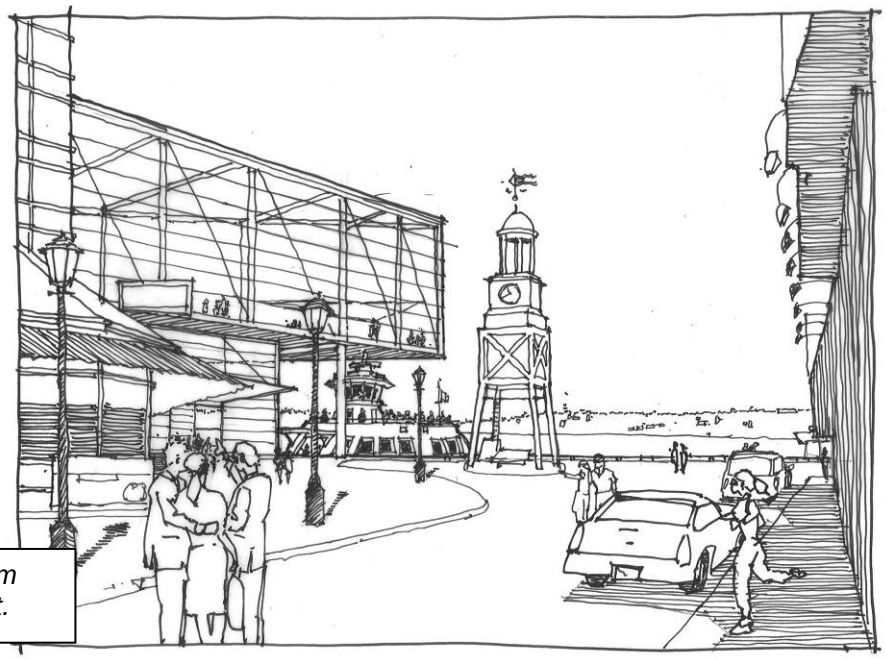


Dartmouth terminal showing glass "portal" observation deck.

Exhibit 10: Concept Design for Halifax Terminal

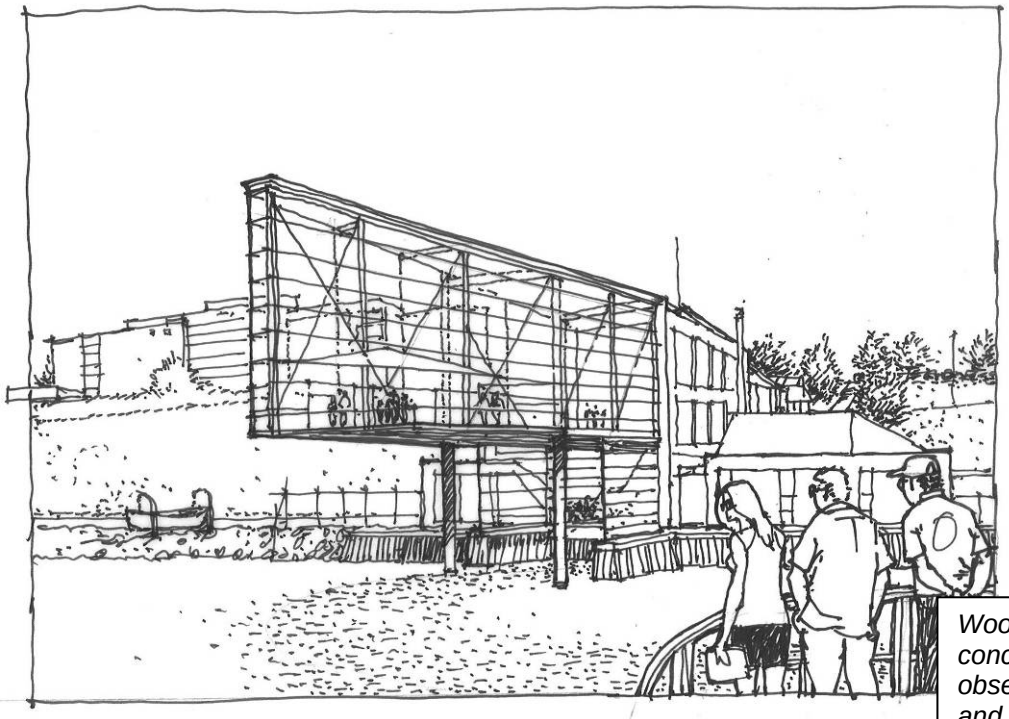


Halifax terminal from the water showing the glass observation deck and portal to the city.



Halifax terminal from Lower Water Street.

Exhibit 11: Concept Design for Woodside Terminal



Woodside Terminal concept with glass observation deck and level connection to parking area.

5.5 Conclusions

The foregoing review of Halifax's ferry service indicates that the image of the Halifax ferry, while iconoclastic, is dated and is in need of revitalization. With greater emphasis being placed on the role of the ferries as a key element of HRM's transportation plan to increase transit use and avoid the need for a 3rd harbour crossing, now is the time to consider giving Halifax's historic ferry service a modern and appealing new look through new vessels and new terminal designs. Revitalizing the image of the service presents an opportunity to broaden the ferry ridership base by:

- Making it a 'cool' **alternative** to increasingly congested highways for commuters to and from the downtown;
- Confirming it as environmentally-friendly, as **'Green Transit'**;
- Developing the **tourism** potential and elements of the ferry system;
- **Transforming** terminals into harbour 'Portals' that are part of a recognizable **'Brand'**; and
- **Leveraging** the terminal locations and passenger flow to support and become a catalyst for adjacent Transit-Oriented Development (TOD) opportunities.

The following are the key conclusions regarding the system's future strategy:

1. The ferry system plays an important role in the public transportation system in the Halifax Regional Municipality. Ferry ridership is projected to increase 1.75 million by 2014;

2. The ferry service's management resources and organization structure have been augmented within the past two years as have staffing (crewing) levels and are now satisfactory and meet current legislative requirements. However, the current crewing levels of four persons per vessel are dependent on continued Transport Canada managerial approval. Metro Transit needs to ensure that the approval continues under any future staff changes within Transport Canada;

3. The existing three ferry vessels are well-maintained and in good condition and can be expected to continue to provide reliable service for a further 10 years. However, HRM should adopt a long-term plan to replace them by 2025;

4. The ferry terminals are dated and in need of refurbishing and modernization. Experience in other ferry operations as well as from an urban planning viewpoint clearly indicate that the ferry terminals, themselves, present a unique opportunity to not only enhance the appeal of using the ferry system but also to play a significant role in raising the tourism profile of the harbour. Therefore, together, new ferries and new terminals will provide the ferry service with a new image. Metro Transit/HRM should commence a planning, revitalization and design process to replace the terminal buildings, initially in Halifax and Dartmouth, with new facilities that will make them a "portal" to the harbour;

5. Metro Transit's Five-Year Strategic Operations Plan calls for upgrading the Woodside ferry service to all day, six day-a-week service as well as 15 minute frequency in peak hours as soon as possible. A fourth vessel, as a minimum, is needed in order to do so and is a priority. A fifth vessel may also be required as a maintenance and operations

spare although Metro Transit should undertake a detailed analysis of the impact of new vessel designs on maintenance requirements and service levels as an alternative to the need for a fifth vessel;

6. For the increased Woodside service, additional staff, estimated at 10 to 12 people, will be required; and

7. The design and selection of additional and replacement vessels must consider two different operating conditions – existing operating area; and, future routes outside the existing operating area. Up to two vessels are required as soon as possible to upgrade the Woodside service and provide a maintenance and operations spare for the fleet. Potential new routes, on the other hand, would extend the range of the ferry operation well beyond the existing compact area of operation and therefore potentially dictate a different vessel design. As a result, there appear to be two different vessel needs:

    a. A vessel suited to the needs of the existing service area; and

    b. Vessels more suited to potential new, longer distance services.

A new vessel suited to the needs of the **current service** could be of general similar design to the existing vessels but incorporating modern materials to reduce weight, improve reliability, reduce maintenance costs and add features to enhance customer appeal. New vessels could incorporate some potential for higher speed.

Vessels for **future longer distance services** may need to be of a radically different design with a new hull design, higher speed and potentially end-loading for passengers. However, determining the design features and specifications for these vessels and how to accommodate them with regard to terminal designs and ferry operations, requires further detailed study and analysis and is highly dependent on the needs associated with new routes. As part of a **longer term strategy** for the ferry service, Metro Transit should begin this design selection process once future service needs become more defined.

In the **short term**, Metro Transit should proceed to purchase a new fourth vessel with similar but improved characteristics for the existing services. The specific design details would form a separate exercise guided by Metro Transit ferry staff in consultation with Transport Canada staff and appropriate marine engineers, and should commence immediately to ensure the earliest possible delivery of the new vessel. It is anticipated that it could take two years to design and construct a new vessel.

Finally, this ferry strategic operations plan should be updated within five years.

6. RECOMMENDATIONS

Short term – 2010 to 2014

It is recommended that:

1. The Metro Transit Strategic Ferry Operations Plan be adopted in principle as the basis for a 10-year plan for renewing the Ferry operation;

2. New design specifications for up to two additional vessels for the existing service area be developed incorporating the key operational and customer design features outlined within this report and that the vessels be acquired for delivery and commissioning by 2013 to expand the Woodside service;

3. Metro Transit undertake an alternatives analysis to determine the need for a fifth vessel for upgrading the Woodside service to 15 minutes in peak hours and as a maintenance and operations spare;

4. The Dartmouth and Halifax ferry terminals be refurbished at an estimated cost of $6 to $8 million to address design deficiencies but also to cosmetically refresh and update the image of the buildings and extend their life for up to 10 years;

5. Metro Transit/HRM lead a team with HRM Planning and Halifax Waterfront Development Corporation staff to re-design and rebuild the Halifax and Dartmouth ferry terminals with the objective of turning the terminals into a major design focus for the ferry operation and tourism and as a catalyst for the harbourfront redevelopment;

6. To prepare for the longer term, Metro Transit should conduct further investigations and analysis of alternative vessel designs specifically with regard to speed and side-loading in concert with any consideration of new, longer ferry routes; and

7. The ferry strategic operations plan be updated in 2014.

Longer Term – 2015 to 2020

It is recommended that:

1. HRM/Metro Transit rebuild/replace the existing ferry terminals with architecturally significant designs;

2. Acquire additional vessels suited to future route needs; and

3. Acquire vessels to replace the existing fleet suited to the needs of either the existing or new services.

7. IMPLEMENTATION PLAN

Exhibit 12 presents an implementation plan and action steps for revitalizing the Halifax ferry system to position it for its future role as a major component of the HRM transportation system and to attract future users and tourists.

Exhibit 12: Implementation Plan and Action Steps

Step	Initiative	Timeline
Short Term – 2010 to 2014		
1	Undertake repairs to Halifax and Dartmouth terminal jetties	2010
2	Develop design and specifications for two new vessels	2010 – 2011
3	Undertake an alternatives analysis to determine the need for a fifth vessel to upgrade the Woodside ferry service	Winter 2010/11
3	Issue RFP for construction of the new ferry(ies)	Spring 2011
4	Refurbish Halifax and Dartmouth terminals	2011 – 2012
5	Award tender for construction of the new ferry (ies)	Summer 2011
6	Construct new ferry(ies)	Fall 2011 – Spring 2013
7	Accept and commission new ferry(ies) for service expansion	Summer 2013
8	Introduce expanded Woodside Ferry service including hiring of additional staff	Fall 2013
9	Update strategic ferry operations plan	2014
Longer Term – 2015 to 2020		
1	Develop new and replacement ferry designs and specifications based on needs of any new services	2015 – 2016
2	Finalize design details for new Halifax and Dartmouth ferry terminals	2017
3	Issue RFP for design of new terminals and prepare construction documents	Spring 2018
4	Issue RFQ and RFP for construction of new Halifax and Dartmouth ferry terminals	Summer 2018
5	Construct new Halifax and Dartmouth terminal buildings	Fall 2018 – Summer 2020

6	Finalize design specifications and issue RFP for new ferries to expand service (as necessary)	2018
7	Finalize design specifications and issue RFP for ferries to replace existing fleet; award tender to construct ferries	2019
8	Commission new terminal buildings, Halifax and Dartmouth	2019
7	Construct replacement ferries	2020 – 2021

APPENDIX A

PEER REVIEW/CASE STUDIES

Annex A: Comparison Table of Urban Ferry Operations

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
Service Description	Integrated transportation with multiple runs ranging in distance from 1 to 17 nautical miles.	Limited year round service (PAX and car) to Hanlon Point. Other runs exist in the summer to provide access to the Park.	Year round commuter based system, although not hooked into the NY transit system in partnership the service links to these systems using buses that are owned by the ferry company. 17 Terminals operating from ½ to 45 nautical miles. Most runs between ½ and 7 nm.	Year round service between Levis and Quebec, PAX and cars. Distance is 1 km. Ferry terminal buildings on each side of the St. Lawrence River. Winter operation there tends to be ice which is kept free with ice breakers. There are rare occasions when the service is disrupted by weather.	Year round part of Vancouver's intermodal commuter system which integrates Ferries with Buses, Sky Train and suburban commuter rail. The service crosses the Burrard Inlet connecting downtown with the North Shore. Distance is 1.7 nautical miles. See Vancouver Route Map.
Fleet	21 Ferries – varying in PAX number, but in short range runs 149 and 200 PAX (8 knots) and long range runs 350 and 400 PAX (21 to 30 knots). Largest vessel 600 PAX – ferry to Provincetown max speed 40 knots. Most vessels monohull, older construction serving short harbor runs. High speed vessels (4 in number) aluminum construction water jet propulsion.	5 Ferries. Oldest is a side paddle wheel boat (1910). Year round ferry 240 PAX with access for vehicles. Other vessels 1,000 PAX built in the late 1950's and early 1960's. Front end loading double ended. See Toronto Fleet.	Fleet mix of monohull, front end loading vessels with standard keel cooled construction, propeller driven. Design is a standard crew boat design. Front end loading decision because of ease of coming alongside, ease of ramp matching and quick loading/off loading of PAX. No vessel side equipment. Operational speed 11 knots.	Steel car ferries, approx 1,700 grosse tones. Side loading 399 PAX and 54 vehicles. Major refits in last two years – modernizing compartments. 2,400 hp with a max speed of 12.5 knots. Constructed in the early 1970's. See Quebec Fleet.	The fleet consists of three vessels currently, but will be paying off the oldest vessel with a newly purchased vessel. This is a medium speed double ended aluminium catamaran which has been designed to improve on transit efficiency and wake wash. Cost of the new vessel $25.5 M. Operational speed is 12 knots.

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
	Single side PAX access. Not preferred, limitation based on jetty alongside. No terminals. Problem with load/unload speed. Would prefer front end loading. Wireless service on longer runs. See Boston Fleet.		Fast ferries look after longer distance runs (e.g. 17 nautical miles). Aluminum catamarans. Operate at 34 knots. PAX numbers 99 to 499 per vessel. All vessels will have wireless fitted within the year. See NY Fleet.		PAX numbers max 400. See Vancouver Fleet.
Crewing	Typically four crew – Master, engineer and two deckhands.	For 220 PAX – 4 crew and 6 for the 1,000 PAX. Each has a Master and Engineer. Other crew members are deckhands. Masters have Minor Water Limited tickets. Number of Crews increase from 3 to 10 from winter to summer.	For smaller vessels 3 crew and for larger 4.	Six with a Master, Engineer and 4 deckhands.	Four – Master, Mate and 2 deckhands.
Maintenance	Full time 15 employees doing planned and unplanned repairs. Contract out dockings and major work such as engine overhauls.	Off-watch engineering crews undertake running repairs. Vessels docked every 5 years for inspection and major work. Docking is contracted out.	Full maintenance compliment working 24/7 in three shifts. Ultimately keeping the vessels operating to protect the schedule. Very focused on the commuter. Own docking facilities	Running repairs undertaken by crew with a docking every 5 years. In non-peak hours the a ferry is taken out of service and during this time maintenance is conducted.	Engineering group working 24/7 – consisting of 12 engineers and 2 electricians. Maintenance team looks after vessels and the terminal. One vessel will operate for

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
			and undertake docking, inspections and complex maintenance in-house.	To protect schedule the service has a spare vessel which it draws on. Dockings are contracted out, and major work is undertaken by a full time maintenance shift of provincial government employees (Atelier 85).	13.5 hours and the other for 21.5 hours, to enable work to be done. Vessel system logs taken 3 times per shift, and if there is an impending problems engineers ride the vessels to clear the issue. At the end of the day vessels go into repair bay and are worked on overnight – addressing needed running repairs. Docking (outsourced) required when removing drives which are overhauled in the shop. There have been no refits to these vessels in 32 years of service.
Management	Outsourced service provided by Boston Harbour Cruises, subsidized by the State (who have responsibility for interstate highways). This ferry service is regarded as part of the highway system.	Municipal service run by Parks and Recreation. Subsidized by the City of Toronto.	Privately held service, no subsidies. Terminals are leased, but have been developed in partnership with the Burroughs of NY and NJ.	Part of the Provincial Government Department of Transportation. Management has responsibility for 8 ferry systems that cross the St. Lawrence River – and they look at these services as part of the Highway system.	This is part of the Vancouver Transit system, and follows the governance and management of that system – reporting through transit to the senior administration of the City.

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
				All ferries in the system are subsidized in a formula called auto-financing to 50%.	
Weather Note: Vis details were not derived from the same data source and therefore may not use the same definition baseline.	Similar to Halifax. Same variations in temperature – weather moderated by Gulf Stream. Severe fog (1/4 mile vis) is normal during summer months, particularly in the month of July (average 24 days per year)	Typical weather patterns of central north America. Climate is moderated by the Great Lakes and there are frequent situations of low vis (155d due to fog and other weather systems) and lightning storms.	Similar to Halifax. Same variations in temperature. Higher numbers of electrical storms and lower numbers of days with low vis (75).	Extreme weather fluctuations. High temperatures in the summer and extremely cold in the winter. High humidity, and low number of days with low vis.	Moderate changes to weather. Significant rain and fog – upwards of 133 days/year of limited vis. No threat of low temperature issues over a sustained period of time.
Schedule	15 minutes departure at peak starting at 6:30 am	½ hour departure starting at 6:35 am. 15 minute run.	20 minute departure for 7 minute transit at peak, operates 6:00 am to 11:00 pm.	The crossing is 10 minutes, and at peak operates on a ½ hour schedule. Service starts at 6:00 am and ends at 2:20 am.	The frequency of the runs are 15 minutes starting at 6:00 until 1:00 on weekdays at peak, and ½ hour in non peak. Crossing is 10 minutes.
Fares	One way adult $1.70 and book of 60 tickets $91.80.	Round trip adult $6.50 and monthly $88.	One way adult fare $7.75 and monthly at $232.	One way adult fare $6.75. Free with transfer from Quebec or Levis bus system. Fare for car $10.80 which will allow for up to 6 passengers.	A single adult fare is $3.50 before 6:30 pm and $2.50 after. This enables the commuter to use any of the transit modes for a 90 minute period.
Number of PAX per day		Peak seasonal 20,000	200,000		17,000

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
Business Value	Non peak time of vessel use as harbour cruise. Business case for ferry based on lower capital costs compared to roads and road maintenance. PAX decision based on reduced time to downtown location, cost comparison and service to island communities with no other route.	Requirement to support those who live on the island year round, and access to the park and beaches in the summer. PAX in summer huge desire to use the Park.	Price competitive with all other modes, and schedule reliability. Bus system is subjected to the traffic issues and time delays. Driving costs as a minimum $16 tunnel toll, and $25 for parking plus the costs for gas and traffic delays. Long runs reduce the travel to 40 minutes vs. at best car travel of 1 hour and 10 minutes, plus the additional costs such as tunnel, gas and parking. Currently investing in other services that will take advantage of the new terminals. Protect business value by having vessels standby in case there are issues with breakdown. See NY Terminals.	Car option is attractive, enabling the PAX to reduce travel time by about 20 minutes driving given best conditions of ferry availability and no traffic. Integration with bus system is significant value enabling individuals to transfer through from Levis to Quebec through the ferry seamlessly without any additional cost. See Quebec Terminals. Recent investment made to upgrade the vessels – comfortable, contemporary design with amenities such as wireless. One of the best values for tourists.	The business value is based on reduced time to cross the inlet, eliminating traffic congestion over the bridge. It also eliminates parking in downtown Vancouver, and provides access to the whole of downtown and points further through the transit system from North Vancouver. Highly integrated and truly intermodal. Schedule of all modes interconnected so that commute is convenient, and connecting from one mode to the next is seamless.
Most Concern	Fuel prices and implementation of ISPS code.	Large PAX load in summer cannot be met. Many times there are long lines with unhappy	Fuel costs which fluctuate and the impact on the bottom-line.	Auto financing doesn't change, even though operating costs do. No real ability to undertake	Fuel costs. Conducting maintenance during available periods,

Municipality/ Discussion Area	Boston	Toronto	New York	Levis/Quebec	Vancouver
		PAX left at either terminals. Could have 20,000 PAX on a day. Capital costs and planning large financial commitments for maintenance.		strategic planning. Some years are good financially, and others are not – regardless of the state of the vessels.	because vessels do not go through refits.
Contact Information	www.bostonharbourcruises.com Alison Nolan 617-720-9222	http://www.toronto.ca/parks/island Capt Rafique Jaffer 416-392-8662	www.nywaterway.com Vinnie Lucante 800-533-3779	www.traversiers.gouv.qc.ca Francois Bertrand 418-643-2019	www.coastmountainbus.com Ken Miller 604-986-1501