Seabus Feasibility Study

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Waterfront Toronto, City of Toronto and Ports Toronto

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This study focuses on the feasibility of new marine transportation services within Toronto's Inner Harbour and opportunities for improvement of the existing marine transport system.

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Opinions and limitations

Unless otherwise indicated, the opinions herein are those of the authors and do not necessarily reflect the views of Waterfront Toronto.

CPCS makes efforts to validate data obtained from third parties, but CPCS cannot warrant the accuracy of these data.

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Cover and below image source: Sections of a 40-foot mural at CPCS headquarters in Ottawa painted by Toronto artist Mike Parsons.

Table of contents

List of figures

List of tables

Acronyms / Abbreviations

BIA	Business Improvement Area
CATS	Canadian American Transportation Systems
CHS	Canadian Hydrographic Service
CMBC	Coast Mountain Bus Company
ColReg	Collision Regulations
CoT	City of Toronto
CoV	City of Vancouver
CSA	Canada Shipping Act
CW	Clockwise
CCW	Counterclockwise
DOT	Department of Transportation
EVSE	Electrical Vehicle Supply Equipment
FTN	Frequent Transit Network
GGF	Golden Gate Ferry
GGT	Golden Gate Transit
GTHA	Greater Toronto Hamilton Area
HRM	Halifax Regional Municipality
JLFT	Jack Layton Ferry Terminal
LNG	Liquified Natural Gas
LRT	Light Rail Transit
MTO	Ministry of Transportation of Ontario
NM	Nautical Miles
NYC	New York City
NYC EDC	New York City Economic Development Corporation
NYCDOT	New York City Department of Transportation
NYC Ferry	New York City Ferry
O/D	Origin/Destination
PANYNJ	Port Authority of New York and New Jersey
PT	Ports Toronto
RCMP	Royal Canadian Mounted Police
SF Bay Ferry	San Francisco Bay Ferry
SIF	Staten Island Ferry
SSP	Steel Sheet Pile
The District	Golden Gate Bridge, Highway and Transportation District
TIDAL	Toronto Islands Docking Access Licence
TRCA	Toronto and Region Conservation Authority
TTC	Toronto Transit Commission
TTS	Transportation Tomorrow Survey
WELRT	Waterfront East Light Rail Transit
WETA	Water Emergency Transportation Authority
WTA	Water Transit Authority
WT	Waterfront Toronto

Executive Summary

The primary goal of the Seabus Feasibility Study was to assess the viability of introducing fixed route, set-timetable marine passenger services in Toronto's Inner Harbour. Five potential route options were analyzed, connecting locations across the Inner Harbour, from Ontario Place in the west to Ookwemin Minising (formerly Villiers Island) in the east, the Toronto Islands in the south and including the Outer Harbour.

Each route was evaluated based on projected passenger demand, driven by significant existing and future landside development and attractions. Additionally, the study considered the commercial, technical, and organizational feasibility of each route option.

Recommendations:

1. Route options A and D (See Figure ES- 1 and Figure ES- 2 below) have the highest potential for success and should progress to further project planning to align with expected new landside attractors and development, under construction or planned over the next 10 to 25 years.

2. Consideration be given to modify Routes A and D as needed. For Route A this could include reviewing additional stops at Ward's Island, Outer Harbour Marina or Cherry Beach. For Route D this could include a redesign to avoid potential technical challenges with navigating the Outer Harbour south of the Toronto Islands – See Route D Option 2 on Figure ES- 1 below.

3. Explore opportunities for a fixed route seabus pilot project to be operated with full access to detailed ridership data and plans to conduct customer surveys to inform further planning (expected ridership, fare, etc.) and decisions on ultimate operational model (private, concession, or public) and the feasibility of potential stop locations. The timing of this pilot would be driven by the speed of the development of new housing and landside attractors such as Ontario Place. The current forecast for ridership is too low on the routes examined to be commercially viable at this time but over the next five years the demand for an east-west fixed route, water-based seabus service should make a pilot feasible.

4. To progress project planning for a future seabus pilot project, and more broadly new marine transport service, the following five steps should be taken:

    i. Work with stakeholders to address potential safety and congestion issues;

    ii. Work with project partners and other relevant waterfront projects to confirm final routing and ensure future proofing for new marine transport services and infrastructure;

    iii. Undertake a stated preference survey to better understand price sensitivities of a future services and the impact of other transport modes;

    iv. Conduct a market sounding to gauge potential interest of operators and assist in planning and decision-making, including addressing exclusive access and docking agreements, levels of services, willingness to invest, timing of services, etc.

v. Monitor progression of planned waterfront developments as key drivers of ridership potential to inform appropriate timing of the pilot project.

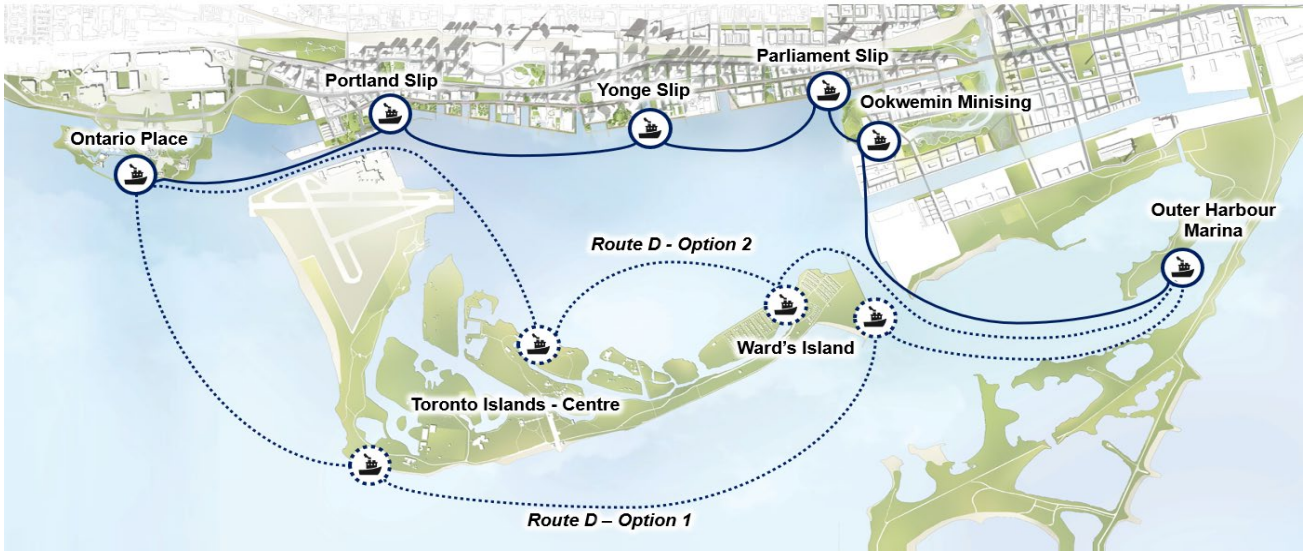
5. Due to the increasing demand for water taxi services between the Toronto Islands and the mainland, a pilot project to study the creation of common water taxi docking system and infrastructure on the landside is recommended. This pilot should include:

i. Examination of sites with most potential in the short and medium terms such as Portland Slip, Yonge Slip and Ookwemin Minising.

ii. Work with stakeholders to review and develop solutions to address operational challenges such as ticketing, berthing of vessels, coordination of activity at these docks and maintenance of dock infrastructure. Consider other local precedents for shared water taxi dock operations, such as at Toronto Island Park.

Figure ES- 1: Potential New Seabus Transportation Services (Route A)

Figure ES- 2: Potential New Seabus Transport Services (Route D – Options 1 and 2)



As mentioned in Recommendation 2 above, Ports Toronto, the City of Toronto and Waterfront Toronto should explore route options for Routes A and D. In particular, the client team has expressed interest in Option 2 for Route D, as shown in Figure ES- 2. This preference is driven by the immediate need to increase water taxi services to the Islands, by the technical studies showing operational challenges with navigating a water taxi or Seabus in the Outer Harbour, and the lack of harbour facilities on the south side of the Toronto Islands.

The recommendation to pilot Route D is based on the projected passenger demand for Option 1. That said, given the relative proximity of stops on the Toronto Islands for both options, it is reasonable to assume that passenger demand would be similar for both options.

Study Overview

Toronto shares many similarities to other global world-class cities, including the existence of a waterfront with a diversity of recreational, commercial, residential, industrial and transportation land uses that attract businesses, residents and tourists. Toronto's waterfront is a key economic driver for the not only the Greater Toronto Hamilton Area (GTHA), but also for the province and the country due to the importance of Toronto to the vitality of both Ontario's and Canada's economies. The three levels of government, WT, other relevant agencies need to continue work together to enhance the waterfront. This collaboration will help ensure that the Toronto waterfront achieves its potential making it comparable to peer waterfront cities and generating benefits for citizens.

This study looks at one dimension of improving Toronto's waterfront, specifically the potential to improve and increase transportation opportunities on the water. Comparative world-class cities rely on robust marine passenger transport networks for their thriving waterfronts. While Toronto has existing passenger marine service, significant future development in the region and increase of waterfront living and visitation is expected to impact existing services. The five kilometre stretch of Toronto's waterfront from Ontario Place to the Eastern Waterfront currently houses over 76,000 residents and 63,000,000 annual daily trips[1] by distinct visitors to the waterfront (excluding people who live or work on the waterfront). By 2051, the number of distinct visitor trips to the waterfront is projected to grow to 115,000,000 and with the residential population reaching over 119,000

[1] Based on data from Waterfront Business Improvement Association Study

residents. This significant growth is expected to create opportunities for expanding the scheduled, fixed-route marine services on Toronto's waterfront.

This study follows up on recommendations made in the *2020 Marine Use Strategy*. Starting in 2019, WT, along with its project partners the City of Toronto (CoT), Ports Toronto (PT), and Toronto and Region Conservation Authority, undertook an update of the *2006 Marine Use Strategy* to account for significant changes affecting the Inner Harbour, including the Port Lands Flood Protection project and development plans for Ookwemin Minising and Keating Channel precincts. The recommendations of the present study built on the *2020 Marine Use Strategy* by analyzing:

1. The **existing state** of operations on Toronto's Waterfront;
2. Best practices for management of motorized/non-motorized marine uses and marine service performance, safety and environmental standards through a **jurisdictional scan;**
3. The **feasibility** and steps for implementation of a seabus transportation system that best serves the needs of Toronto's waterfront; and,
4. **Other opportunities** to improve marine transportation operations in Toronto's Inner Harbour.

The report is structured into the following five chapters.

Chapter	Description
Chapter 1	Explores project background and purpose of the Seabus Feasibility Study.
Chapter 2	Outlines existing marine operations on Toronto's waterfront, marine rules and regulations, and findings from stakeholder engagement undertaken at project commencement with marine use stakeholders.
Chapter 3	Summarizes findings from a jurisdictional scan of four North American cities with diverse marine transportation services. These jurisdictions were studied to understand details of marine operations, management, and governance and report best practices relevant to Toronto's context.
Chapter 4	Summarizes the feasibility analysis conducted for five potential seabus services connecting the Toronto waterfront, Inner Harbour, and Outer Harbour. Feasibility was based on commercial feasibility (expected ridership), technical feasibility (feasibility of new marine infrastructure), and organizational feasibility (impact of governance).
Chapter 5	Analyzes five other opportunities to improve marine operations in Toronto.

Existing Marine Transportation

Toronto's existing marine passenger transport operations consist of:

- Five private water taxi operators connecting the waterfront and Toronto Islands; and,
- Three ferry routes operated by the CoT connecting the Jack Layton Ferry Terminal (JLFT) and Toronto Islands.

These services operate from similar origins and destinations focused on the Toronto Islands but operate with different schedules and fares.

Water taxis provide on-demand service primarily using small capacity boats (typically 12-person vessels) making connections to the islands more flexible. These taxis operate seasonally from May to October with an average adult fare for a one-way trip costing $13. During peak season approximately 55 vessels operate, collectively serving between 450,000 to 500,000 passenger trips (WBIA survey, 2023). The impact on water taxi demand by the introduction of high-capacity ferries by the CoT by 2027 will need to be monitored, but current demand appears to be increasing for the water taxi services.

The ferries run a scheduled service using large capacity ferries and with service provided from one point on the mainland, the Jack Layton Ferry Terminal (JLFT) to three points on Toronto Island Park (Hanlan's Point, Centre Island, and Ward's Island), serving 1,400,000 passengers per season. Only the Ward's Island service operates year-round providing an important connection for island residents. A ferry adult fare is $9 for a round-trip.

Toronto's marine passenger transport is not formally governed by an organization with a mandate to manage planning and operations of marine uses, although there is some collaboration through the Marine Coordination Committee. Access to docks on the Toronto Islands is managed through the city's licence Toronto Islands Docking Access Licence or TIDAL. There is no licence required for operations between points on the waterfront mainland.

Marine Stakeholder Engagement

To understand the existing state of marine passenger transportation on the Toronto waterfront and to shape opportunities for future marine transport, stakeholder engagement was conducted with twelve stakeholders representing a variety of waterfront uses (i.e., industry, private marine operators, resident associations, recreational marine users, etc.).

Stakeholders were generally interested in new marine connections and other opportunities to improve marine operations, and identified two key issues to be taken into consideration as projects progress:

1. Safety – Many competing uses on the waterfront (industrial, motorized travel, non-motorized users), these need to be considered for future planning and may require additional marine police enforcement.

2. Congestion – There are concerns about high-traffic landside congestion, opportunities to manage this would be beneficial for all users.

Jurisdictional Scan

Four North American cities were studied as part of a jurisdictional scan to understand best practices in marine passenger service governance, planning and operations, and to bring relevant insights to Toronto. The studied jurisdictions included Vancouver, Halifax, New York City (NYC), and San Francisco.

These jurisdictions operate in different contexts to that of Toronto, both in terms of operations and in governance. The studied jurisdictions each connect large populations and commuter demand between two areas separated by water, whereas Toronto's marine transport is largely focused on transporting tourists and recreational users from the mainland to Toronto Island Park. Most of the studied jurisdictions had a combination of public, concession, and private operations, with the marine services often being operated similar to public transportation with subsidized fares and private operations priced for specific tourism and commuter markets.

The publicly owned marine transportation services are operated in various ways across the jurisdictions studied. In the two Canadian cities, the local public transit authorities operate the publicly owned ferries and seabuses. In NYC, the Department of Transportation operates the Staten Island Ferry, and the semi-public NYC Economic Development Corporation oversees a ferry service under a concession model. In San Francisco, a regional transportation authority, created by the state, has the responsibility for managing the public ferry system and runs their services through a concession model.

Studied jurisdictions did not have a single regional organization tasked with the responsibility of oversight, management or planning of all regional marine passenger transport services. Only representatives from San Francisco expressed that a regional planning lens and collaboration could benefit regional users.

Licensing requirements are different within each jurisdiction, but in no cases are licences used to manage or control the number of operators.

Two elements from other cities that could be implemented in Toronto's context:

- Wayfinding - better signage and mapping to showcase local attractions and other transport options (marine and landside) would improve customer experience and ridership
- Payment systems - public ferry systems in other major cities have payment systems incorporated with local transit payment systems. Such an integration with PRESTO would improve customer experience and ridership.

Finally, these jurisdictions reported challenges with trying to forecast the demand for marine services and found that demand could often not be accurately forecast until services were introduced. They did, however, all see value in collecting data on ridership and user experience to help understand and react to the local market.

Feasibility Analysis of New Seabus Routes

This study finds that of the five potential seabus routes analyzed, Routes A and D (shown above in Figure ES- 1) are the most feasible for a future seabus service. Route A is forecasted to have a ridership of 28,042 riders in 2023 during its peak month and is expected to grow to 121,070 in 2050. Route D is forecasted to have a peak month ridership of 48,034 riders in 2023 and expected to grow to 153,730 in 2050.

Modelling of the passenger demand for these seabus routes indicates that, while Toronto Island Park will continue to be an important driver of demand, major developments at Ontario Place, Ookwemin Minising and the East Bayfront - expected to be completed over the next 10 to 25 years (i.e., 2035 to 2050) - are projected to have large impacts on future demand for east-west travel along the Toronto waterfront.

Demand for marine transportation services is driven not only by new developments and population growth, but also by factors like pricing, service frequency, onboard amenities, competing transportation options, and the overall user experience. These considerations are common in forecasting travel demand and can make forecasting future demand challenging. Furthermore, the jurisdictional review identified that forecasting for marine transportation has a higher level of unpredictability due to the nature of the service being more experiential than other forms of passenger transportation. It may also be more sensitive to factors such as price and comfort. These are factors to considered in the design and successful implementation of any new seabus services for the Toronto waterfront.

It should be noted that Routes A and D are preliminary route concepts and will need to be subject to further refinement (i.e., potentially adding or removing some of the stops) during an implementation phase. One example of a possible change to consider is to adjust Route D to provide access to Hanlan's (north side of the islands) rather than Manitou Beach (south side of the islands). This change would avoid the technical challenges with navigating the open lake south of the Toronto Islands.

Section 4 of the report provides details on Routes A and D. Key service metrics for each of the routes, over three time periods (2023, 2035 and 2050), are provided including ridership forecasts, operational hours, frequency of service, boat size and loading factors. Costing information over the same three periods for these routes is also detailed including total operating and capital costs.

Other Opportunities to Improve Marine Operations

In addition to the potential for new seabus services analyzed above, the *2020 Marine Use Strategy* recommended further analysis of opportunities to improve existing services. These opportunities were evaluated in this study and found that three of these opportunities could be implemented in the **near future:**

1. A **common water taxi docking system** could be piloted at landside locations where there is sufficient current demand such as Yonge Street Slip and Portland Slip and potentially at Ookwemin Minising. Such a system has benefits for both passengers and water taxi operators. As part of developing this pilot the operational issues that are identified in this report should be examined.

2. **High-capacity ferries** are expected to be in operation as early as in 2027. These ferries, and any potential policy or operational changes that accompany the new ferries (e.g. return ticket validation), may impact other marine services (existing and future). Consideration and planning for these impacts should be undertaken prior to 2027.

3. A **Modified vehicle ferry service** involving relocating vehicle ferry services away from Jack Layton Ferry Terminal could be implemented in 2027 once existing ferry vessels are replaced with the new high-capacity vessels. Further planning on a new ferry slip, and study of passenger demand and requirements to accommodate passenger movements could be undertaken as required.

4. Opportunities for **transit integration** could significantly improve ridership and customer experience. Wayfinding signage and inclusion of real-time digital signage for local transit connections could be implemented within the existing system. Fare integration should be studied and further considered.

Other opportunities include management of marine services, and supporting alternative propulsion vessels were important considerations for the future and require additional study and planning prior to implementation.

Conclusion

The Toronto waterfront sits at a critical point in its history. As the city and region continue to grow and develop as a world-class city, a significant amount of investment will be focused in on the waterfront. This introduces the opportunity to provide new marine passenger transport services and opportunities to implement improvement to existing operations. These changes will make the waterfront more accessible to residents of the city as well as people visiting the area.

While piloting a fixed-routed seabus service does not appear to be economically viable at this time, the continued developments on the waterfront should allow by 2030 to 2035 the introduction of such a service on certain east-west routes as well as connections to the Toronto Islands. The initial planning for a pilot of this service can start now.

The planning and studies required to successfully implement a pilot of a common water taxi docking system on the landside of the Inner Harbour can begin immediately as well due to the demand for this service and the current challenges with congestion and safety at poplar docking locations. Areas such as the Portland Slip and the Yonge Street Slip should be considered along with Ookwemin Minising, where demand is expected to increase in the near term with the opening of a park at this location. This initiative could also serve to help better understand the travel demand for future seabus routes.

1 Introduction

Key chapter takeaway

This chapter introduces the background and purpose of the Seabus Feasibility Study including its links to the *2006 Marine Use Strategy* and its update the *2020 Marine Use Strategy*. This chapter also includes the limitations and major assumptions regarding this feasibility study.

1.1 Background to Seabus Feasibility Study

In 2020 Waterfront Toronto (WT), along with its project partners the City of Toronto (CoT), Ports Toronto (PT), TRCA, CreateTO and Harbourfront Centre, undertook an update of the *2006 Marine Use Strategy* and Implementation Plan[2]. At a high-level this Strategy and Implementation Plan were intended to ensure that diverse marine uses and users were accommodated within the context of waterfront revitalization activities.

The *2020 Marine Use Strategy* builds upon the previous *2006 Marine Use Strategy* vision while focusing on defining next steps, action plans, and recommendations to successfully implement the strategy and address new changes to development located on the Eastern waterfront. The objective of the *2020 Marine Use Strategy* update was to:

- Confirm that the 2006 Vision for Marine Community as an exceptional asset to the city remains relevant.
- Ensure that proper balance for all types of marine uses and users is maintained
- Provide an overview of major trends and current challenges for the Marine Community.
- Develop a list of "actionable" items for:
  - Near-term actions to address urgent needs and issues;
  - Future work, including an action plan for studies and process improvements; and
  - Identify partnerships that will support successful implementation of key actions.

The *2020 Marine Use Strategy* has three main areas upon which recommendations and an implementation roadmap were created for future marine development – Movement, Mooring, and Management. The Movement section is rooted in a principle of creating "more connections to more destinations". This includes not only making it easier to get people to the water's edge, but also movement over the water. As part of this key theme, the need for a future study was identified to consider the feasibility of an enhanced public marine transportation network.

[2] 2020 Marine Use Strategy – Source: https://www.waterfrontoronto.ca/sites/default/files/2022-03/Waterfront+Toronto+2020+Marine+Use+Strategy+-+Final+Report+(March+2021)%20AODA%20resize.pdf

Three recommendations from the Movement section of the *2020 Marine Use Strategy* form the basis of this study[3]:

1. **Common Water Taxi Dock System** - Carry out a review of the current pick-up and drop-off marine operations on the waterfront and complete a feasibility study and comprehensive management strategy for a system of common user docks for water taxis across the waterfront.

2. **Seabus System** - Launch a feasibility study for the introduction of a seabus system on the Waterfront.

3. **Permitted Vehicle Ferry** - Consider introducing a consolidated and dedicated permitted vehicular ferry service.

1.2 Purpose of the Seabus Feasibility Study

This study focuses on the feasibility of new seabus services within Toronto's Inner Harbour and opportunities for improvement of the existing marine transport system

The purpose of this study is as follows:

1. Understand the existing state of operations on Toronto's waterfront;

2. Understand best-practices and evaluate options for management of motorized and non-motorized marine uses, and management of marine service performance, safety and environmental standards through the undertaking of a jurisdictional scan;

3. Understand the feasibility and steps for implementation of a seabus system that best serves the needs of Toronto's waterfront; and,

4. Explore other opportunities to improve marine transport operations in Toronto's Inner Harbour.

It should be noted that while, the original scope of this study was to address the three recommendations from the Movement Section of the *2020 Marine Use Strategy*, due to the need to prioritize the tasks to complete this work, there has only been a very high-level exploration of the technical and infrastructure needs with respect to location of docks and their associated landside and waterside requirements.

1.3 Limitations and Assumptions

Readers should note the following key limitations regarding this study:

1. **No reliance:** The scope of the analysis for this study was broad and assessed a variety of potential markets, routes, technologies and services. The results are intended to represent a first-stage feasibility analysis for new or expanded marine transportation services on Toronto's waterfront, to determine which options may merit further consideration. No reliance is provided regarding the commercial, technical, operational, or other feasibility of any specific service or solution. Further study, such as market studies or stated preference surveys, should be considered if proceeding with implementation of any service or solution.

[3] 2020 Marine Use Strategy – Chapter 6.2 Implementation Roadmap

2. **Utilitarian use:** The study scope was limited to assessing the market for water transportation services to serve a utilitarian use. Utilitarian users are passengers who travel to pursue some specific activity in a specific location, i.e., people travelling from point A to point B. This includes both residents and tourists. The market for experiential users, those that want to take a trip on the water for solely that experience, was not considered for the purposes of this study. The modelling for the study was based on trips having a point of origin and destination, which could be forecast based standard modelling approaches and supported by data. This is not the case for experiential trips, which are best captured through surveys of users, and are not driven by demand to move from a specific origin to a destination. The Project Team notes that, to the extent that there may be services that would serve a combined utilitarian and experiential market, this may be worth evaluating further if considering implementing the services.

3. **Data limitations:** While there was data provided to the Project Team to support this study, there were also some data limitations, that required assumptions to be made to carry out the modelling and feasibility analysis. Key data limitations included:

    a. Incomplete data on existing travel patterns to the Islands. The CoT's ferry ridership data are based on ticket sales and do not capture the return leg, nor is the data distilled to capture routes used (Ward's, Centre or Hanlan's). Detailed data on vessel movements or ridership were not available from water taxi operators.

    b. Incomplete data on existing travel patterns along the Waterfront. The Transportation Tomorrow Survey (TTS) is limited in its direct applicability since it is oriented towards weekday travel by residents, whereas much of the travel along the Waterfront is on weekends, including by tourists. Visitation data from the Waterfront BIA (Business Improvement Area) are only available at a high level (number of unique visitors).

    c. Incomplete knowledge of future demands. Data was available on future trip generators, including population, employment, and special attractions. However, assumptions still needed to be made about new developments, the demand for travel, origins-destinations, other travel options, and location of facilities.

4. **Evolving landside development:** The Waterfront is a rapidly evolving region. At time of writing, there remains uncertainty around many significant land and infrastructure developments, for example Ontario Place, the Port Lands and the Waterfront East LRT (Light Transit Rail). Considering the large scale of proposed or planned developments, the study findings are sensitive to these developments occurring or not occurring, in a variety of ways.

2 Existing State of Toronto's Waterfront

Key chapter takeaway

This chapter summarizes the background research undertaken to preface the feasibility analysis. This includes understanding existing marine operations on Toronto's waterfront

Some key findings:

- Water taxis and city ferries provide complementary service in connecting the Toronto Islands to the mainland.
- Approximately 55 water taxis operate on the waterfront through five operators, each with their own exclusive cityside docking location. They share docking space on the Toronto Islands.
- Water taxis do not operate on fixed schedules but typically wait less than 10 minutes to start a trip and they operate from May to October.
- Between 450,000 to 500,000 passengers use the water taxi service annually.
- The ferry service is less expensive than water taxis but provides fewer destinations and has less flexibility of service. The ferry service operates year-round, but only services Ward's Island in the winter
- Marine stakeholders reported some safety issues between shared spaces with motorized and non-motorized marine uses, and all users agree that additional patrolling could result in a safer inner harbour.
- Concerns were raised about the condition, capacity and safety of the wharves on the Toronto Islands (Centre Island) owned by Toronto Parks and used by water taxis and other boaters.
- Changes to the city ferry services, including the introduction of the new higher capacity ferries, could impact the demand for water taxi service.

2.1 Introduction

Toronto's waterfront is a key driver of the city supporting many activities including residential and office uses, industrial uses, recreational uses (land and marine based) and tourism.

In analyzing existing operations and future potential services, some key definitions are required to separate types of services and vessels which can be easily correlated (although they do not have to be).

Water taxi refers to a type of marine transport service connecting point A and B that responds to demand and does not operate on a scheduled timetable. This service could be provided with any vessel type.

Seabus refers to a type of marine transport service that operates on a specified route (i.e., connecting points A, B, C, etc.) and operates on a scheduled timetable. This service could be provided with any vessel type.

These terms will be used as defined above throughout this report.

2.2 Current Movement on Toronto's Waterfront

2.2.1 Water Taxi Operations

There are five water taxi companies[4] currently operating on Toronto's waterfront: Tiki Taxi, Pirate Taxi, Toronto Harbour Tours Inc., T.Dot Taxi, and Toronto Harbour Water Taxi and Limo Service. Each water taxi company has unique operations based on typical user profile and other historical elements. One-on-one consultations were conducted with each operator as part of this study to understand existing marine operations on the Toronto waterfront.

General Operations

The first water taxi operations coincided with the CoT strike in 2009, with a few operators and a total fleet of approximately ten vessels providing ad-hoc service to support island residents and visitors during the strike. Since then, water taxi service has grown rapidly and consistently with a current estimate of 55 vessels operated by five companies. Most of the water taxis operate vessels with a capacity of 12 passengers. There are several advantages for this size of vessel in terms of crew qualifications requirements, capital costs and availability of this type of vessel since they are built in series by a few manufacturers. In recent years, two water taxi companies have purchased larger vessels with each owning one 24-passenger and one 50-passenger vessels that are used when there is peak demand for the services.

Table 2-1: Water Taxi Fleet Summary[5]

Vessel Size	Number	Total Pax Capacity
12 passengers	51	612
More than 12 passengers	4	148

Due to the nature of water taxi service operation (i.e., no schedule and limited waiting time before departure), large vessels have been reported to be used only during peak periods in the summer to compensate for the limited capacity of a 12-passenger vessel.

[4] In past years a sixth operator, The Otter Guy, was also operating water taxi services. At the time of this study The Otter Guy was not in operations.

[5] Based on data provided during one-on-one consultations with water taxi operators

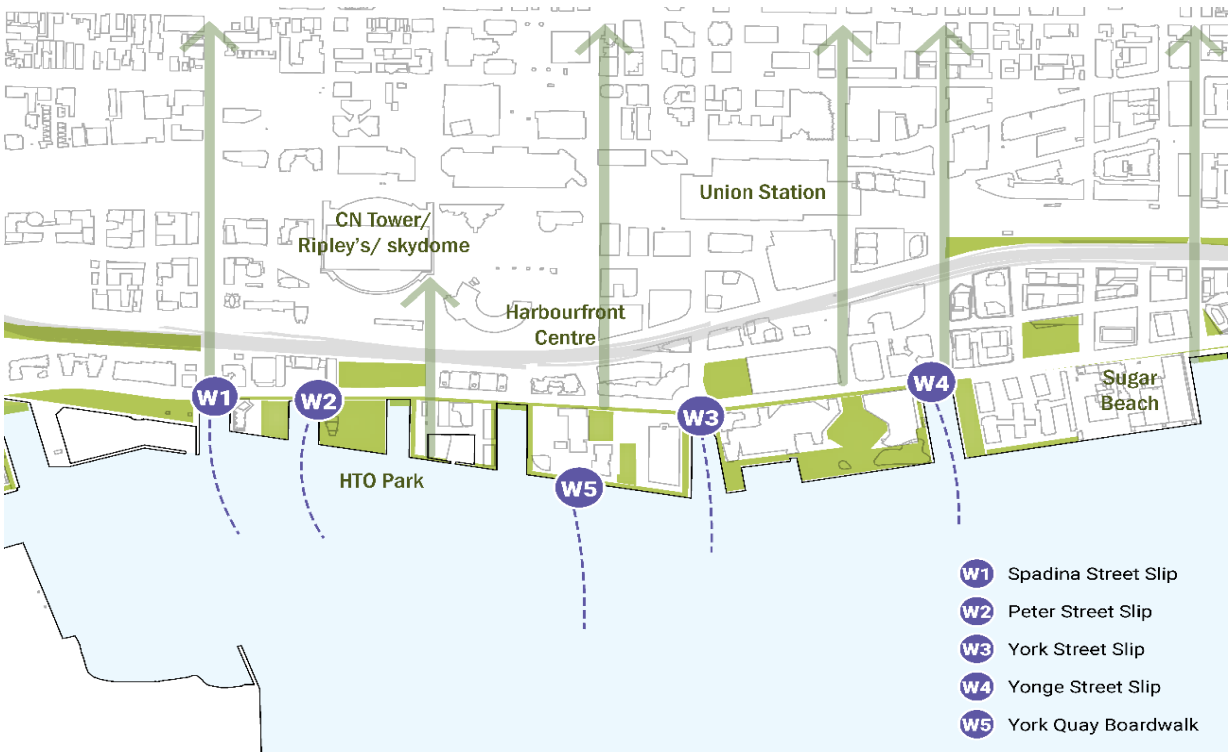
Most water taxi companies operate on a dynamic basis and do not have set sail schedules. They typically manage their fleet and service offerings to minimize passenger wait times. All interviewed operators preferred having at least three passengers before leaving but often strike a balance with waiting times as they do not want customers to wait more than ten minutes before departing. This operational situation typically occurs in off-peak periods.

Source: Toronto could expand water taxi service to the west side (blogto.com)

During peak-periods, water taxi operators alight and board passengers as quickly as possible to manage the demand. The number of vessels per company (around ten) and the short distance travelled to the islands (less than 1.5 nautical miles) creates frequent and short vessel rotations which allows to offer several departures without the burden of a fixed schedule.

Through consultations and direct experience, the Project Team observed that water taxi location on the city side is important to attracting customers. Figure 2-2 illustrates the landside locations where passengers can board water taxis. Water taxi locations close to major streets or attractions (Spadina Avenue, York Street, and near JLFT) typically attract higher volumes of customers. During high season, it is not unlikely for all operators to experience line-ups during peak times.

Figure 2-2: Existing Water Taxi Operating Locations (Landside)



Water Taxi Market and Service

Non-residents of the Toronto Islands are the largest users of ferry and water taxis services to the Toronto Islands, while a smaller proportion of trips serve residents of Algonquin Island and Ward's Island. Centre Island is by far the most popular destination, with reports that more than 80% of visitors to Toronto Islands go there.

The ferry terminals at Hanlan's Point and Ward's Island are less popular but still experience regular demand. Water taxi operators report they provide services to tourists and residents to both Hanlan's Point and Ward's Islands. While taxi operators provided information to inform this report, detailed ridership data by destination for water taxi services is not available.

Water taxis use other wharves and destinations on Toronto Island Park beyond the three most popular docking terminals: Centre Island, Hanlan's Point and Ward's Beach. These other locations are located further up channel with speed limitations and because the water taxi operating model is based on quick turnaround time, they avoid these locations as much as possible. Water taxi operators prefer destinations within a ten-minute boat ride from their base terminals on the cityside.

Based on the traffic statistics obtained through one-on-one consultations with water taxi operators, it is estimated that in 2022 they served between 450,000 to 500,000 passengers per year (one way trip). This data is corroborated by the *Commercial Tour, Charter, and Water Taxi Survey – 2019 and 2022* conducted by Waterfront BIA. Based on the water taxi fleet capacity, each seat of capacity available on these vessels generate 650 passengers in traffic per year.

Since the water taxi market focuses almost exclusively on tourism, their business is dependent on the season and the weather. Most water taxi operators begin their service in May and end in October. At the beginning and end of the season, some water taxis operate only during weekends using only a portion of their fleet. From June to early September, water taxis operate all days of the week. Most services begin at around 9 a.m. until 8 p.m. Some operators extend the hours up to 11:30 p.m. or later especially on busy days.

Water taxi operators identified that the peak period of demand is during the day, a few hours before noon and a few hours after lunch, with the busiest period in the early evening. Reportedly, tourists who go to the island in the morning to spend a day, along with those who arrived in the afternoon, all want to go back in the evening.

The water taxi operators estimate that the market growth for their services should remain strong, but they believe that growth will be slower than in previous years. Some of them forecast a market growth between 6% to 9% in the coming five years.

The water taxi fare varies from operator to operator. Table 2-2 summarizes the fare for each operator. Since the ferry return is 'free', many water taxi users come back by the ferry. No data is available on ferry fare evasion, although it is reported that the ferry takes back 25% additional customers on the trip to the city. This creates unbalanced load for vessels as water taxis bring in more people to the Toronto Islands than they bring back, while it is the opposite for the ferry. Marine users and stakeholders reported, along with water taxi operators, that long line-ups for ferries and more convenient city side destinations are the main factors attracting passengers to pay for their return trip and use a water taxi.

Table 2-2: Summary of Ticket Prices for Toronto Islands Marine Services

Operator	Price (2023)
Toronto Harbour Water Taxi	Adult - $12.50 + card fee Infant (under 1 year) – Free
Pirate Taxi	Adult - $12.00
Tiki Taxi	Adult - $12.00 Kids - $12.00
T.Dot Water Taxi	Passenger - $12.50 (+GST and 2% card fee) Children (under 2 years) - Free
Toronto Harbour Tours Inc.	Passenger - $12.50 (+1.50 card charge) Children (under 2 years) - Free

Source: Water taxi operator websites (2023)

Water Taxi Terminals

On the city side, each water taxi operator has their own exclusive terminal space. They lease berth space from their respective wharf owners/managers. In some cases, like at the Yonge Street terminal, water taxis must bid on the berth space which leads to a lease agreement of three years. Some leasing contracts include a two-year optional extension. This 3+2-year lease agreement seems to suit most water taxi operators consulted since it is long enough for them to amortize their infrastructure improvements investments. Some of these investments include installing ticket booths on the wharf as well as floating docks.

In some cases, the lease term is shorter which prevents water taxis from investing in infrastructure improvements. Also, some leases do not allow for the add-on of any structures or modification of berths to accommodate water taxi operations. Since city side berth space is limited, water taxis must adapt to the berth/wharf owners and managers preferences.

On the island side, Toronto Parks manages and maintains access to all marine terminals and access is managed through the approval of a Toronto Islands Docking Access Licence (TIDAL). Centre Island terminal is by far the most popular docking location and water taxi stakeholders all mentioned that it is a major bottleneck. The Centre Island terminal berth capacity for water taxis could be doubled to significantly reduce water taxis idling time in the opinion of users. Stakeholders have also reported issues with state of good repair of Toronto Islands docking infrastructure.

2.2.2 City of Toronto Ferry Operations

The CoT operates ferry services to the Toronto Islands, serving Ward's Island, Centre Island as well as Hanlan's Point. Service to the Toronto Islands is provided from JLFT on the mainland situated at the foot of Bay Street. Four ferries are currently operating serving approximately 1.4 million passengers per year. Most of these passengers are visitors to Toronto Island Park along with some park workers and Algonquin and Ward's Island residents. This ferry service is also the primary access for service vehicles.

The ferry services begin between 6:30 a.m. to 8:00 a.m. and end between 9:15 p.m. and 11:45 p.m. There are four vessels offering the services with a total carrying capacity of 2,400 passengers. Ferry capacities vary between 220 and 915 passengers[6].

[6] Ferry Fleet Replacement – City of Toronto

Since passenger's tickets are only checked when they travel to Toronto Island Park, it has been reported that city ferries carry 25% more passengers on the way back to the city. Passengers who arrived at the island via water taxis are currently able to return without paying the ferry fare.

The ferry service to Ward's Island is the only marine service operating year-round allowing island residents to maintain access to the mainland.

Table 2-3 below summarizes the 2024 fare structure of the ferry service.

Table 2-3: City of Toronto Ferry Fare Structure

Operator	Price (2024)
City of Toronto	Adult - $9.11 Senior (65+) - $5.86 Youth (under 19) - $5.86 Junior (under 14) - $4.29 Infant (under 2) – Free

The CoT's Fleet Services Division has the authority to operate the city's ferry system. There has been exploratory discussion with the Toronto Transit Commission (TTC), the operator of the city's public transportation system, about the TTC taking on the responsibility of the ferry operations, but this has not resulted in the TTC taking on an oversight or management role of the city's ferries.

The CoT has begun the process to replace its existing ferry fleet, which ranges in age from 61 to 114 years. The city has procured two new ferries each with a maximum capacity of 1,300 passengers[7]. These two new ferries are under construction with the first of these ferries expected to begin service by 2027, with the second one expected to be put in service soon afterward. These new ferries will increase the capacity of the ferry service by 2,300 passengers bringing the total passenger capacity of the system to 4,690. This maximum capacity could be considered high as one of the new ferries will also be used for transporting vehicles, which when used for that purpose reduces its passenger capacity to 650. In any case, there will be is a significant increase in the CoT's ferry capacity in the next couple of years.

If the existing ferries are replaced, at this level of passenger capacity, the total capacity of the system would reach 4,120 passengers instead of the current 2,400. The current ferry services carry 1.4 million passengers within its current capacity of 2,400 passengers. Therefore, every passenger space generates 583 trips. This is lower than the average water taxi performance which is around 650 passengers in yearly traffic per vessel unit capacity. However, this is understandable as water taxis only operate during peak season and the ferry service operates year-round.

Based on the current trip generation of the ferry system, an increase in the capacity of the system to 4,120 passengers could result in an increase of up to 2.4 million passengers annually. This is around 500,000 more than the total of existing visitation to the islands (1.4 million ferry passengers and approximately 500,000 water taxi passengers). The impact of expanded ferry vessel capacity is discussed further in Section 5.2.

[7] Ibid

2.2.3 Other Marine Passenger Transport Operations

It is understood that other private marine transport services have operated from the Toronto waterfront, and private operators have explored options to implement new services at a regional level.

In 2004, the Canadian American Transportation Systems (CATS) began a high-speed ferry service connecting Toronto and Rochester, New York. The service ran for the 2004 and 2005 summer seasons and ultimately stopped operations citing issues such as: damage of boat hull and engine during delivery, issues with customs operations, delayed construction of the Toronto ferry terminal, and bankruptcy of parties.

In recent years there have been proposals for new ventures such as Lake Ontario Express (connecting Toronto to the Niagara Region) and Hoverlink Ontario (providing a high-speed connection between downtown Toronto and Niagara Region).

Regional marine connections are not included within the scope of this study and as such will not be considered in further analysis.

2.3 Rules and Regulations

Different rules and regulations apply to the water transportation services in the Toronto waterfront area. Transport Canada regulates water transportation and vessels used on the Toronto waterfront must comply with the *Canada Shipping Act (2001) (CSA)* and its regulations. The CSA and regulations cover many aspects of vessel operation such as:

- Shipbuilding, maintenance and inspection;
- Safe manning of the vessel;
- Safety equipment;
- Personnel training and certification;
- Pollution prevention from ships; and,
- Navigation rules.

Understandably, some regulation requirements are less stringent for small commercial vessels operating in sheltered waters than for large ocean-going vessels. In this case, there is a regulation threshold for personnel certification, and manning and safety equipment for vessels carrying twelve passengers or less. This is the main reason why most water taxis rarely exceed this passenger capacity limit. For example, slightly larger vessels would require two crew members (one captain and one deck hand) instead of one. Also, the captain is required to have a *Master, Limited for a Vessel of Less Than 60 Gross Tonnage licence* instead of a *Small Vessel Operator Proficiency* licence for a vessel carrying twelve passengers or less.

In terms of enforcement regarding Transport Canada regulations, vessels of twelve passengers or less fall under the self-inspection regime. Any larger vessels must have an annual inspection. For the personnel certification, in short, marine personnel are certified upon achievement of the appropriate courses (provided by Transport Canada approved institution listed in the TP10655E) and passage of a final examination with Transport Canada. The personnel certification is valid for five years and can be renewed upon certain conditions.

In terms of navigation, all vessels[8] must comply with the *Collision Regulations (ColReg).* Rule 2 of the ColReg mentions that no vessel can exonerate themselves from neglecting of any precaution, based on ordinary practice of seamanship, to avoid an accident. Although ColReg identifies the circumstances in which a vessel shall give way to another one, in the event of a collision, the privileged vessel cannot exonerate its responsibility if it did not apply ordinary practice of seamanship to avoid the collision. This is an important difference from road regulations, which most pleasure boaters may not understand this fact

Rule 6 of the ColReg is about safe speed. This is another big difference from road regulation. On land, safe speed is defined by a sign on almost every road. This cannot be done on the water. Therefore, safe speed is a definition where the vessel "can take proper and effective action to avoid collisions and be stopped within a distance appropriate to the prevailing circumstances and conditions". To support seamen in the interpretation of this definition, ColReg list factors to be considered to evaluate the safe speed in each circumstance. Too often on the water, power boaters may not consider this rule and may think that without speed limit signage, there are no speed limits. This can contribute to create unsafe conditions on the water.

Boat captains[9] are responsible for the damage caused by their wake. There are a few recent court cases where captains were held responsible for injuries caused to others by their wake or misconduct[10].

In terms of law enforcement, Transport Canada oversees vessel certification, inspection, as well as the certification of marine personnel. In the event of an accident, it is the Transportation Safety Board of Canada that is responsible for the investigation. Other law enforcement agencies can be involved if infractions of other laws are involved in the accident.

Neither Transport Canada nor the Canadian Coast Guard patrol waters, on a daily basis, to ensure that vessels and captains are complying to regulations, especially in relation to pleasure boaters. Instead, this responsibility is delegated to local or provincial police departments. In areas with a high number of pleasure boaters, most local police forces have marine patrol units to enforce Transport Canada regulations, among others. In the Toronto Harbour, this task is assigned to the Toronto Police Department Marine Unit.

Local police marine units typically do not get involved with commercial vessels, as their captains have better training, and these vessels are inspected annually[11]. As well, police resources are limited, and marine patrol is just one of many law enforcement responsibilities.

A water taxi does not require a licence if passengers are transported only to and from locations on the mainland. Although, permission is required from landowners to use docking locations on the mainland. To dock on the Toronto Islands, water taxi operators must annually obtain a TIDAL from the City of Toronto (P&R). This licence allows the water taxis to use the wharves on the islands to drop-off and pick-up passengers. The licence requires the applicant to demonstrate that their vessels are compliant with Transport Canada regulations as well as a proof of insurance, including civil liability.

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[8] ColReg applies to all vessels, from paddle boards to ocean-going vessels.

[9] In legal definition, a captain is the person responsible of the embarkation. The captain might not be the person driving at the moment of the accident.

10 Accidents de bateau – Avocat en responsabilité civile (lambertavocats.ca)

[11] Most water taxis have a capacity of 12 passenger of less, they therefore fall into the « self-inspection" regime at Transport Canada, meaning the owners can inspect their own vessels.

The City of Toronto does not currently limit the number of water taxis that can be granted a licence. Neither does the City of Toronto control the use of their marine infrastructures by water taxis or check that all boats using this marine infrastructure have TIDAL licences. It should be noted that stakeholders did not mention that this was an issue, nor did they identify that the local police Marine Unit enforces the TIDAL.

Consulted stakeholders all identified that the marine infrastructure on the Toronto Islands is in poor condition with some raising concerns about safety. Over the years, the City of Toronto appears to not have sufficiently maintained this infrastructure. Additionally, licence holders were not permitted to make any modifications to the city's marine infrastructure. Stakeholders also reported that the marine infrastructure on the islands is inadequate to meet the current demand, and that the city has neither expand the capacity of this infrastructure, nor limited the number of TIDAL licensees to address this issue.

2.4 Landside Attractors

Toronto's waterfront features a mix of residential, office, community, and tourist destinations to bring various users to collectively engage along the waterfront. For the purposes of this study, these "landslide attractors" are the origin and destination generators of marine passenger traffic on the Toronto waterfront. People are either coming or going from these attractors, and as the number of landside attractors grow in quantity (i.e., the number of attractors), size or popularity, they contribute to building greater demand for marine transportation services. Therefore, identifying current and future landside attractors is key to determining the feasibility of introducing a greater level of marine transportation services both in terms of timing and the level of these new services.

Major landside attractors can fall into one of the following categories:

- Office – major employers along the waterfront including WT, Metrolinx, George Brown College, Toronto Region Board of Trade, and many others;
- Industrial – including Redpath Sugar and the Port of Toronto;
- Residential – including various existing and future residential developments, Toronto Islands;
- Tourist – including Harbourfront Centre, hotels/accommodations near the waterfront, Toronto Island Park, various attractions on the cityside waterfront including the WaveDecks;
- Recreation – including Martin Goodman Trail, Tommy Thompson Park, various other parks along waterfront); and,
- Transport - Billy Bishop Airport, Queens Quay streetcar, Toronto Island ferries, water taxis.

Existing and future landside attractors have been considered as part of the feasibility study, this is discussed further in Section 4.4 in analyzing the market and demand drivers.

2.4.1 Existing Attractors

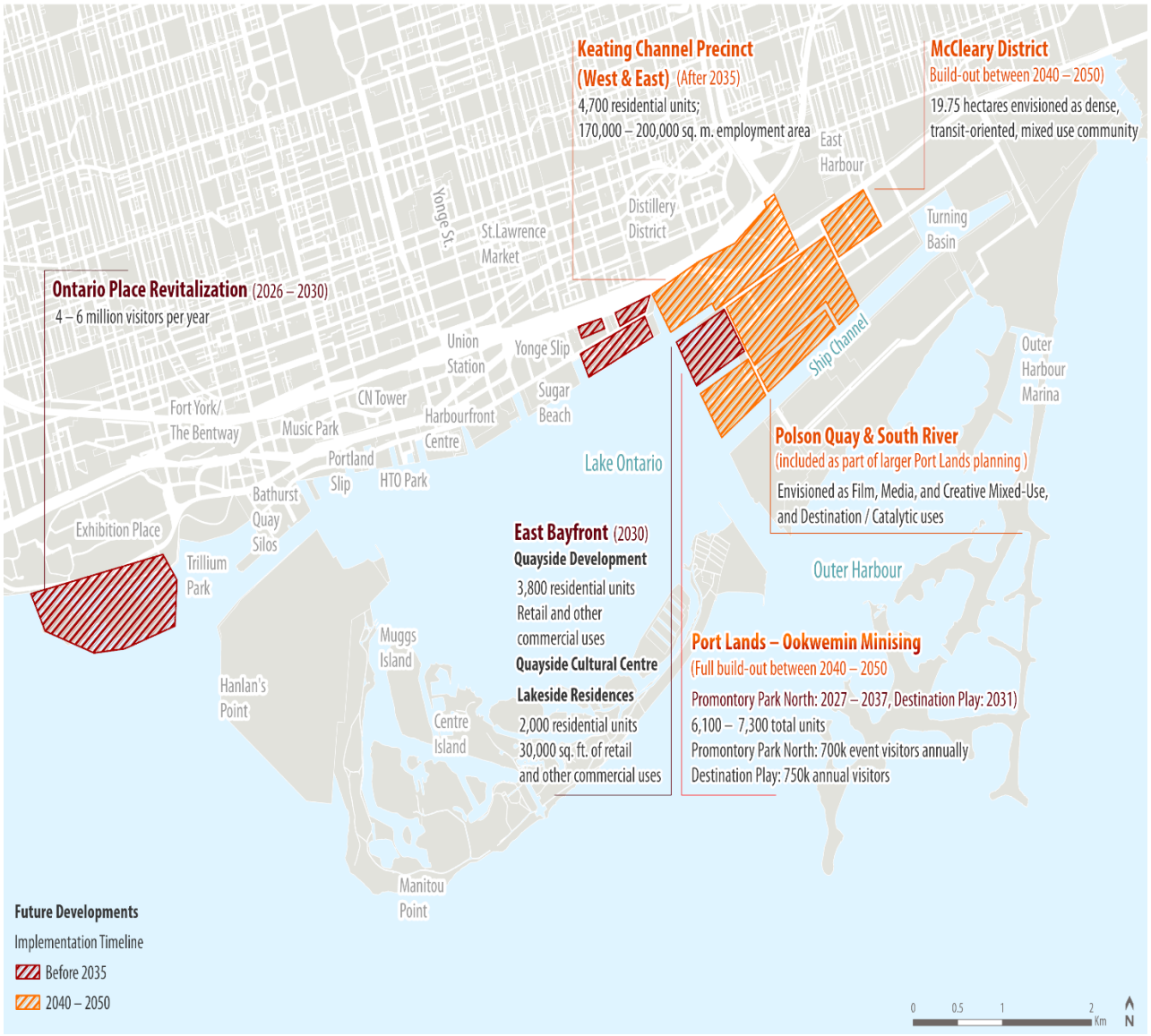
Existing landside attractors include many of the above uses and are typically concentrated between the Western Waterfront (Ontario Place to Rees Street), Central Waterfront (Rees Street to Lower Jarvis Street), and Toronto Island Park. Specific attractors and their estimated trip demand generation is discussed further in Section 4.4 in analyzing the market and demand drivers. Figure 2-3 below shows the location of some of the existing landside attractors on the Toronto waterfront and Toronto Islands.

Figure 2-3: Existing Landside Attractors

2.4.2 Future Attractors

Several major developments are planned along Toronto's waterfront. These developments will have a significant impact on the number of people visiting and living along Toronto's waterfront. These developments are shown in Figure 2-4 and explained at a high-level below. Again, the estimated trip demand generation for each future attractor is discussed further in Section 4.4.

Figure 2-4: Future Landside Attractor Developments



Source: Watefront Toronto

Ontario Place Revitalization

Redevelopment of Ontario Place (155 acres of land and water) to create a year-round destination including mixed-uses, enhanced public spaces, a variety of accessible programming and activities, and waterfront access. Concept design (for Environmental Assessment purposes) includes Ontario Science Centre, waterfront parks and access, plazas and flex spaces, and private developments (Budweiser Stage, Therme Canada). The redevelopment is anticipated to attract 4-6 million visitors a year.

Figure 2-5: Ontario Place Redevelopment Preferred Design

Source: Engage Ontario Place

The Ontario Place Revitalization will include connections to the Martin Goodman Trail and the Ontario Line subway, providing long-distance connections for recreational and transit users to the area local area (waterfront and beyond). As connections for local and regional transit is anticipated to be at Exhibition Station (a 20–25-minute walk from Ontario Place), there may be a significant opportunity and demand for a marine transport service.

Eastern Waterfront

Significant development is slated to occur in the Eastern Waterfront including Lower Yonge, Keating West, Keating East, Ookwemin Minising, McCleary District, Polson Quay, South River, Media City, Turning Basin, and East Harbour. These developments will result in significant increases in residential and commercial uses that will generate significant demand for local and regional travel to and from the Eastern Waterfront for residents, workers, and tourism purposes. Development is slated to be partially complete in 2035 with all development expected by 2050.

Figure 2-6: Rendering of Future Development Ookwemin Minising (Eastern Waterfront)

Source: Waterfront Toronto

Waterfront East LRT (WELRT)

Extension of current Waterfront LRT (operating from Exhibition Loop / Exhibition GO Station to Union Station along Fleet Street and Queens Quay Street) is planned for future implementation; the project is currently being progressed to 60% design by CoT, TTC, and WT. WELRT is proposed to connect Union Station to Cherry Street with future extensions into Distillery Loop, the Port Lands, and east of the Don River. Currently no funding has been secured for further advancement and construction of this project and project timeline is Phase 1 is uncertain. If development timelines and WELRT timelines are not aligned, there could be a significant demand for transport along the waterfront and regionally that may not be satisfied by the existing local transit solutions.

Figure 2-7: Future Transit Connections to Western Waterfront

Source: Waterfront Toronto

2.5 Yonge Street Slip East Operation

Located next to the JLFT, the Yonge Street Slip represents current eastern border of the waterfront. In 2020, Waterfront Toronto and PT began leasing the east side of Yonge Street Slip to create a multi-user dock space. The east dock wall includes the following uses/operations:

- T.dot Taxi (operating water taxi services May through October);
- Personal craft pick-up/drop-off;
- Skipperi (boat rental/subscription);
- Art/music activities; and
- Kiss'n'Sail

It has been informally reported that multi-user marine operations have been successful in bringing and keeping people at this marine node. No detailed data was made available for this study regarding number of passengers or visitors throughput at this slip (pure visitation and/or water taxi operations), as such no comment can be made on the comparison of this site to other marine nodes along the waterfront. It has been informally reported that issues can exist when mixing operations between commercial service and customers renting boats (which are often inexperienced boat drivers). This often occurs as inexperienced pleasure craft operators are not intimately familiar with the ColReg rules. Careful consideration should be given to mixing these uses in busy slips to safely manage operations.

2.6 Summary of Stakeholder Engagement

On November 6, 2023, a meeting was held with the Marine Use Stakeholders to provide an update on the Seabus Feasibility Study. The purpose of this meeting was to provide an overview of the project goals, an update of work completed to date on the study and gather feedback from stakeholders. This included a review of the existing context on Toronto's waterfront, what we heard during the Marine Strategy, and a summary of best practices from other cities. The feasibility study scenarios were also shared with stakeholders.

High-level takeaways to come out of the stakeholder engagement included:

1. **Safety** – Many competing uses on the waterfront (industrial, motorized travel, non-motorized users), these need to be considered for future planning and may require additional marine police enforcement. Concerns were also raised about providing water taxi service to the Outer Harbour due to safety concerns.

2. **Congestion** – There are concerns about high-traffic landside congestion, opportunities to manage this would be beneficial for all users. The ability to get to the Toronto Islands from the east side of the harbour was seen as an opportunity to reduce congestion along the central waterfront.

3. **Interest** – There is generally an interest for new marine connections and other opportunities to improve marine operations. They also saw that demand would increase for water taxi and seabus services as the waterfront continues to develop and attract more tourists and residents. It was also identified that more development may need to occur before services can expand.

The feedback from the stakeholder discussions did not directly impact the modelling that was done for this study, as the routes and stops were provided by WT for the Project Team to model. However, the stakeholder feedback raised valuable points that should be considered in developing and implementing any new water taxi or seabus services.

A full summary of the stakeholder engagement and feedback received can be found in Appendix A.

3 Jurisdictional Scan – Water Transportation Systems

Key chapter takeaways

This chapter summarizes a jurisdictional scan of select marine transportation services in North America. The key findings in this section included:

- These jurisdictions differed from the Toronto operational context including in route length, annual ridership, markets served and one-way fares.
- The jurisdictions have a combination of public concessions and private marine transportation operations.
- The services provided, along with management organizations, are heavily based on historical context and the need to address each jurisdiction's unique needs. Subsequently they may not be able to be successfully replicable in other jurisdictions without understanding this context.
- Vancouver, Halifax, New York and San Francisco all connect large populations and commuters between two areas separated by water, while Toronto's marine transport is largely focused on transporting tourists and recreational users from the mainland to the Toronto Islands.
- None of the studied jurisdictions managed planning and operations of marine services through a larger regional organization.
- Jurisdictions analyzed did not have organizations that served to play a wider marine regional planning role as services did not interfere with each other. This type of organization should be considered for the Toronto Harbour as there is more overlap between services and space.
- Modelling of marine transportation passenger demand can be challenging.
- Two elements from other cities that could be implemented in Toronto's context:
  - Wayfinding – better signage and mapping to showcase local attractions and other transport options would improve customer experience and ridership
  - Payment systems – public ferry systems in these cities often have payment systems incorporated with local transit payment systems.

3.1 Introduction

A jurisdictional scan was undertaken to understand how other cities manage multiple marine uses (ferries, water taxis/shuttles, private boating, non-motorized recreational users, etc.). This includes a review of existing operations, infrastructure, and operating structures for each jurisdiction. The jurisdictions studied were Vancouver, Halifax, New York, and San Francisco. Findings for each jurisdiction are provided in the following subsections. Full sized maps of marine services in each jurisdiction can be found in Appendix B.

3.2 Vancouver

Metro Vancouver benefits from a variety of marine transportation options. Regionally, the provincially managed BC Ferries operates two terminals in Metro Vancouver, offering routes to Victoria, Nanaimo, Bowen Island, and Langdale. To connect the North Shore with the City of Vancouver (CoV), the regional transit authority TransLink owns and operates the SeaBus, which departs every 15 minutes across the Burrard Inlet. Lastly, two private companies operate services in False Creek, which lies in the heart of the Vancouver. The Aquabus and False Creek Ferries provide frequent year-round fixed-route services to tourists and commuters alike.

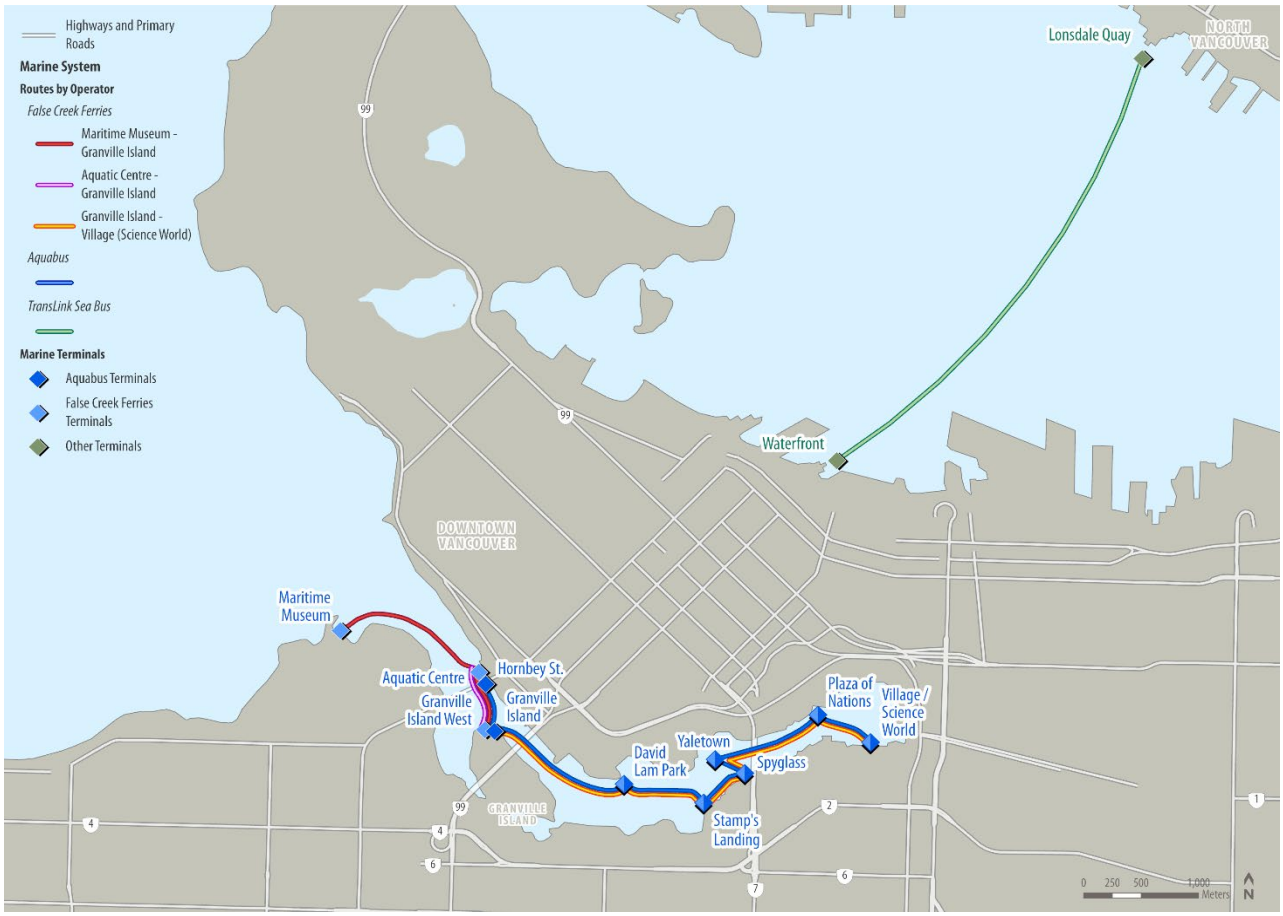
Table 3-1 below provides an overview of water transport operations within Metro Vancouver; Figure 3-1 showcases the local marine services provided by TransLink and private operators.

Table 3-1: Vancouver Water Transport Operations Overview

Type of Operators	(1) Regional Ferry – BC Ferries (2) Municipal SeaBus - TransLink (3) Private Operators – Aquabus and False Creek Ferries
Overview of Operations	**BC Ferries**: six routes arriving/departing in Metro Vancouver to Vancouver Island and Gulf Islands **SeaBus**: links North Vancouver with downtown **Private Operators**: two companies operating out of 11 docks
Annual Ridership	**BC Ferries**: 21.6 million (2023 ridership, all routes) **SeaBus**: 4,245,700 **Private Operators**: Not available
Operating Structure	**BC Ferries**: Provincially owned and operated. **SeaBus:** Owned by TransLink, operated by subsidiary CMBC (Coast Mountain Bus Company) **Private Operators**: Both services are privately owned and operate out of public and private docks.
Waterway Management	(1) Vancouver Port Authority for BC Ferries and SeaBus[12] (2) City of Vancouver for Private Operators[13]

[12] Jurisdictional map | Port of Vancouver (portvancouver.com)
[13] Anchoring | City of Vancouver

Figure 3-1: Marine Passenger Transport System – Vancouver



3.2.1 TransLink SeaBus – Operations Overview

The SeaBus ferry is an integrated service in Metro Vancouver's public transit system. It is owned by TransLink (TL) and operated by the Coast Mountain Bus Company (CMBC), a subsidiary of TransLink[14]. The service runs between North Vancouver and downtown crossing the Burrard Inlet connecting Lonsdale Quay to Waterfront Station. Waterfront Station is one of the busiest hubs in Canada being a terminal station connecting Canada Line, Expo Line, West Coast Express, and SeaBus services to Downtown Vancouver. It takes approximately 15 minutes to cross between the two terminals including docking times[15].

Figure 3-2: TransLink Seabus
Source: TransLink

The SeaBus is integrated into TransLink's regional service as part of the Frequent Transit Network (FTN), this includes 15-minute service or better from 6 a.m. to 9 p.m. (except on Sundays and holidays). Additionally, a 30-minute service is provided

[14] Coast Mountain Bus Company | TransLink
[15] SeaBus Schedules | TransLink

from 9 p.m. to 2 a.m. Passengers can pay with their Compass card or contactless card payment and is considered a Zone 2 trip[16]. The SeaBus has an annual ridership of 4.3 million passengers, the majority of which are commuters travelling between the North Shore and the rest of Metro Vancouver for work.

The SeaBus fleet is made up of four diesel engine ferries, each with a capacity of 395 passengers and are wheelchair accessible[17] In 2022, TransLink undertook a SeaBus propulsion feasibility study to look at how they could reduce its fleets GHG emissions by more than 85% compared to diesel[18]. TransLink's intent is to convert its ferry fleet to low emission options to reach their net-zero GHG emission target by 2050. An interview was conducted with TransLink on their SeaBus service and marine operations in Vancouver. They identified that the SeaBus is viewed as a critical part of the transportation network, in part as it offers commuters an option if there are significant delays or closures on the Lions Gate and Ironworkers Memorial bridges. In these circumstances, transit vehicles are rerouted to Waterfront Station and Lonsdale Quay so that passengers can access SeaBus service.

Within the harbour several operational changes are allowed for the SeaBus service including an agreement with the local port authority to allow SeaBus vessels to exceed the 5-knot limit within the inlet to meet required schedule, allowing passengers to make their connections to other public transit services on time. The SeaBus runs year-round service as ice formation in the Burrard Inlet is not a concern with the coastal waters and relatively mild winters that Vancouver experiences. Fog is typically the biggest winter challenge in the harbour and can sometimes impact service schedule.

3.2.2 BC Ferries – Operations Overview

BC Ferries is a provincially operated regional ferry system that has two terminals in Metro Vancouver. The terminals are located at Horseshoe Bay (21 km north of downtown) and Tsawwassen (36 km south of downtown). Both terminals and the surrounding Vancouver Harbour Area are federally managed by the Vancouver Port Authority.

BC Ferries has a fleet of 37 vessels, 14 of which regularly service at least one of the six routes that operate out of either of the Horseshoe Bay and Tsawwassen terminals[19]. All vessels have diesel engines, are wheelchair accessible, and have passenger and crew capacities ranging from 457 to 2,100. All vessels also operate vehicle transport services.

Figure 3-3: BC Ferries Vessel at Horseshoe Bay
Source: Daily Hive

[16] SeaBus service is considered a Zone 2 fare ($4.55) during daytime service. Zone 1 fare ($3.15) on evenings after 6:30pm and on weekends. Zone 1 and Zone 2 prices shown as cash/contactless fare for Adults; Compass Card usage results in a lower fare ($2.55 for Zone 1 and $3.75 for Zone 2).
[17] Coast Mountain Bus Company | TransLink
[18] Corporate Sustainability | TransLink
[19] Our Fleet | BC Ferries

BC Ferries recently awarded an order to Damen Shipyards for four new hybrid electric vessels to operate off the coast of Vancouver Island. The vessels will be equipped with 2,000 kW batteries to allow for 100% electric operations and will also contain auxiliary diesel engines for back-up and redundancy. Vessels will be charged using rapid charging stations during disembarking/embarking at each terminal end.[20]

BC Ferries operations were deemed not to be relevant to existing and proposed operations within Toronto's Inner Harbour, as such BC Ferries was not interviewed as part of the jurisdictional scan.

3.2.3 Private Water Taxis – Operations Overview

Two private services, AquaBus and False Creek Ferries, operate in False Creek within downtown Vancouver. The docks within False Creek are all city owned, though some docks are not maintained by the city.[21] False Creek is managed by the CoV and water taxis are required to follow the speed limits and anchoring laws within the inlet.[22] Pricing for each service is similar and ranges from $2.50 to $11.00 depending on the number of stops travelled. Figure 3-1 showcases the various routes each private company operates.

AquaBus is a private ferry serving eight stops in False Creek every 5 to 15 minutes. Its 14 vessels fleet is made up of a mixture of electric and diesel-powered pontoon boats, half of which are wheelchair accessible. Additionally, all but two docks in their route are accessible. The service operates year-round.[23]

False Creek Ferries operates a nine-stop ferry route within False Creek, with similar service frequency as AquaBus. Its fleet is entirely diesel powered and is only accessible to passengers with foldable wheelchairs.[24] Their ferries sail every five minutes from the West End of downtown Vancouver to Granville Island, and every 15 minutes on all other routes. At peak times, ferries sail every two minutes from the West End, and every 7-10 minutes on other routes.[25]The study team made several unsuccessful attempts to reach out to both the private ferry operators and the Vancouver Park Board. Based on the COV's website, the COV has a master license agreement with both private ferry companies operating in False Creek: This agreement grants non-exclusive access to seven city-owned, leased, or managed docks, ensuring equal access for both companies for an annual fee paid to the city. The agreement standardizes terms related to indemnification, liability, insurance requirements, and maintenance responsibilities.

3.2.4 Relevant Findings for Toronto Context – Vancouver

TransLink's SeaBus service is critical infrastructure connecting a large body of commuters from the north shore, across the Burrard Inlet to downtown Vancouver. As such, all service planning and operations is done by TransLink and its operating subsidiaries. This ensures that capital and operational budgets are made as part of the regional transportation planning process. The fares for the SeaBus are also set to reflect a public transport service.

[20] https://www.offshore-energy.biz/damen-wins-bid-to-build-four-hybrid-electric-vessels-for-bc-ferries/
[21] Docks and boat ramps | City of Vancouver
[22] False Creek anchoring map (vancouver.ca)
[23] website
[24] Frequently Asked Questions - False Creek Ferries (granvilleislandferries.bc.ca)
[25] Plan Your Trip - False Creek Ferries (granvilleislandferries.bc.ca)

3.3 Halifax

The Halifax region has relatively limited marine transportation options. Halifax Transit operates ferry service within Halifax Harbour. Water taxi services have been available in the past in Halifax Harbour, but no services are currently operating. Table 3-2 below provides an overview of water transport operations within the Regional Municipality of Halifax. Figure 3-5 on the next page showcases the local marine services provided by Halifax Transit, including existing and future planned services.

Table 3-2: Halifax Water Transport Operations Overview

Type of Operations	Municipal/regional Seabus
Overview of Operations	Two ferry routes operating out of three terminals
Annual Ridership	1.4 million
Operating Structure	Operated by Halifax Transit
Waterway Management	Halifax Port Authority

3.3.1 Halifax Transit Ferry Service – Operations Overview

The safety and waterway management of the Halifax Harbour is overseen by the federally appointed Halifax Port Authority.[26] Halifax Transit operates two year-round ferry routes that are integrated with the city's bus service.[27] All five vessels that operate in these routes are diesel powered and wheelchair accessible.[28]

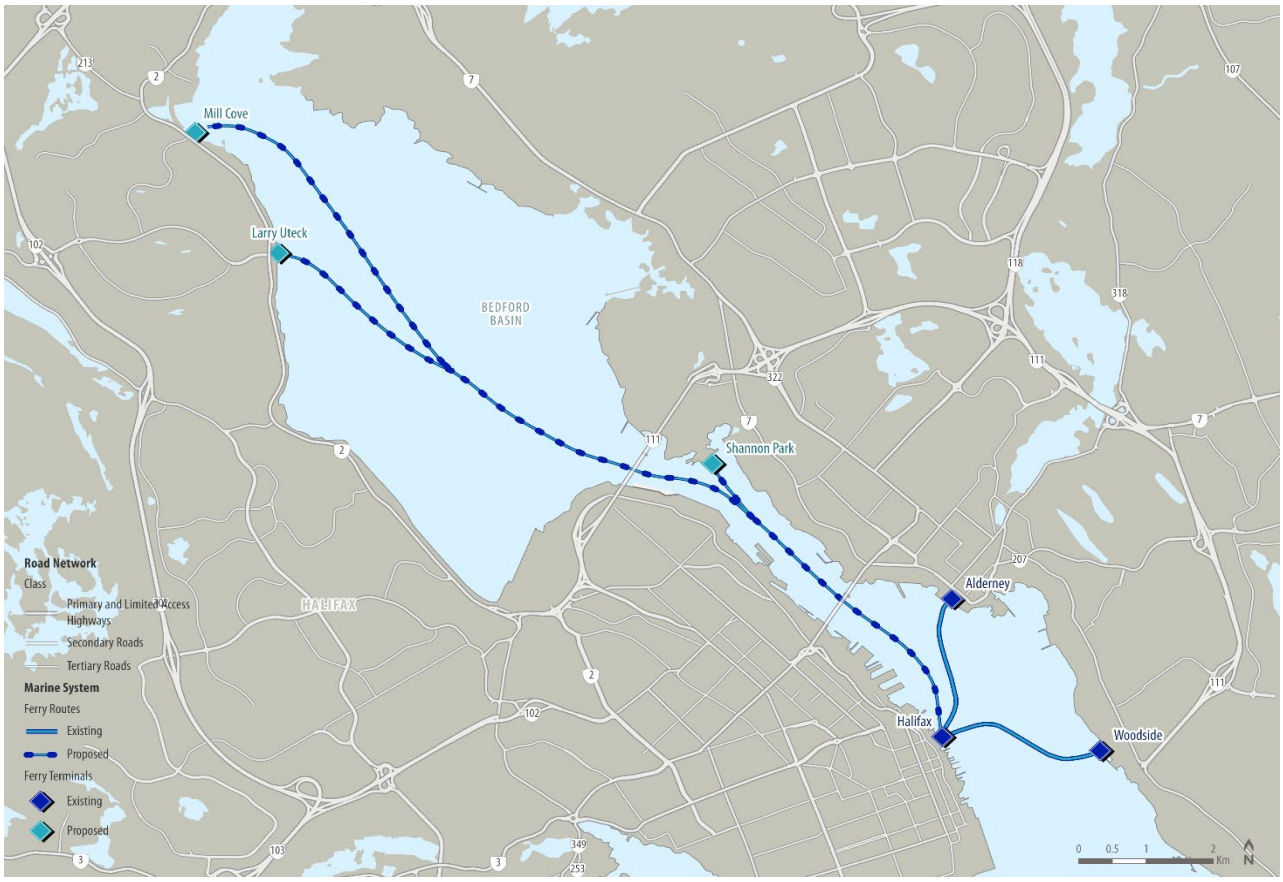
The Halifax-Alderney ferry departs every 15 minutes on weekdays and every 30 minutes on the weekends. The Halifax-Woodside service departs every 30 minutes but only runs on weekdays. Both ferry services are integrated with transit operations and are subject to the same fare structure. The fares for both routes are $2.75.[29] The service is mainly catered to commuters, although during the summer season tourists and cruise ship passengers use the service as well.

Along with the provincial and federal governments, the Halifax Regional Municipality (HRM) has plans to add three new routes as a part of their rapid transit plan.[30] Recently, the Province of Nova Scotia and HRM announced a joint $260-million investment with the federal government to build the Mill Cover Ferry Service, which includes the purchase of five electric ferries, a new ferry terminal at Mill Cove, renovation of the existing Halifax Ferry Terminal, a maintenance facility, and a bridge over the CN rail line in Bedford to connect the community to the Mill Cove terminal.

Figure 3-4: Halifax Transit Ferry
Source: Halifax Examiner

[26] Safety | Port of Halifax
[27] Halifax Transit | Ferry | Halifax
[28] Rita Joe ferry joins Halifax Transit fleet | Halifax
[29] Ride the Ferry from Halifax to Dartmouth | Discover Halifax (discoverhalifaxns.com)
[30] Rapid Transit Strategy | Shape Your City Halifax

Figure 3-5: Marine Passenger Transport System – Halifax



Halifax Transit staff reported that their ferry services, which run year-round, is a critical part of the transportation network that connects the larger region. The Halifax Port Authority is responsible for overall safety and navigation in the harbour. They impose an 8.5-knot speed limit within the harbour and a 7-knot limit near piers or docks.

Halifax Transit staff identified that their existing ferries have diesel engines and do not experience any operational issues. Vessels can withstand sea and swell of up to 40-45 knots. Waters in and around the basin are brackish and only form thin ice, as such ferry vessels are not ice class vessels.

In the summer the port is full of activity including ferry service, novice pleasure craft users, motorized and non-motorized marine uses, naval vessels, submarines, and some ship building. Management of all the various activities is not overseen by a specific overarching organization and no specific issues were reported with conflicting uses. The RCMP (Royal Canadian Mounted Police) and Halifax Regional Police marine unit both enforce safe operations in the harbour.

3.3.2 Private Water Taxis – Operations Overview

In 2015, two water taxi companies were launched in the Halifax Harbour, Harbour Water Taxi and Chebucto Water Taxi.[31] Both services have since gone out of business and no additional information could be found on their previous operations.

[31] Two new water taxis give you the keys to Halifax Harbour | City | Halifax, Nova Scotia | THE COAST

3.3.3 Relevant Findings for Toronto Context – Halifax

Halifax Transit ferry services are viewed as critical infrastructure connecting commuters across the Halifax Port. As such, all service planning and operations is done by Halifax Transit. This ensures that capital and operational budgets are part of the regional transportation planning decision making process. The fare for the service is also set by Halifax Transit and reflects fares for a public transport service.

Ice class vessels are not required due to the brackish nature of the waters the service operates in. Along with the provincial and federal governments, the HRM recently announced investment in a new ferry service to Mill Cove including the purchase of five electrical vessels and charging infrastructure. The Halifax Harbour is extremely busy with many competing marine uses with no organization responsible for managing traffic on the harbour.

Water taxi services no longer operate within the Halifax Port due to insufficient demand.

3.4 New York

NYC benefits from a variety of marine transportation options. Regionally, six operators provide scheduled service between the five boroughs and New Jersey.

Table 3-3 below provides an overview of water transport operations within NYC. Figure 3-6 showcases the local marine services provided by the various operators.

Table 3-3: New York City Water Transport Operations Overview

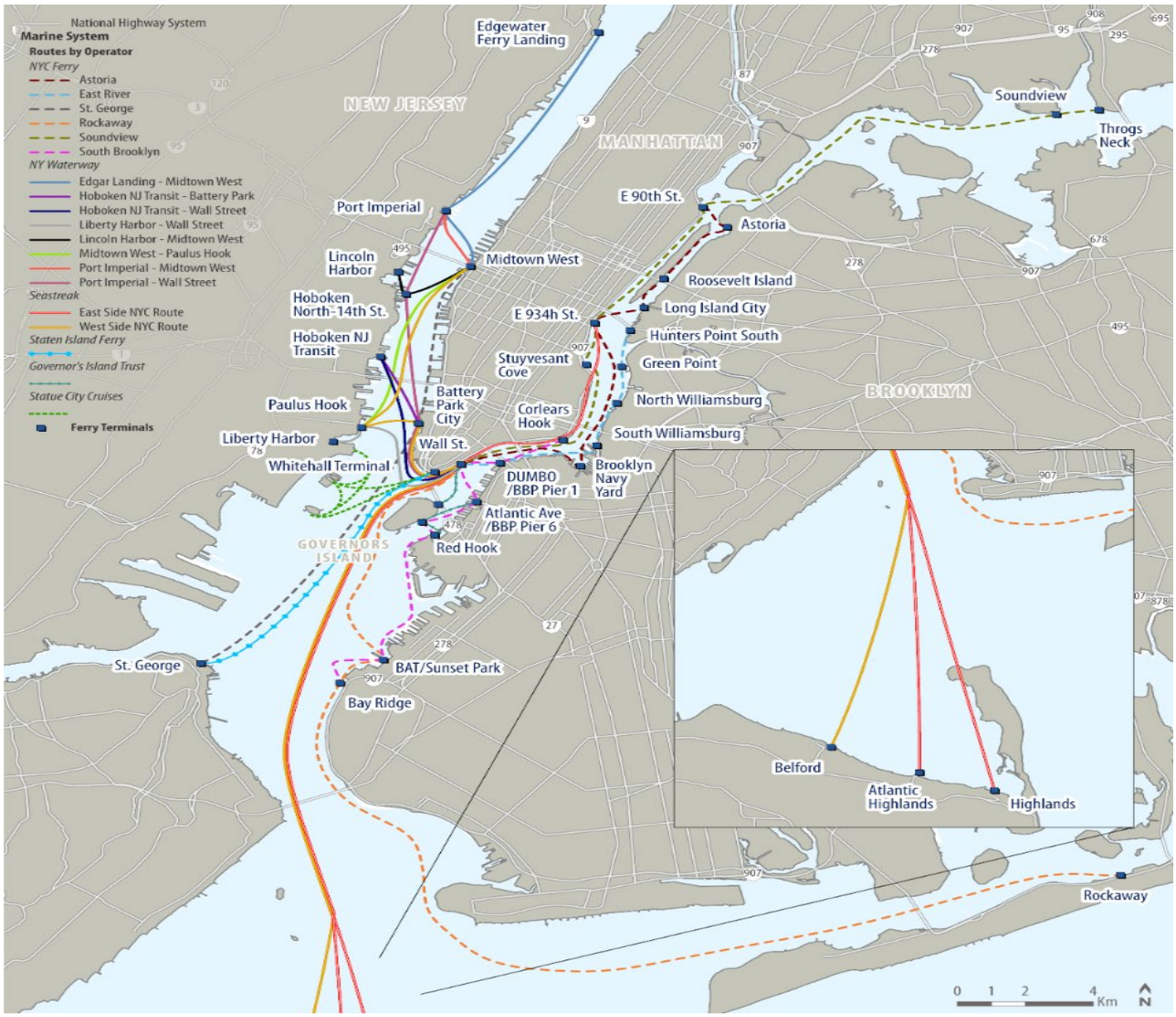
Type of Operations	(1) Regional Commuter Ferries (2) Municipal Seabus
Overview of Operations	**Staten Island Ferry**: free service from Staten Island to Manhattan **NYC Ferry**: nine routes linking all five boroughs **NY Waterway**: five routes operating in the Hudson River **Seastreak**: two commuter routes connecting NJ and NYC **Governors Island Trust**: three routes linking Manhattan and Brooklyn to the island **NYC Water Taxi**: private charters (no scheduled hop-on/hop-off service)
Annual Ridership[32]	**Staten Island Ferry:** 13.6 million **NYC Ferry**: 6.1 million **NY Waterway**: 4.7 million **Seastreak**: 805,886 **Governors Island Trust**: N/A **NYC Water Taxi:** 87,294
Operating Structure	**Staten Island Ferry:** publicly owned and operated by the city **NYC Ferry:** private (Hornblower) **NY Waterway**: private **Seastreak:** private **Governors Island Trust**: non-profit created by the city[33] **NYC Water Taxi**: private
Waterway Management	Port Authority of New York and New Jersey

[32] 2022 NYC Ferry and Water Taxi ridership data
[33] The Trust for Governors Island

3.4.1 Ferry Services - Operational Overview

There is a significant ferry network made up of privately and publicly operated routes that serve NYC and its surrounding suburbs. Safety, law enforcement, and ports are managed by a public joint venture between NY and NJ State, called the Port Authority of New York and New Jersey (PANYNJ).

Figure 3-6: Marine Passenger Transport System – New York City



The **Staten Island Ferry** (SIF) is a free wheelchair accessible service operated by the NYC Department of Transportation (NYCDOT).[34] The route connects the Whitehall Ferry Terminal in Manhattan to the St. George Terminal on Staten Island. The SIF operates 24/7, departing from either terminal every 15 minutes. NYCDOT is responsible for the maintenance of their ten-vessel diesel fleet, along with the two terminals.[35] As they begin to transition their fleet, three of their vessels now operate on cleaner tier 4 diesel engines.[36]

[34] Staten Island Ferry | Accessible NYC
[35] The Staten Island Ferry (siferry.com)
[36] New Staten Island Ferry Boat to be Named for Dorothy Day | City of New York (nyc.gov)

NYC Ferry provides a public network of ferry routes with the goal of connecting NJ residents to NYC and the five boroughs (including Governors Island). NYC Ferry is part of the NYC Economic Development Corporation (EDC), a quasi-public entity managing public land including a large portion of the waterfront. NYC Ferry manages the planning of ferry services while operations are delivered through concession contracts. All contracts are currently operated by Hornblower Cruises. NYC Ferry offers nine accessible routes connecting the five boroughs for $4.00 (adult fare).[37] Hornblower Cruises has a fleet of both 150- and 350-person diesel powered vessels.[38] According to a 2022 survey, 36% of customers use the service for commuting and 56% use the ferry at least three days a week.[39]

From an interview conducted with NYC Ferry the following additional information was shared regarding their organization and ferry services. NYC Ferry started following the successful pilot project of the East River Ferry in 2011 which was planned by NYC EDC (Economic Development Corporation) and operated using a private operator, a planning study for the development of a city-wide ferry system was undertaken in 2015 and launched in 2017.

NYC Ferry has implemented many lessons learned from their contracting and procurement experiences throughout the years. Vessel purchase costs were initially included as part of the concession contracts, requiring the operator to buy the boats at risk. If service was not successful, a contract mechanism could allow for either the operator to keep the vessel and redeploy elsewhere or for NYC EDC to purchase the boats. Services have been successful, and NYC EDC has since opted to purchase boats to reduce concession contract values. Initial concession contracts set minimums and guarantees for service and allowed for vast majority of farebox revenue to go to the operator; more recent concession contracts have changed and now specify exactly what should delivered (routes, service schedule, etc.) and price reflects cost of operations.

NYC Ferry has undertaken multiple ferry planning studies and developed a regional ferry travel demand model based on detailed ridership data and customer surveys. While this is a helpful tool in planning, results are not aways as expected. NYC Ferry indicated that 30% of their ridership is commuters (in line with transit mode share in NYC) and customer surveys indicate that 40% of riders take service as it is 'nicer' while only 20% take it because it is a faster option. While this is useful information for service planning, it can be difficult to accurately predict expected ridership of a service as a significant percentage of ridership uses the service for subjective reasons.[40]

NYC Ferry has alluded to situations where a launched service did not perform as ridership modelling predicted, some routes resulting in higher ridership while others lower ridership than expected. This reflects the differences in experiential travel demand and the difficulty with planning such services in a similar manner to public transport. NYC Ferry subsidizes all services as its goal is like that of a public transport agency in providing service to city residents.

NYC Ferry shared that there is no larger regional planning organization that manages planning and operations of services across NYC, this has been managed through the mandates and goals of each operating organization. NYC Ferry does not experience competition to its services and is not seeking any new business opportunities. It leaves potential new opportunities to private operators.

[37] New York NYC Ferry Routes & Schedules, The New York NYC Ferry Experience
[38] The New York NYC Ferry Experience
[39] 2022 NYC Ferry Survey
[40] 40% of users reporting they take the service as it is 'nicer' is likely in part influenced by current fare structure and competing price with transit alternatives. Modelling is not currently able to capture how many passengers are simply switching modes from transit versus who are new users (both a transit and ferry rider or just a ferry rider) – this would be an interesting and important aspect of wider regional planning and efficacy of public funds.

A DOT (Department of Transport) licence is required to land a vessel in NYC, this is largely perfunctory and not used as a mechanism to control the number of operators. Additionally, a landing slot licence is required for each pier/dock (typically signed with the landowner).

NYC Ferry operates a 'Rockaway vessel' (an open-water coined as it is used for their Rockaway service which has significant open-water travel) and a 'River vessel' (which is used for services operating in largely protected water bodies). Neither vessel type are ice class vessels. NYC Ferry does not experience issues with winter operations due to the tidal nature of the NYC Bay Area. Tugboats are employed at times when extreme weather conditions cause ice formation in Jamaica Bay.

Governors Island is an uninhabited island in the NYC Harbour that had 939,000 visitors in 2022.[41] The **Trust for Governors Island Ferry** operates a route between Lower Manhattan (10 South Street) and Soissons Landing year-round to access Governors Island. Additionally, they run two weekend services from Yankee Pier on the Island's east side to Brooklyn Bridge Park and Red Hook. These services cost $4 for an adult round trip, are wheelchair accessible, and provide riders with free service on the weekends before noon.[42] Joining its 400-passenger diesel vessel, the Trust will add a hybrid battery powered 1,200 passenger ferry in 2024.[43]

NY Waterway is a privately owned company that offers eight routes in the Hudson River out of eleven terminals, with a limited weekend service.[44] They have a fleet of 32 vessels, which operate their various routes in roughly 30-minute intervals. The fares range from $1.75 to $11 depending on the route and the time the passenger is on board.[45]

A commuter ferry provided by private company **Seastreak** links New Jersey to Manhattan through two routes using seven diesel powered catamarans.[46] The $28 one-way fare, year-round service, departs from three NJ terminals approximately every 30 minutes, transporting approximately 2,500 commuters daily.[47] Seastreak estimates that their average commuter saves 75 minutes daily by taking the ferry compared to other forms of transportation to or from Manhattan.[48]

3.4.2 Private Water Taxi – Operations Overview

The **New York City Water Taxi** is privately operated by New York Cruise Lines. They have a fleet of ten vessels that have a capacity between 99 and 149 passengers.[49] The service can stop at 28 docks in NYC Harbour. Although they offer commuter transport, the service does not operate on a regular schedule nor a truly on-demand service and is primarily for private charters.[50]

3.4.3 Relevant Findings for Toronto Context – New York City

NYC's operating context is different to Toronto. NYC has a large population and tourist base that results in significant demand for marine transport. Routes are typically significantly longer and are either priced higher to capture time-sensitive users and tourists or are priced similarly to public transport to capture commuter demand. NYC Ferry service is viewed as critical infrastructure and is considered part of the regional transportation network. As such, all planning is done by NYC

[41] Governors Island Annual Report
[42] Ferry | Governors Island
[43] Trust for Governors Island Introduce New, Hybrid Ferry
[44] NY Waterway Weekday Ferry Map
[45] Fares, Routes & Schedules (nywaterway.com)
[46] Our Robust Fleet | Seastreak Ferries
[47] New York City | New Jersey Commute By Seastreak Ferry
[48] Commute by ferry to New York City and New Jersey | Seastreak Ferries
[49] Our Fleet - New York Water Taxi
[50] FAQ - New York Water Taxi

Ferry, and the service fare is set to reflect public transport service. NYC Ferry contracts out operations through a concession contract.

Service planning for NYC Ferry services is conducted to optimize services for commuters, although the service operators report that this is somewhat difficult to assess actual demand and user types for the services.

Other private ferry operators exist and typically cater to time-sensitive customers and tourists, but these services are not competing against NYC Ferry services allowing both public and private services to operate. Licensing requirements typically include a route licence with the DOT and a landing slot licence with the specific dock/pier owner. Licences are not used to manage or control the number of operators.

A water taxi service exists although it functions more as a private charter (and not as an on-demand service).

3.5 San Francisco

San Franscisco Bay has both publicly owned commuter ferry services and private water taxi services. The WETA (Water Emergency Transportation Authority) is responsible for the ferry service and emergency response and public safety in the in the bay.[51] Table 3-4 below provides an overview of water transport operations within San Francisco (SF); Figure 3-7 showcases the local marine services provided by the various operators.

Table 3-4: San Francisco Water Transport Operations Overview

Type of Operations	(1) Municipal/regional Seabus (2) Water Taxi
Overview of Operations	**SF Bay Ferry**: six year-round routes linking SF, Oakland, and surrounding areas **Golden Gate Ferry**: five year-round routes with similar services to SF Bay Ferry **SF Water Taxi**: hop-on/hop-off service in the SF bay
Annual Ridership	**SF Bay Ferry**: 1,787,400 **Golden Gate Ferry**: 1,155,682 **SF Water Taxi**: N/A
Operating Structure	**SF Bay Ferry**: publicly owned by WETA and privately operated by Blue & Gold Fleet. **Golden Gate Ferry**: publicly owned + operated by the Golden Gate Bridge, Highway and Transportation District **SF Water Taxi**: privately owned + operated
Waterway Management	SF Ports

[51] WETA | Water Emergency Transportation Authority, SF Ports Waterfront Plan

3.5.1 Ferry Services - Operational Overview

The **San Francisco Bay Ferry (SF Bay Ferry)** is owned by the WETA, and operations are contracted out through a concession to the private firm Blue & Gold Fleet. SF Bay Ferry has six year-round routes, two short hop links, and two seasonal event routes that operate out of twelve terminals.[52] Fares range from $4.60 to $9.30, depending on the zone you are traveling in.[53] The fleet consist of 17 ferries, all of which run on renewable diesel.[54]

WETA was originally established in 1999 as the San Francisco Bay Water Transit Authority (WTA) after Bay Area bridges remained closed for a significant amount of time following the 1989 Loma Prieta earthquake and access was provided via ferry service. This included consolidation of services provided by the City of Alameda and the City of Vallejo (operations on the east side of the bay) into the operations of the WTA. In 2007 following significant emergency incidents across the United States where ferry services were used as part of emergency management operations (i.e., 9/11 and Hurricane Katrina), the California state legislature revised the mandate of the WTA changing it to WETA. WETA now has the mandate of operating and expanding ferry service on the San Francisco Bay and coordinating water transit response to regional emergencies.

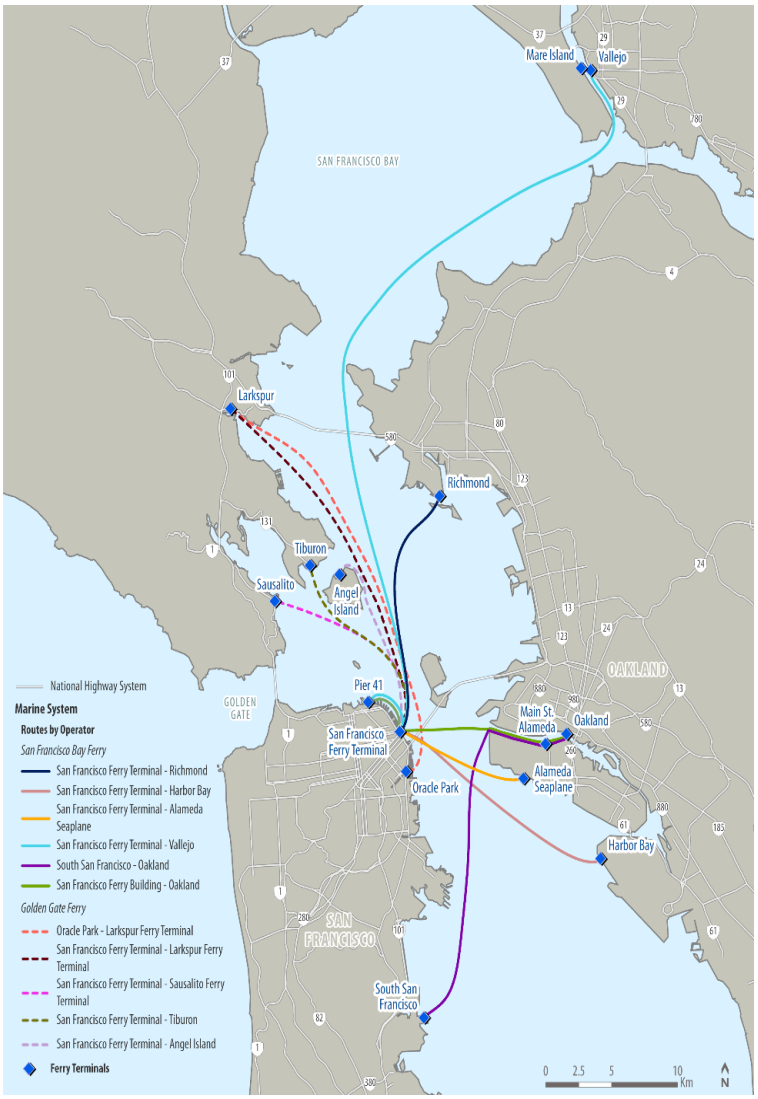


Figure 3-7: Marine Passenger Transport System – San Francisco

Initial reactions to the amalgamation of services received responses that mostly focused on concerns of a reduction in services. In the last ten years of operations, SF Bay Ferry has been able to expand and scale services including upgrading of terminals, purchases of new boats, and increasing operating level of service. While its mandate includes coordination for regional emergencies, ferry service planning and expansion are conducted to align with typical commuter travel. Emergency planning requires that services can be nimble and accommodate surge demand; however, SF Bay Ferry reports that commuter demand can fill up service that was initially planned for future or emergency demand. This showcases the difficultly in accurately estimating ferry demand and the typical downfall of funding capital costs (versus operational costs). WETA

[52] Fares & Tickets | San Francisco Bay Ferry
[53] ibid
[54] San Francisco Bay Ferry - FerryRiders.com, Diesel Technology Forum

operations are mainly funded through bridge tolls and fare box recovery (approximately 60% fare box recovery).

The Golden Gate Ferry (GGF) is an accessible ferry service that is publicly owned and operates connecting the counties of Marin, Sonoma, San Francisco, Contra Costa, and Angel Island.[55] The fares range from $14.00 to $15.50, and the service operates five routes out of six municipally operated terminals.[56] The seven diesel engine vessels in the fleet have capacities between 400 - 750 passengers.[57]

The Golden Gate Bridge, Highway and Transportation District (the District) is a special district of the State of California which operates and maintains the Golden Gate Bridge and its two public transit systems, Golden Gate Transit (GGT) and GGF. Prior to and during construction of the Golden Gate Bridge (completed 1937), ferry and rail service was the only way to access Marin County from San Francisco. Due to the popularity of the Golden Gate Bridge, ferry services to Marin County terminated in 1947. Ferry services were restarted in 1970 (as GGF alongside GGT under the mandate of the District) following capacity concerns with the Golden Gate Bridge. GGF and GGT are funded Golden Gate Bridge Tolls, fare box recovery, and local subsidies, advertising, and other District revenue (50%, 20%, and 30% respectively). GGF operates ferry services in the northwest side of the Bay.

As SF Bay Ferry and GGF are both public operations there is some regionalism with planning and operations of service being reserved to historic local jurisdictions. A more coordinated approach could benefit the region but is difficult to realize in the wider state and local governance structure.

Additional ferry services include Alcatraz Island that is delivered through a concession contract by the U.S. National Park Service. This service is currently operated by Hornblower.

3.5.2 Private Water Taxi – Operational Overview`

Starting at $10, the **San Francisco Water Taxi** offers a hop on, hop-off taxi service in the bay that stops at six docks from Hyde Steet Pier to Pier 52.[58] Service is not based on a timetable and requires online booking or calling to schedule a pick-up time.

3.5.3 Relevant Findings for Toronto Context – San Francisco

San Francisco's operating context is different to Toronto – two public ferry services are heavy influenced by historical context which impacts overall planning and delivery of regional ferry services. Different approaches are taken to service planning and fare structure which impacts regional users. Ferry service is viewed as playing an important role in the regional transportation network and has the added role of supporting in emergency management operations.

A water taxi service exists although it functions more as a charter (and not as an on-demand service).

[55] Accessibility on GGF - Ferry | Golden Gate
[56] Summer 2023 Golden Gate Ferry Service Summary
[57] Fleet - History & Research | Golden Gate, Statistics & Ridership - History & Research | Golden Gate
[58] Hop-On, Hop-Off Landings (sfwatertaxi.net)

3.6 Jurisdictional Scan Findings

Table 3-5 provides a summary comparison of each studied jurisdiction alongside Toronto's existing marine operations.

Table 3-5: Jurisdictional Scan Overview

Jurisdiction	Service	Approximate Length (one-way)	Annual Ridership	Market Served	Operating Model	One-way Fare (Adult)
Toronto	**City of Toronto Ferry**	**2 km**	**1.4 million (2022)**	**Tourist, Recreational, Access**	**Public**	**$8 (CAD) *only pay to Island**
	Water Taxis (6 operators)	**2 km**	**500,000 (2022)**	**Tourist, Recreational, Access**	**Private**	**$12 - $12.50**
Vancouver	TransLink SeaBus	**3 km**	4.3 million (2022)	Commuter, Tourist	**Public**	$4.55 (CAD)
	Water Taxis (2 operators)	0.3 km –**3 km**	n/a	Tourist	**Private**	$3.55 - **$11** (CAD)
Halifax	Halifax Transit Ferry	**1.5 km –2 km**	**1.4 million (2021/2022)**	Commuter, Tourist	**Public**	$2.75 (CAD)
	Water Taxis (not operational)	n/a	n/a	n/a	n/a	n/a
New York City	Staten Island Ferry	8 km	13.6 million (2022)	Commuter, Tourist	**Public**	Free
	NYC Ferry	**3 km**-33 km	6.1 million (2022)	Commuter, Tourist	Concession	$4 (USD)
	NY Waterway	**2 km**–13 km	4.7 million (2022)	Commuter, Tourist	Private	**$7 - $13.50** (USD)
	Seastreak Ferry	45 km	**0.8 million (2022)**	Commuter, Tourist	Private	$28 (USD)
	Governors Island Trust Ferry	0.8 km	n/a	**Tourist, Recreational**	Concession	$4 (USD)
	Charter services	n/a	87,000 (2022)	**Tourist**	Private	n/a
San Francisco	SF Bay Ferry	9 km -5 0km	**1.8 million (2022)**	Commuter, Tourist	Concession	$1 **-$9.30** (USD)
	Golden Gate Ferry	11 km –24 km	**1.0 million (2022)**	Commuter, Tourist	Concession	$14 - $15.50 (USD)
	Water Taxi	7 km	n/a	**Tourist**	**Private**	**$10**-$25 (USD)

The studied jurisdictions operate in different contexts to that of Toronto, both in terms of operations (majority of marine transport services are for commuter access purposes) and in governance (marine services are considered similar to public transport and fares are subsidized or private operations for specific tourism and commuter markets and priced accordingly). San Francisco is highly influenced by historical context, which in some ways limits the regional approach to marine transport service.

All interviewed jurisdictions thought their jurisdictions still had issues to be resolved, local context is extremely important in setting up efficient operations and particularities within each jurisdiction require solutions to address their unique needs

Modelling of ferry demand and ridership was found to be unpredictable due to the inherit experiential demand for marine transport services and that demand could not typically be accurately assessed until services had been introduced or expanded. Regardless, it was noted as important by all jurisdictions to collect data on ridership and customer experience to draw conclusions relevant to the local context.

Studied jurisdictions did not have a regional organization tasked with oversight, management or planning of regional marine passenger transport services, this was typically managed through market demand. In interviews, Vancouver, Halifax, and New York did not see a need for such an organization; San Francisco expressed that a regional planning lens and collaboration could benefit regional users. Licensing requirements are different within each jurisdiction, but in all cases are not used to manage or control number of operators.

Water taxi services were highly dependant local geographical context and demand. Water taxi services do not exist in Halifax due to insufficient demand. Vancouver has two water taxi services which operate on a specific route but not on a specific timeline. These services do not compete with TransLink's SeaBus. New York and San Francisco have operators called 'water taxis' although they operate services more resembling a private charter.

4 Feasibility Analysis

Key chapter takeaway

This chapter summarizes the feasibility analysis (commercial, technical, and organizational) conducted for five potential fixed routes; scheduled marine services connecting the Toronto waterfront, Inner Harbour and Outer Harbour.

The commercial feasibility of the five routes was assessed based on the demand modelled for each route, the expected costs, and the revenues required to cover the costs. The commercial feasibility analysis was the main factor in determining the overall feasibility of the potential routes as the technical and organizational feasibility analysis did not find significant difference between the routes.

The analysis found that feasibility is improbable for the 2023 study horizon for all the routes as key destinations are undergoing development and it is unlikely that there is sufficient demand to make the services commercially feasible. As well, the fares that would be required to be charged to cover the costs to operate the services are not competitive with other transportation options.

The feasibility in 2035 and 2050 increases to potential and promising in some cases as development and demand increases.

While the feasibility for all routes in the 2023 study horizon was found to be improbable, it is recommended that two routes (A and D) should be considered for a pilot project. With modifications in route design to eliminate stops that offer little or no landside attractors, these two routes would have greater feasibility in the near term. Routes A and D also offer the highest forecasted peak month passenger demand and between the two routes encompass all other routes analyzed. This contributes to making them a higher priority for piloting.

These pilots should include detailed ridership and visitation data, and as well as a preference survey of future potential users of water taxi and seabus services.

In terms of the organization needs, the creation of a new body with a mandate and regulatory powers to coordinate marine operations would be difficult to start and fund on an on-going basis. The need for such a body would be dependent on ultimate decision regarding operational model of a new proposed service (public, concession, or private) and role that existing organizations want to or are legally able to undertake.

Amendment of TIDAL licence or creation of new licence could be used to manage safety, operators approved for terminal use, and other elements of customer experience as demand increases for cityside marine transport.

4.1 Methodology Overview

To assess the feasibility of introducing fixed-route, set-timetable marine passenger services in Toronto's Inner Harbour a four-step approach was undertaken to guide the analysis for this study. These steps in relation to this study are summarized below and in Figure 4-1

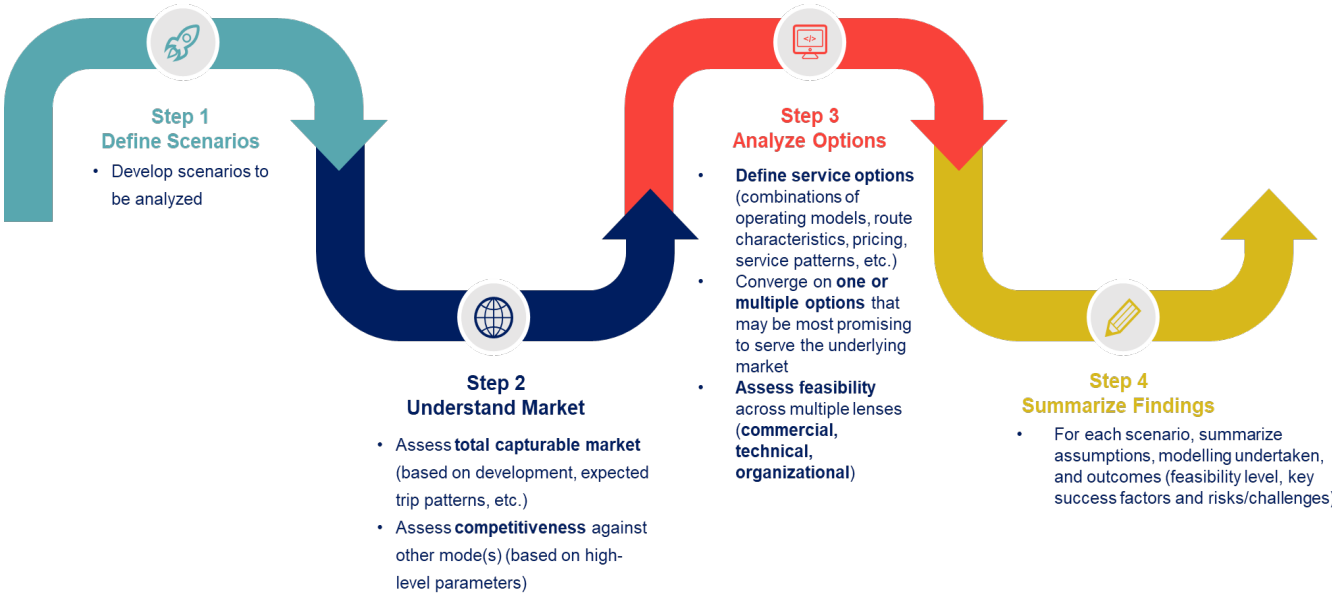
Step 1 - Define Scenarios: Determine the fixed-route marine passenger scenarios in Toronto's Inner Harbour to analyze for feasibility.

Step 2 – Understand Market: Assess the population of existing and future users of marine passenger services amongst different travel zones along on the waterfront. This step involves understanding the travel patterns of these current and future potential uses between these travel zones and considers future developments (e.g., landside attractors) on the waterfront and existing and future transportation options.

Step 3 – Analyze Options: Model the travel demand of each route scenario based on passenger demand identified in Step 2. Then assess the commercial, technical and organizational feasibility of these route scenario models.

Step 4 – Summarize Findings: The last step provides a summary of the analysis of each route scenario based on the different feasibility lenses that were applied to these routes in Step 3. This step includes providing a classification for each route scenario on its potential feasibility

Figure 4-1: Feasibility Study Process Overview



As identified in Step 3, the feasibility of services was analysed across three dimensions: commercial feasibility, technical feasibility, and organizational feasibility to provide an all-encompassing assessment of each route scenario. Below is summary of the major elements considered under each of the three dimensions of feasibility.

1. **Commercial Feasibility**:

   This assessment explored the commercial feasibility to operate a fixed route, scheduled marine transportation service for each route that the Study Team was asked to analyze. This commercial feasibility was based on the calculated demand to travel between the stops located on each route to determine the size of the market demand for this service. This market demand calculation included identifying how much of the demand would be met by other transportation options including transit, driving or walking. It also considered the seasonality of the demand.

   The commercial feasibility analysis also looked at the cost to provide the service versus the price that would have to be charged to cover the costs of the marine transportation service based on the projected number of passengers that would use the service.

2. **Technical Feasibility:**

   A high-level analysis was done to determine the required infrastructure and engineering feasibility of providing docking facilities to accommodate the marine transportation routes that were reviewed. This analysis included looking at opportunities to use existing docking facilities as well as the cost of providing new infrastructure that was appropriate to support the expected level of service (e.g. size of boat, number of passengers, etc.).

   The analysis also examined the bathymetric conditions (depth and floor of Ontario Lake within study area); site environmental conditions (waves, wind, current); sediment accumulation and dredging requirements; harbour navigational traffic; existing harbour infrastructure; and elements of ownership (landside, water, docking, etc.).

3. **Organizational Feasibility:**

   An assessment of the governance and organization structural requirements of new services were assessed along with any changes that would be required to support new fixed-route marine services. As well, at a high-level, licensing and legal issues were identified that could impact the introduction of fixed-route, scheduled marines service.

   Feedback from various major waterfront and marine stakeholders were also taken into consideration for the feasibility analysis.

Assessment Feasibility Categories

For this study, the feasibility of each fixed-route marine scenario is classified into one of the following categories:

1. **Improbable** – no further analysis is recommended unless significant changes to assumptions.
2. **Potential** – may warrant additional study of feasibility in further depth, commentary to include circumstances under which feasibility could increase.
3. **Promising** – warrants additional study of commercial, technical, and organizational considerations in depth.

The decision on how to classify each of the marine route scenarios was based on a combination of the three feasibility dimensions. Greater weight was placed on the commercial feasibility dimension as there was not a large difference found between route scenarios in terms of technical or organizational feasibility. As well, the thresholds between each assessment category were not precise due to the nature of this study and the numerous assumptions that had to be made, which are detailed below.

4.2 Study Parameters

This section presents the study parameters that were used to undertake the analysis of the demand for marine transportation services on Toronto's waterfront. To determine the demand for marine transportation three study horizons (2023, 2035, and 2050) were chosen to guide the feasibility analysis. For the two future horizons assumptions were made on the landside context including the development of attractors and land-based transportation options.

Landside developments and transportation options are key factors in determining the demand for marine transport services and the associated feasibility of providing such services and making recommendations on future study and investments.

Existing Horizon (2023)

- Ontario Place summer programming (Budweiser Stage, Trillium Park, other events)

Near Future (2035)

- Ontario Place redevelopment is complete (with projected visitation and jobs)
- Partial development of: East Bayfront, Keating West, East Harbour, McCleary District, Polson Quay and South River, Media City, and Turning Basin, Quayside and Ookwemin Minising developments
- Growth of visitation (based on projected regional growth) and reallocation of visitation (based on development of population/jobs)
- Ontario Line and WELRT complete

Future (2050)

- Ontario Place redevelopment is complete (with projected visitation and jobs)
- Completed development of: East Bayfront, Keating West, East Harbour, McCleary District, Polson Quay and South River, Media City, and Turning Basin, Quayside and partial Ookwemin Minising development
- Growth of visitation (based on projected regional growth) and reallocation of visitation (based on development of population/jobs)
- Ontario Line and WELRT complete

Detailed assumptions for each study horizon are discussed further in Section 4.4 (Step 2: Understanding Market).

4.3 Step 1: Define Scenarios

The *2020 Marine Use Strategy* recommended the analysis of several new marine services for further feasibility analysis. The seabus route scenarios analyzed for feasibility for this study are defined and discussed in further detail in Table 4-1. Each route was analyzed in isolation (i.e., not operated alongside any of the other proposed routes) to determine the most feasible solution while balancing demand attractors and service operations. The routes and docking locations (i.e., stops) were developed based on the findings in the *2020 Marine Use Strategy* and in collaboration with the client.

Table 4-1: Feasibility Study Scenarios

Study Scenario	Details
Route A (East-West route with stops along landside of harbour from Ontario Place to Ookwemin Minising)	New proposed route with stops at: 1. Ontario Place *(Optional)* 2. Portland Slip 3. Yonge Slip 4. Parliament Slip 5. Ookwemin Minising (Canoe Cove) *(Optional)*
Route B	New proposed route with stops at: 1. Ontario Place 2. Portland Slip 3. Parliament Slip 4. Toronto Islands (*Optional*) 5. Outer Harbour Marina (*Optional*)
Route C	New proposed route with stops at: 1. Ontario Place 2. Portland Slip 3. Yonge Slip
Route D	New proposed loop route with stops at: 1. Ontario Place 2. Portland Slip 3. Yonge Slip 4. Parliament Slip 5. Ookwemin Minising (Canoe Cove) 6. Outer Harbour Marina 7. Wards Beach 8. Gibraltar Point 9. Ontario Place
Route E	New proposed route with stops at: 1. Yonge Street 2. Parliament Slip 3. Ookwemin Minising (Canoe Cove) 4. Toronto Islands

4.4 Step 2: Understanding Market

4.4.1 Waterfront Study Zones

To undertake a transportation demand analysis for possible fixed route, scheduled marine transportation services on the Toronto waterfront, the waterfront was separated into seven zones of interest which were used as origins and destinations for a travel demand analysis. These zones are shown in Figure 4-2.

Figure 4-2: Waterfront Study Zones (Imagery Source: Google Earth)

The above map identifies the study zones used in this analysis and are described further in Table 4-2 below.

These zones were created based on stop locations used to develop the fixed-route marine transportation schedules. Each zone represents the area where demand for marine transportation services was modelled for the stop within that zone. The total demand from all stops was then aggregated to assess overall route demand and evaluate its commercial feasibility.

Table 4-2: Description of Study Zones

Study Zone	Zone Description	Zone Boundary
Zone 0	Ontario Place	Lake Shore Boulevard West and Ontario Place Boulevard to shoreline. Includes Ontario Place and Trillium Park.
Zone 1	West Waterfront	Ontario Place Boulevard to Rees Street; Lake Shore Boulevard West to shoreline. Includes Portland Slip, Spadina Slip and Rees Slip.
Zone 2	Central Waterfront	Rees Street to Lower Jarvis Street; Lake Shore Boulevard West to shoreline. Includes Simcoe Slip, York Slip, Jack Layton Ferry Terminal, and Yonge Slip.
Zone 3	East Waterfront	Lower Jarvis Street to Cherry Street; Lake Shore Boulevard West to shoreline. Includes Jarvis Slip and Parliament Slip.
Zone 4	Ookwemin Minising	Includes Ookwemin Minising, McCleary District, Polson Quay & South River, Media City, Turning Basin, and East Harbour. This represents the northern portion of the Toronto Port lands.
Zone 5	Toronto Islands	Includes all islands within Toronto Island Park. Does not include study of Billy Bishop Airport.
Zone 6	Outer Harbour	Includes the southern portion of the Toronto Port Lands, Cherry Beach, Outer Harbour Marina, and Tommy Thompson Park.

4.4.2 Methodology of Travel Demand Modelling

The Project Team developed a method that harnesses the principles of the “Four Step” approach to travel demand modelling. Because of data limitations, a number of assumptions needed to be made in synthesizing Origin/Destination (O/D) matrices. The basic approach consisted of the following steps:

Market segmentation: The market for utilitarian travel was divided into two segments, for which trip generation was computed separately:

a) Demand related to daily-type trips, such as work, school, errands, shopping, appointments, etc. This was assumed to be a function of population and employment.

b) Demand related to special trip generators, such as tourist attractions, parks, festivals, etc. This was assumed to be a function of visitorship by non-residents.

Within these market segments, three user groups were analyzed:

1) Employees / Residents – covered under market segment (a).

2) Cityside Visitation – partially covered under special trip generator demand. This demand is differentiated from Island Visitation due to other existing transport modes available to complete the trip.

3) Island Visitation – partially covered under special trip generator demand. This demand is differentiated from Cityside Visitation as transport requires a marine connection.

Trip generation and distribution: Trip generation for **market segmentation (a)** was estimated based on functions derived by the Project Team from the TTS. Trip distribution (origin-destination patterns) was assumed based on relationships derived from the TTS for other benchmark neighbourhoods in the central core, which are broadly similar. These steps resulted in the development of mode-agnostic O/D tables for the waterfront for current and future years (i.e., sum of all modes), such that as new development occurs, it is assumed to have similar trip generation and distribution patterns as the benchmarks.

For **market segmentation (b),** an assumption was made as to the proportion of demand coming from near versus far locations, which varied by trip generator. Trips that originated from “far” locations were not assigned amongst the zones due to the availability of other modes of transportation that can provide faster, more competitive transportation services for demand coming from these far locations. The “near” trips were assigned among the zones based on the overall level of activity for the given year (e.g., travel between special generators and the Eastern Waterfront will increase proportionally as the Eastern Waterfront is built out).

Mode and route: Mode choice was incorporated by adjusting the total modelled O/D flows downward to develop an estimate of total contestable market (which accounts for the assumption that there is some percentage of travelers who would not consider switching to a water-borne mode). Next, for each proposed water transportation route, a high-medium-low factor was applied to each O/D to estimate the capture rate, i.e., the share of total contestable market that could be expected to select the route. This was applied for each route based on the directness of the water route and the availability of transportation alternatives such as streetcar routes.

Temporal dimension: The O/D matrices were first created on a monthly basis, assuming an average month during the warm-weather season (e.g., approximately the period May to September). Once the O/D matrices were carried through the above steps, modelled passenger trips were converted from monthly to daily trips for service analysis; service analysis is discussed further in Section 4.5.

4.4.3 Challenges and Key Assumptions

At a broad level, there were three key challenges in determining the demand generated for marine transport services along the Toronto waterfront. Most of the assumptions that were required to be made in the development of the Trip O/D matrix were related to these three challenges.

1) **Timing and size of the future development of landside attractors**

While there was considerable data available on future landside attractors, there was still uncertainty on the actual development timelines and final population impacts from these future attractors. The best data available was used, but it was recognized that many of the timelines and final residential population impacts were estimates that could vary considerably by the time a project is fully planned, approved and developed.

2) **Travel patterns associated with the new landside attractors**

The travel patterns of the residents and employees of the new landside attractors are not known, so for the modelling of demand the travel patterns for other similar neighbourhoods in downtown Toronto were applied to the new developments planned for the Toronto waterfront.

3) **Transportation modal choice**

The largest challenge was determining the modal choice of the residents and employees of the new landside attractors. While there is good data and research that can be used to determine modal choice (e.g., driving a car, transit and cycling) between destinations using land-based transportation, these is much less reliable information and research available related to marine transportation, and its impact on modal choice when marine transportation is available. The modal choice issue was also made more complex by not fully knowing the transportation options that may be available in the future along Toronto's waterfront, with the WELRT being the most prominent example.

Table 4-3 below discusses the assumptions that needed to be made to address these challenges in more detail. Note that Appendix C provides additional details on market assumptions that were used for modelling purposes.

Table 4-3: Market Analysis Key Assumptions

Parameter or Input	Assumption
Number of residents and employees, by zone (current and future)	Assembled using data and projections provided to the Project Team by Waterfront Toronto, accounting for planned developments.
Number of visitors, by zone (current and future)	Assembled using several data sources. Current visitor data was obtained from the Waterfront BIA for the waterfront and assigned to the Western, Central and Eastern zones on a weighted basis. This reflects an estimate of the first/primary zone visited. Note that data source defines visitors as non-residents / non-employees of the waterfront. Future-year visitors were estimated by assuming that visitors will grow at the same rate as Toronto's population. In addition, projections provided to the Project Team by Waterfront Toronto were incorporated reflecting new planned special attractors, for example on Ookwemin Minising.
Trip generation, residents and employees, by zone	Trip generation for this market was estimated by applying a trip generation curve derived by the Project Team from the TTS for all trips in Toronto. This curve estimates total daily one-way trips per resident (all purposes) as a function of the employee-resident ratio. The higher the E/R ratio, the greater the trip generation per resident. This curve was applied for both the current and future years for each zone. The daily trip generation was multiplied by 30 to achieve a monthly total.
Trip generation, visitors, by zone	The total number of annual visitors was multiplied by a **factor of 0.15** to derive a monthly equivalent. This ratio is the equivalent of assuming approximately a five-month warm-weather period in which 3/4 of annual trips take place. For

Parameter or Input	Assumption
	reference, this parameter is broadly consistent with seasonality data from the City of Toronto ferry services. This results in an estimate of one-way trips by visitors per month.
Share of trips internal to the zone	For the employee/resident market, **3% of all trips** were assumed to be internal to the same zone. This is consistent with travel patterns on the Western Waterfront currently based on TTS data, as well as other comparator neighbourhoods such as City Place. For visitors, 0% of trips were assumed to be internal to the same zone.
Share of trips within the study area (excluding internal within same zone)	For the employment/resident market, **3% of all trips** were assumed to be to elsewhere within the study area, in the base year. This share was estimated to increase to **6% for 2035** and **9% for 2050**. To develop these estimates, the Project Team assessed TTS patterns for four benchmark neighbourhoods with similar development patterns (i.e., newly developed central neighbourhoods): Liberty Village, Fort York, City Place, and Queens Quay West. On average, around 9% of trips originating in these neighbourhoods are destined along an axis (EW or NS) to destinations within approximately 2 km in either direction. The Waterfront can be hypothesized to have similar travel patterns when fully built out. For the visitor market, the share of trips within the study area was assumed to vary between 2% to 5%. A rough analysis was done examining the locations of hotels and similar accommodations, which found a concentration downtown with a comparatively small share along the Waterfront. It is therefore hypothesized that in high-tourist zones of the Waterfront, a lower share of visitors will be coming from accommodations along the Waterfront. For zones where the visitor demand is likely to be driven by non-tourists, the higher range was used to reflect that these visitors may be more likely to originate elsewhere along the Waterfront (as these zones may be less of a regional draw). Overall, the visitor market is hypothesized to be more regional than the demand for resident/employee travel, hence the former shares are not assumed to be as high. Note that trip-making patterns can be very complex (especially when considering the possibility of trip-chaining); the assumptions are limited by the paucity of data and benchmarks.
Pass-through trips	For trips along the landside, no pass-through trips (originating and/or destining outside the study area) are incorporated. The assumption is that water transportation would not generally be competitive for these trips. There are two cases to consider: a) there may be trips where one trip end (O or D) is just outside the study area. It is assumed that although such travelers may be candidates for a water mode, they would have a net-zero impact on demand generation;[59] b) there may be some trips where the origin and/or destination may be farther from the water, but where a natural travel path may include a route passing along the Waterfront. It is assumed that water transportation

[59] This is because the zones generally have oblong shapes and some parts of any zone are somewhat far from a potential water transportation station. Therefore, if an alternate catchment area were drawn around a station with a more traditional circular shape, some new residents/employees would be captured, but others would be lost. This is assumed to have an offsetting impact, with no net change in demand in the catchment area, which the Project Team considers to be a reasonable assumption for the level of analysis applied in this feasibility study.

Parameter or Input	Assumption
	would be poorly competitive with transit, including due to the time, cost, and hassle of transferring modes.[60] For trips to the Islands, pass-through trips are accounted for, as all these trips require a water mode. 5% of trips to the island are assumed to originate in the land-side study area, and the remaining 95% at points beyond. The relevance of this assumption is that the former are assumed to grow in proportion to the expansion in population and employment along the Waterfront specifically, while the latter are assumed to grow in proportion to the City's population. Among the former category, 2/3 are assumed to originate from the Western Waterfront (Zone 1) in the base year, which percentage drops in future years as other parts of the study area are built out. Among the latter category, 3/4 are assumed to prefer to pass through the Central Waterfront (Zone 2), reflecting the gravity of Union Station and the Ferry Terminal. This number is assumed to remain consistent over time.
Total contestable market	For trips along the landside, **a factor of 50%** is applied to the total (all-modes) O/D matrices to compute a total contestable market. It is assumed that the total contestable market is approximately equal to the share of travelers who would take public transit, since transit can be considered the most direct substitute for a marine transport mode. (This assumes that in general, most travellers using other modes such as driving, taxi/uber, walking and biking will not be obvious candidates to switch to water transportation). The 50% ratio is approximately equal to the share of trips that are made by public transit in the core over similar distances. Specifically, the Project Team computed the mode shares from the TTS for trips of 2 to 5 kilometres in length originating in the core, defined as the area roughly bounded by Bathurst-Dupont-DVP-Lake Ontario (which can be considered a benchmark for the revitalized Waterfront). In the case of trips to and from the Islands, a **factor of 100%** is applied as water transportation is the only option.
Capture rate	A further capture rate is applied to indicate the likelihood of the contestable market to switch over to a marine transport service. A capture rate of **10%** was applied for all landside connecting zones (i.e., every O/D pair expect those that travel to and from Zone 5 – Toronto Islands). A 10% capture rate was assumed to be appropriate for the preliminary feasibility level of this study. In reality, many aspects would influence the actual capture rate including direct competitive alternative landside routes, fare, time, and convenience of service among other factors. For Toronto Islands, it is assumed that the modelled routes have to compete with the existing marine services (ferry and water taxis). All modelled routes (A to E) are modelled independently of each other (i.e., it is assumed that the routes are **not** operating in parallel and competing with one

[60] Based on the Project Team's analysis, there do not appear to be any obvious major markets where travelers to major inland destinations (e.g. Downtown, Union Station) would benefit from taking a water-based mode as part of the journey. This is because the time penalty from walking from the Yonge Slip to downtown (or the time and cost penalty of transferring to TTC) more than offsets any time advantage gained elsewhere. For example, from Ontario Place, walking to Exhibition and taking an (expanded service) GO train or Ontario Line train downtown is modelled to be preferable to taking a water mode to Yonge and walking, or taking a combination of water mode and streetcar. Similarly, even if the Waterfront East LRT is not built, walking from to Ookwemin Minising Corktown Station (Ontario Line) or even the Distillery Loop (King streetcar) and taking transit is modelled to be preferable to water mode plus walking (or water mode plus streetcar). Note that the above assumes a 15-minute headway on the water mode.

Parameter or Input	Assumption
	another). A 100% capture rate is applied to any O/D pair including Toronto Islands (Zone 5) as there is no landside alternative.
Zone 5 breakdown	A further breakdown of Island trips was applied to represent differences in visitation to the various island nodes. It has been informally reported that approximately 80% ferry ridership accesses Centre Island as their primary destination; based on water taxi interviews conducted, it was informally reported that their service typically caters more to local tourists who visit Hanlan's Point and Ward's Islands. For the purposes of this study, it was assumed that **70%** of visitorship to Toronto Islands accesses **Centre Island**, while **15% each visit Ward's Island and Hanlan's Point**.

4.4.4 O/D Analysis

The Total Contestable Market O/D matrices (i.e., the share of total contestable market that could be expected to select a future marine service), developed for the study horizons (2023, 2035 and 2050) are summarized below in Table 4-4 through Table 4-6. Intermediary O/D tables as described in Section 4.4.2 can be found in Appendix D. Note that information on the data sources used in this study that supported the modelling of O/D between zones can be found in Appendix E.

Table 4-4: Total Contestable Market (2023)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	5,749	89
Zone 1	7,821	-	57,377	24,645	-	50,553	4,955
Zone 2	11,930	57,377	-	34,848	-	206,651	6,886
Zone 3	3,587	24,645	34,848	-	-	23,999	1,853
Zone 4	-	-	-	-	-	282	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37
Zone 6	89	4,955	6,886	1,853	-	37	-

Table 4-5: Total Contestable Market (2035)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	7,855	114
Zone 1	7,226	-	68,347	50,757	14,949	59,879	5,882
Zone 2	12,491	68,347	-	56,337	20,538	264,216	8,852
Zone 3	7,571	50,757	56,337	-	25,566	33,411	6,002
Zone 4	1,688	14,949	20,538	25,566	-	2,628	-
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74
Zone 6	114	5,882	8,852	6,002	-	74	-

Table 4-6: Total Contestable Market (2050)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	9,029	138
Zone 1	8,873	-	90,219	56,355	86,716	68,031	7,674
Zone 2	16,123	90,219	-	76,658	155,141	320,775	14,934
Zone 3	9,310	56,355	76,658	-	104,270	37,927	7,887
Zone 4	1,688	86,716	155,141	104,270	-	10,880	-
Zone 5	4,514	68,031	320,775	37,927	10,880	-	111
Zone 6	138	7,674	14,934	7,887	-	111	-

4.5 Step 3: Analyzing Options - Commercial Feasibility

Following the development of the Total Contestable Market O/D matrices, further analysis was conducted to develop loading tables for each of the routes to further analyze the commercial feasibility of each scenario.

4.5.1 Key Assumptions

A number of key assumptions were undertaken to conduct the service analysis and study the commercial feasibility. These key assumptions are discussed in the following sub-sections.

Service Assumptions

Table 4-7 below outlines the service assumptions common for all routes. The service hours are set to fit the needs of different costumers, such as residents, employees and tourists, considered as part of this study. To be attractive, especially to regular commuters, the vessel schedule has been set with departures occurring between 15–30 minutes, particular schedules change by route

analyzed is detailed within each route analysis in Section 4.5.2. Less frequent departures would narrow the potential customers to the tourists where they can set their daily activities based on the experience they want to focus on. The analysis focuses on a peak month as per estimated on the market demand.

Table 4-7: Service Assumptions

Items	Assumptions
Service hours	07:00 to 18:00 Monday to Thursday 07:00 to 22:00 Friday to Sunday
Departure Frequency	Between 15 and 30 minutes
Vessel speed	8 knots (inner harbour) 10 knots (Route D)
Time in Port	Between 6 and 10 minutes
Diesel cost	$2.00 per liter
Gas cost	$1.65 per liter
Season duration	4.5 months

To estimate the transit time, we assumed a vessel speed of 8 knots for all the inner harbour routes. The average vessel speed is increased to 10 knots for Route D, where around 40% of the distance is in the outer harbour. Time in port to load and unload passengers varies between 6 and 10 minutes. When estimating the schedule, the total transit time shall not exceed multiples of 15 or 30 minutes to optimize vessel use. This is the reason why the time in port varies between 6 and 10 minutes. These assumptions also require that all passengers are pre-checked before vessel arrival or checked once on board. This is particularly important for larger capacity vessels, as onboard ticketing would add significant additional time.

Each scenario also shows the buffer time after each complete trip cycle, allowing vessels to adjust their schedule in case of delays. A 4.5-month operational season for new services was assumed recognizing the peak summer months and a ramp-up and ramp-down period.[61]

Vessel Assumptions

Vessel sizing was done to ensure a sufficient route capacity by combining the demand estimations and the service frequency. For all routes analyzed, vessels with capacities of between 12 and 75 passengers would be sufficient to accommodate the estimated service scenarios from 2023 through 2050. Table 4-8 below outlines typical vessel characteristics based on the size category.

[61] Overall, this is consistent with other marine transport services in Toronto. The City of Toronto ferries saw 75% of ridership occur in June through September (from 2019 and 2022 data), and water taxis typically operate approximately a 6-month season with significant ramp-up and ramp-off periods (i.e., operating only weekends through May and September/October). A 4.5-month full-time operational period assumption would allow for tweaking of service offerings to extend ramp-on/ramp-off periods as needed (i.e., service could be offered Friday through Sunday for an extended ramp-up/-off period rather than Monday through Sunday service).

Table 4-8: Vessel Characteristics Assumptions

	12 PAX	24 PAX	50 PAX	75 PAX
Length Overall	8-10 metres	10-12 metres	12-14 metres	15-16 metres
Beam	2 metres	2 to 2.5 metres	2.5 to 3 metres	4 to 4.5 metres
Draft	< 1 metre	< 1 metre	1 metre	1 metre
Air Draft[62]	3 metres	3 metres	4 metres	4 metres
Fuel Type	Gas	Gas	Diesel	Diesel
Fuel Consumption (L/hr)	25	41	56	68
Purchase Price (CAD$)	$80,000	$140,000	$1,200,000	$1,600,000
Depreciation Rate	10%	10%	4%	4%
Maintenance cost	2.5% of initial capital investment			
Number of crew	2	3	4	5

Sources: CPCS from diverse data including TechniKal and Damen Shipyard

The 12- and 24-passenger vessels are similar to existing water taxi fleets operated in Toronto currently, with some vessels built by TechniKal. The hulls are made of aluminum and are propelled by an outboard gasoline engine. The 12- and 24-passenger vessels have a lower capital investment but conversely have a shorter life-span and higher fuel consumption compared to larger vessels. The 50- and 75-passenger vessels are based on Damen Shipyard's River and harbour ferries models. These vessels are designed and built to withstand more intensive commercial uses, hence the higher capital cost. Correspondingly, their lifespan is higher, and they are equipped with a diesel engine. Their larger size and relatively slow operational speed (10 knots) results in a lower fuel consumption relative to their capacity.

Operational Cost Assumptions

The minimum labor estimation for each vessel type is based on actual operation for a 12-passenger vessel in Toronto. The estimation for the crew for the other vessel type are based on vessel evacuation scenarios where one crew would lead a group of 25 passengers in a life-raft, one crew to ensure communication plus one captain to command the operations. Official evaluation from Transport Canada or the vessel operator might require more crew members on board for safety or operational reasons (e.g., to manage onboard ticketing).

Table 4-9 below summarizes assumptions undertaken for number of crew positions and their respective wages for each type of vessels. Additionally, employee benefits and training costs of 20% and 2% respectively have been built into the total labour costs.

[62] Air draft is defined as the distance from the top of a vessel's highest point to its waterline.

Table 4-9: Assmptions for Vessel Crew and Hourly Rates

Role	Hourly Rate	12 PAX	24 PAX	50 PAX	75 PAX
Captain	$30	1	1	1	1
1st Officer	$28			1	1
Engineer	$28				1
Deckhand	$25	1	2	2	2
Employee Benefits	20% of total cost				
Training	2% of total cost				

Estimations of the route costs are based on operational and cost assumptions. The cost estimations include marine transportation costs only. They do not include terminal costs, administration costs, the cost of ticket sale, and port fees.

4.5.2 Interpreting Service Analysis

The commercial feasibility of each proposed route was analyzed by testing different combinations of the service and vessel assumptions discussed above. These defined service options aim to determine the appropriate level of service required for each route to meet the estimated demand.

In analyzing the commercial feasibility, there are two important aspects to consider, these are discussed below in further detail.

Average loading factor

The average loading factor represents the ratio of estimated demand to capacity of the service for the busiest leg. Average loading factor is an important consideration as a service should be designed such that passengers experience a good quality of service (i.e., minimizing crowding) and to be able to absorb any other potential demand.

The analysis conducted herein is based on a peak month demand; in this case, it is appropriate to assume that a loading factor between 80-90% would be the point at which to consider adding capacity either through increased service headways or larger capacity vessel(s). A combined fleet (i.e., a combination of larger and smaller vessels) could also be considered, this would increase overall capacity while also allowing for more efficient services during daytime peaks.

Cost per boarding passenger

The cost per boarding passenger is calculated using the total operational cost and estimated demand. This cost is used as a general benchmark comparator and would be subject to demand experienced. In the absence of a stated preference survey, the cost per boarding passenger can be used as a general indicator of market acceptability of a service. In comparison to other marine transport services in Toronto, which range between $9 to $14 for an adult fare, is it unlikely that a customer would pay greater than $20 for a new service.

4.5.3 Route A

Figure 4-3 below showcases the envisioned stops for Route A, connecting the cityside waterfront from Ontario Place to Ookwemin Minising.

Figure 4-3: Route A Map

Using the O/D matrices developed in Section 4.4.4, loading tables were produced for Route A eastbound and westbound services accounting for proposed stop locations and a 10% capture rate of the total contestable market. Table 4-10 summarizes loading for eastbound services for each study horizon; westbound loadings can be found in Appendix F.

Table 4-10: Monthly Loading by Leg - Route A Eastbound

Route A 2023		Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Ookwemin Minising
Eastbound	Boarding	2,334	8,202	3,485	-	n/a
	Alighting	-	782	6,931	6,308	n/a
	Loading (by leg)	2,334	9,754	6,308	-	n/a
Route A 2035		**Ontario Place**	**Portland Slip**	**Yonge Slip**	**Parliament Slip**	**Ookwemin Minising**
Eastbound	Boarding	2,898	13,405	7,688	2,557	-
	Alighting	-	723	8,084	11,467	6,274
	Loading (by leg)	2,898	15,580	15,184	6,274	-
Route A 2050		**Ontario Place**	**Portland Slip**	**Yonge Slip**	**Parliament Slip**	**Ookwemin Minising**
Eastbound	Boarding	3,599	23,329	23,180	10,427	-
	Alighting	-	887	10,634	14,232	34,781
	Loading (by leg)	3,599	26,041	38,587	34,781	-

Table 4-11 below summarizes the travel time for a one-way trip. Route A is scheduled to complete a one-way trip in 56 minutes which leaves a buffer time of four minutes should the vessel experience any delays.

Table 4-11: Route A Travel Time

Port	Distance to next port (nm)	Arrival (min)	Departure (min)	Travel time (min)
Ookwemin Minising	0.6		-	3.6
Parliament Slip	0.9	3.6	11.6	5.4
Yonge Slip	1.3	17.0	25.0	7.8
Portland Slip	1.2	32.8	40.8	7.2
Ontario Place		48.0	56.0	
Total one-way trip	**4.0**		**56.0**	**24.0**

To offer a departure every 15 minutes, eight boats would be required.

Table 4-12 below summarizes key metrics of Route A calculated using loading and service information from the above tables. A 12-passenger vessel would meet the demand of the busiest service leg in 2023, while in 2035 a 24-passenger vessel would be required and in 2050 a 50-passenger vessel.

Table 4-12: Route A Key Metrics

	12 Pax	24 Pax	50 Pax
Headway	15 minutes	15 minutes	15 minutes
End-to-End transit time (one-way)	56 minutes	56 minutes	56 minutes
Total number of boats	8	8	8
Service hours	0700 to 1800	Monday to Thursday	
	0700 to 2200	Friday to Sunday	
Service Capacity (unidirectional per month)	17,229	34,457	71,786
Average Loading Factor (2023)	57%	28%	14%
Average Loading Factor (2035)	90%	45%	22%
Average Loading Factor (2050)	225%	112%	54%
Cost per boarding Passengers (2023)	$13.27	$21.41	$47.52
Cost per boarding Passengers (2035)	$7.01	$11.31	$25.10
Cost per boarding Passengers (2050)	N/A	N/A	$11.01

Table 4-13 on the next page provides a breakdown of operational costs, consisting of the cost to run a service (per month) and fixed costs. Route A would cost between $1,212,230 and $3,101,932 annually to operate. The monthly service cost for a seven-day operation varies from $240,051 for a 12-passenger vessel to $505,544 for a 50-passenger vessel. This equates to a cost per passenger capacity varying between $8.71 and $10.80 depending on vessel type.

Table 4-13: Route A Boats Operational Cost Estimation

	12 Pax	24 Pax	50 Pax
Service Cost			
Labor	$192,673	$278,816	$376,904
Fuel	$47,379	$77,701	$128,640
Total Service Cost (per month)	*$240,051*	*$356,517*	*$505,544*
Total Service Cost (per year)[63]	*$1,080,230*	*$1,604,327*	*$2,274,948*
Fixed Costs			
Maintenance	$16,000	$28,000	$234,738
Insurance	$40,000	$80,000	$166,667
Winterisation	$12,000	$24,000	$50,000
Depreciation	$64,000	$112,000	$375,580
Total Fixed Cost (per year)	*$132,000*	*$244,000*	*$826,984*
Total Operational Cost (per year)	**$1,212,230**	**$1,848,327**	**$3,101,932**
Cost per Pax Capacity	$10.80	$8.71	$9.28

4.5.4 Route B

Figure 4-4 below showcases the envisioned stops for Route B, connecting Ontario Place to Portland Slip, Parliament Slip, Ward's Island and Outer Harbour Marina.

Figure 4-4: Route B Map

[63] Assuming a 4.5-month operational season per year

Using the O/D matrices developed in Section 4.4.4, loading tables were produced for Route B eastbound and westbound services accounting for proposed stop locations and a 10% capture rate of the total contestable market. Table 4-14 summarizes loading for eastbound services for each study horizon; westbound loadings can be found in Appendix F.

Table 4-14: Monthly Loading by Leg - Route B Eastbound

Route B 2023		Ontario Place	Portland Slip	Parliament Slip	Ward's Island	Outer Harbour
Eastbound	Boarding	1,236	3,718	545	1	-
	Alighting	-	782	2,823	1,205	690
	Loading (by leg)	1,236	4,172	1,894	690	-
Route B 2035		**Ontario Place**	**Portland Slip**	**Parliament Slip**	**Ward's Island**	**Outer Harbour**
Eastbound	Boarding	1,609	6,562	1,101	1	-
	Alighting	-	723	5,833	1,517	1,201
	Loading (by leg)	1,609	7,448	2,717	1,201	-
Route B 2050		**Ontario Place**	**Portland Slip**	**Parliament Slip**	**Ward's Island**	**Outer Harbour**
Eastbound	Boarding	1,967	7,423	1,358	2	
	Alighting		887	6,567	1,725	1,571
	Loading (by leg)	1,967	8,504	3,295	1,571	-

Table 4-15 below summarizes the travel time for a one-way trip. Route B is scheduled to complete a one-way trip in 60 minutes with the shortest in port time of six minutes. Additional in port time could be added to bring the total one-way trip time to 75 minutes, which would ultimately require another vessel.

Table 4-15: Route B Travel Time

Port	Distance to next port (nm)	Arrival (min)	Departure (min)	Travel time (min)
Ontario Place	1.2		-	7.2
Portland Slip	1.9	7.2	13.2	11.4
Parliament Slip	0.9	24.6	30.6	5.4
Wards' Island	1.9	36.0	42.0	11.4
Outer Harbour		53.4	59.4	
Total one-way trip	**5.9**		**59.4**	**35.4**

To offer a departure every 30 minutes, four boats would be required. With the current scheduled service of 60-minute travel time and departures every 30 minutes, this service is likely to experience delays.

Table 4-16 below summarizes key metrics of Route B calculated using loading and service information from the above tables. A 12-passenger vessel would fit meet the demand of the busiest service leg in 2023 and 2035. A 24-passenger vessel would be required in 2050.

Table 4-16: Route B Key Metrics

	12 Pax	24 Pax	50 Pax
Departure every	30 minutes	30 minutes	30 minutes
End-to-End transit time (one-way)	59 minutes	59 minutes	59 minutes
Total number of boats	4	4	4
Service hours	0700 to 1800	Monday to Thursday	
	0700 to 2200	Friday to Sunday	
Service Capacity (unidirectional per month)	8,795	17,589	36,643
Average Loading Factor (2023)	47%	24%	11%
Average Loading Factor (2035)	85%	42%	20%
Average Loading Factor (2050)	97%	48%	23%
Cost per boarding Passengers (2023)	$18.18	$29.35	$63.89
Cost per boarding Passengers (2035)	$10.79	$17.41	$37.89
Cost per boarding Passengers (2050)	$9.38	$15.13	$32.94

Table 4-17 on the next page provides a breakdown of operational cost, consisting of the cost to run a service (per month) and fixed costs. Route B would cost between $669,095 and $1,715,090 annually to operate. The monthly operating cost for a seven-day operation varies from $134,021 for a 12-passenger vessel to $289,244 for the 50-passenger vessel. In terms of cost per passenger capacity, in varies between $9.18 and $11.37.

Table 4-17: Route B Boats Operational Cost Estimation

	12 Pax	24 Pax	50 Pax
Service Costs			
Labour	$98,349	$142,321	$192,390
Fuel	$35,672	$58,502	$96,854
Total Service Cost (per month)	*$134,021*	*$200,823*	*$289,244*
Total Service Cost (per year)[64]	*$603,095*	*$903,704*	*$1,301,598*
Fixed Costs			
Maintenance	$8,000	$14,000	$117,369
Insurance	$20,000	$40,000	$83,333
Winterisation	$6,000	$12,000	$25,000
Depreciation	$32,000	$56,000	$187,790
Total Fixed Cost (per year)	*$66,000*	*$122,000*	*$413,492*
Total Operational Cost (per year)	***$669,095***	***$1,025,704***	***$1,715,090***
Cost per Pax Capacity	$11.37	$9.18	$9.59

4.5.5 Route C

Figure 4-5 below showcases the envisioned stops for Route C, connecting Ontario Place to Portland Slip, and Yonge Slip.

Figure 4-5: Route C Map

[64] Assuming a 4.5-month operational season per year

Using the O/D matrices developed in Section 4.4.4, loading tables were produced for Route C eastbound and westbound services accounting for proposed stop locations and a 10% capture rate of the total contestable market. Table 4-18 summarizes loading for eastbound services in each study horizon. Westbound loadings can be found in Appendix F.

Table 4-18: Monthly Loading by Leg - Route C Eastbound

Route C 2023		Ontario Place	Portland Slip	Yonge Slip
Eastbound	Boarding	1,975	5,738	-
	Alighting		782	6,931
	Loading (by leg)	1,975	6,931	-
Route C 2035		**Ontario Place**	**Portland Slip**	**Yonge Slip**
Eastbound	Boarding	1,972	6,835	-
	Alighting		723	8,084
	Loading (by leg)	1,972	8,084	-
Route C 2050		**Ontario Place**	**Portland Slip**	**Yonge Slip**
Eastbound	Boarding	2,500	9,022	-
	Alighting		887	10,634
	Loading (by leg)	2,500	10,634	-

Table 4-19 below show the travel time for a one-way trip. The travel time for a one-way trip is 30 minutes with a short in port time of 7 minutes. It means that this service is very tight to be on-time with such this schedule with little buffer time to realign to the schedule after one trip. Additional in port time could be added to bring the total one-way trip time to 45 minutes, which would ultimately require another vessel.

Table 4-19: Route C Travel Time

Port	Distance to next port (nm)	Arrival (min)	Departure (min)	Travel time (min)
Ontario Place(M1)	1.2		-	7.2
Portland Slip (M2)	1.3	7.2	14.2	7.8
Jack Layton		22.0	29.0	-
Total one-way trip	**2.5**		**30.0**	**15.0**

To offer a departure every 15 minutes, four boats would be required. With the current scheduled service of 30-minute travel time and departures every 15 minutes, this service is likely to experience delays. Table 4-20 below summarizes Route C key metrics calculated using loading and service information from the above tables. A 12-passenger vessel would meet the demand of the busiest service leg through all study horizons.

Table 4-20: Route C Key Metrics

	12 Pax	24 Pax	50 Pax
Departure every	15 minutes		
End-to-End transit time (one-way)	29 minutes		
Total number of boats	4	4	4
Service hours	0700 to 1800	Monday to Thursday	
	0700 to 2200	Friday to Sunday	
Service Capacity (unidirectional per month)	17,589	35,177	73,286
Average Loading Factor (2023)	39%	20%	9%
Average Loading Factor (2035)	46%	23%	11%
Average Loading Factor (2050)	60%	30%	15%
Cost per boarding Passengers (2023)	$12.61	$20.35	$44.60
Cost per boarding Passengers (2035)	$11.05	$17.82	$39.06
Cost per boarding Passengers (2050)	$8.44	$13.62	$29.86

Table 4-21 below provides a breakdown of operational costs, consisting of the cost to run a service (per month) and fixed costs. Route C would cost between $644,610 and $1,648,607 annually to operate. The monthly service cost for a seven-day operation varies from $128,580 for a 12-passenger vessel to $274,470 for a 50-passenger vessel. In terms of cost per passenger capacity, in varies between $4.46 and $5.53.

Table 4-21: Route C Boats Operational Cost Estimation

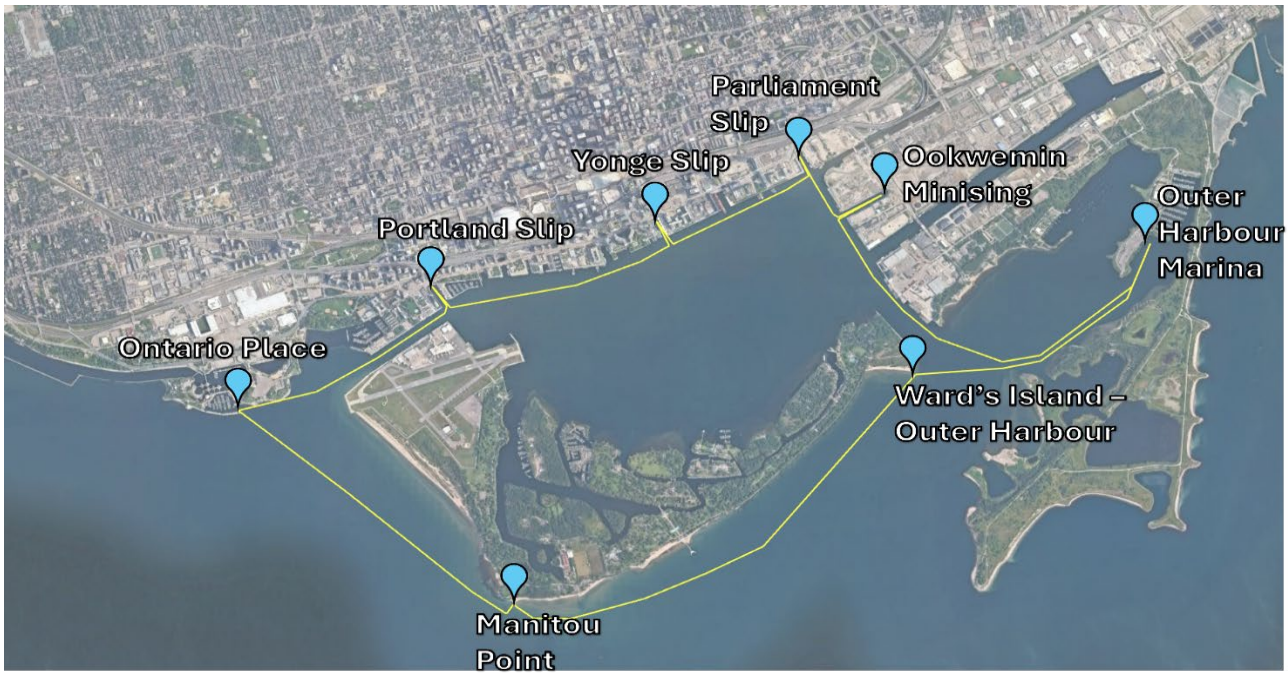
	12 Pax	24 Pax	50 Pax
Service Cost			
Labour	$98,349	$142,321	$192 390
Fuel	$30,230	$49,578	$82 080
Total Service Cost (per month)	*$128,580*	*$191,899*	*$274,470*
Total Service Cost (per year)[65]	*$578,610*	*$863,546*	*$1,235,115*
Fixed Costs			
Maintenance	$8,000	$14,000	$117,369
Insurance	$20,000	$40,000	$83,333
Winterisation	$6,000	$12,000	$25,000
Depreciation	$32,000	$56,000	$187,790
Total Fixed Cost (per year)	*$66,000*	*$122,000*	*$413,492*
Total Operational Cost (per year)	***$644,610***	***$985,546***	***$1,648,607***
Cost per Pax Capacity	$5.53	$4.46	$4.69

[65] Assuming a 4.5-month operational season per year

4.5.6 Route D

Figure 4-6 on the next page showcases the envisioned stops for Route D, connecting Ontario Place, Portland Slip, Yonge Slip, Parliament Slip, Ookwemin Minising (Canoe Cove), Outer Harbour Marina, Ward's Island, and Manitou Point.

Figure 4-6: Route D Map



Route D is envisioned as operating a clockwise (CW) and counterclockwise (CCW) service to connect customers with the fastest possible travel time. Table 4-22 on the next page outlines the assumptions for O/D pair demand being assigned to the CW or CCW loadings, this was determined based on a total travel time (marine travel time and in-port time) in each service scenario. Details on the loadings for Route D can be found in Appendix F.

Table 4-22: Route D Service Assignment

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Ookwemin Minising	Outer Harbour	Ward's Island	Manitou Beach
Ontario Place		CW	CW	CW	CW	CCW	CCW	CCW
Portland Slip	CCW		CW	CW	CW	CW	CCW	CCW
Yonge Slip	CCW	CCW		CW	CW	CW	CW	CCW
Parliament Slip	CCW	CCW	CCW		CW	CW	CW	CCW
Ookwemin Minising (Canoe Cove)	CCW	CCW	CCW	CCW		CW	CW	CW
Outer Harbour	CW	CCW	CCW	CCW	CCW		CW	CW
Ward's Island	CW	CW	CCW	CCW	CCW	CCW		CW
Manitou Beach	CW	CW	CW	CW	CCW	CCW	CCW	

Table 4-23 below summarizes the travel time for a clockwise trip of Route D. The travel time for a one-way trip is almost two hours with the shortest in port time of six minutes. It means that this service has a very tight schedule and with a six-minute buffer time to realign the schedule. For this service, half of the vessels would sail clockwise and the other half counterclockwise to offer a back-and-forth service for the customers.

Table 4-23: Route D Travel Time

Port	Distance to next port (nm)	Arrival (min)	Departure (min)	Travel time (min)
Ontario Place	1.2		-	6.5
Portland Slip	1.3	6.5	12.5	7.1
Jack Layton	0.9	19.6	25.6	4.9
Parliament Slip	0.6	30.5	36.5	3.3
Canoe Cove	2.1	39.8	45.8	11.5
Outer Harbour	1.3	57.3	63.3	7.1
Ward's Island Beach	2.1	70.4	76.4	11.5
Manitou Beach	2.6	87.8	93.8	14.2
Ontario Place		108.0	114.0	
Total one-way trip	**12.1**		**114.0**	**66.0**

To offer a departure every 30 minutes, four boats would be required and eight for a departure every 15 minutes. Table 4-24 below summarizes Route D key metrics. A 50-passenger vessel leaving every 30 minutes would barely meet the demand on the busiest leg in 2023. By doubling the service

frequency, a 50-passenger vessel could meet the demand in 2035 but not in 2050 where 75-passenger vessels would be required.

Table 4-24: Route D Key Metrics

	50 Pax	50 Pax	75 Pax
Departure every	30 minutes	15 minutes	15 minutes
End-to-End transit time (one-way)	114 minutes		
Total number of boats	4	8	8
Service hours	0700 to 1800	Monday to Thursday	
	0700 to 2200	Friday to Sunday	
Service Capacity (unidirectional per month)	18,322	35,893	53,840
Average Loading Factor (2023)	75%	38%	25%
Average Loading Factor (2035)	115%	59%	39%
Average Loading Factor (2050)	252%	129%	86%
Cost per boarding Passengers (2023)	$14.49	$28.75	$38.45
Cost per boarding Passengers (2035)	N/A	$17.40	$23.28
Cost per boarding Passengers (2050)	N/A	N/A	$12.08

Table 4-25 on the next page provides a breakdown of operational cost, consisting of the cost to run a service (per month) and fixed costs. Route D would cost between $1,685,543 and $4,261,240 annually to operate. The monthly operating cost for a seven-day operation varies from $282,000 for the 50-passenger boats leaving every 30 minutes to $689,000 for the 75-passenger vessel leaving every 15 minutes. In terms of cost per passenger capacity, it varies between $17.15 and $19.23.

Table 4-25: Route D Boats Service Costs Estimations

	50 Pax (30 min)	50 Pax (15 min)	75 Pax (15 min)
Service Cost			
Labour	$192,390	$376,904	$474,992
Fuel	$90,288	$176,880	$214,783
Total Service Cost (per month)	$282,678	$553,784	$689,775
Total Service Cost (per year)[66]	*$1,272,051*	*$2,492,028*	*$3,103,988*
Fixed Costs			
Maintenance	$117,369	$234,738	$320,097
Insurance	$83,333	$166,667	$250,000
Winterisation	$25,000	$50,000	$75,000
Depreciation	$187,790	$375,580	$512,155
Total Fixed Costs (per year)	*$413,492*	*$826,984*	*$1,157,252*
Total Operational Cost (per year)	**$1,685,543**	**$3,319,012**	**$4,261,240**
Cost per Pax Capacity	$19.00	$19.23	$17.15

4.5.7 Route E

Figure 4-7 below showcases the envisioned stops for Route E, connecting Yonge Slip, Parliament Slip, Ookwemin Minising (Canoe Cove), and Ward's Island.

Figure 4-7: Route E Map

[66] Assuming a 4.5-month operational season per year

Using the O/D matrices developed in Section 4.4.4, loading tables were produced for Route E eastbound and westbound services accounting for proposed stop locations and a 10% capture rate of the total contestable market. Table 4-26 summarizes loading for eastbound services for each study horizon. Westbound loadings can be found in Appendix F.

Table 4-26: Monthly Loading by Leg - Route E Eastbound

Route E 2023		Yonge Slip	Parliament Slip	Ookwemin Minising	Ward's Island
Eastbound	Boarding	6,585	360	4	-
	Alighting	-	3,485	-	3,464
	Loading (by leg)	6,585	3,460	3,464	-
Route E 2035		**Yonge Slip**	**Parliament Slip**	**Ookwemin Minising**	**Ward's Island**
Eastbound	Boarding	11,651	3,058	39	-
	Alighting	-	5,634	4,610	4,504
	Loading (by leg)	11,651	9,075	4,504	-
Route E 2050		**Yonge Slip**	**Parliament Slip**	**Ookwemin Minising**	**Ward's Island**
Eastbound	Boarding	27,992	10,996	163	-
	Alighting	-	7,666	25,941	5,544
	Loading (by leg)	27,992	31,322	5,544	-

Table 4-27 below show the travel time for a one-way trip. The travel time for a one-way trip is approximately 35 minutes with the shortest in port time of seven minutes which leaves a buffer time of five minutes to realign the schedule should the vessel experience any delays.

Table 4-27: Route E Travel Time

Port	Distance to next port (nm)	Arrival (min)	Departure (min)	Travel time (min)
Yonge Slip	0.9		-	5.4
Parliament Slip	0.6	5.4	12.4	3.6
Canoe Cove	0.8	16.0	23.0	4.8
Ward's Island		27.8	34.8	-
Total one-way trip	**2.3**		**40.0**	**13.8**

To offer a departure every 20 minutes, six boats would be required. Table 4-28 below summarizes Route E key metrics. A 12-passenger vessel would fit meet the demand of the busiest service leg in 2023 and in 2035, but a 24-passenger vessel would be required in 2050.

Table 4-28: Route E Key Metrics

	12 Pax	24 Pax	50 Pax
Departure every	20 minutes		
End-to-End transit time (one-way)	40 minutes		
Total number of boats	6	6	6
Service hours	0700 to 1800	Monday to Thursday	
	0700 to 2200	Friday to Sunday	
Service Capacity (unidirectional per month)	19,517	39,035	81,322
Average Loading Factor (2023)	34%	17%	8%
Average Loading Factor (2035)	60%	30%	14%
Average Loading Factor (2050)	160%	80%	39%
Cost per boarding Passengers (2023)	$19.81	$31.96	$71.14
Cost per boarding Passengers (2035)	$9.34	$15.06	$33.52
Cost per boarding Passengers (2050)	N/A	$5.67	$12.63

Table 4-29 on the next page shows that total boat service costs vary between $892,679 and $2,278,218 annually to operate. The monthly operating cost for a seven-day operation varies from $176,000 for the 12-passenger boat to $368,440 for the 50-passenger vessel. In terms of cost per passenger capacity, in varies between $5.69 and $7.05.

Table 4-29: Route E Boats Service Costs Estimations

	12 Pax	24 Pax	50 Pax
Service Cost			
Labour	$145,511	$210,568	$284,647
Fuel	$30,861	$50,613	$83,794
Total Service Cost (per month)	$176,373	$261,181	$368,440
Total Service Cost (per year)[67]	*$793,679*	*$1,175,315*	*$1,657,980*
Fixed Costs			
Maintenance	$12,000	$21,000	$176,053
Insurance	$30,000	$60,000	$125,000
Winterisation	$9,000	$18,000	$37,500
Depreciation	$48,000	$84,000	$281,685
Total Fixed Costs (per year)	*$99,000*	*$183,000*	*$620,238*
Total Operational Cost (per year)	**$892,679**	**$1,358,315**	**$2,278,218**
Cost per Pax Capacity	$7.05	$5.69	$6.08

4.6 Step 3: Analyzing Options - Technical Feasibility

4.6.1 Basis of Study

Proposed Locations

Proposed marine facilities for water taxi/seabus and ferries are defined by the service analysis study. A map of marine locations is presented in Figure 4-8 on the following page. These locations are based on the conceptual locations for Marine Nodes identified in the *2020 Marine Use Study*. Marine Facilities requirements are summarized in the Table 4-30, also on the following page.

[67] Assuming a 4.5-month operational season per year

Figure 4-8: Potential Marine Nodes Study Locations

Table 4-30: Potential Marine Nodes

ID	Name	Required Infrastructure to accommodate	Planning and development
1	Ontario Place	Water taxi / Seabus	Major redevelopment of the area. Master plan in the design phase.
2	Portland Slip	Water taxi / Seabus	Existing slip
3	Yonge Slip	Water taxi / Seabus	Existing slip
4	Parliament Slip	Water taxi / Seabus	Major redevelopment of the area in the planning phase by others.
5	Keating Channel	Water taxi / Seabus	Major redevelopment of the area in the planning phase by others.
6	Ookwemin Minising	Water taxi / Seabus	Major redevelopment of the area in the planning phase by others.
7	Port Lands	Ferry vessel	Major redevelopment is required to accommodate ferry vessels.
8	Outer Harbour Marina	Water taxi / Seabus	Existing marina can accommodate water taxi and seabus. Alternatively, a new dock can be constructed.
9	Ward's Island Beach	Water taxi / Seabus	New facility is required to accommodate the project vessels.
10	Manitou Point	Water taxi / Seabus	New facility is required to accommodate the project vessels.
11	Hanlan's Point	Ferry vessel	Expansion / addition to the existing infrastructure.

ID	Name	Required Infrastructure to accommodate	Planning and development
12	Centre Island	Water taxi / Seabus	Expansion / addition to the existing infrastructure.
13	Ward's Island	Water taxi / Seabus	Expansion / addition to the existing infrastructure.

Water Depth

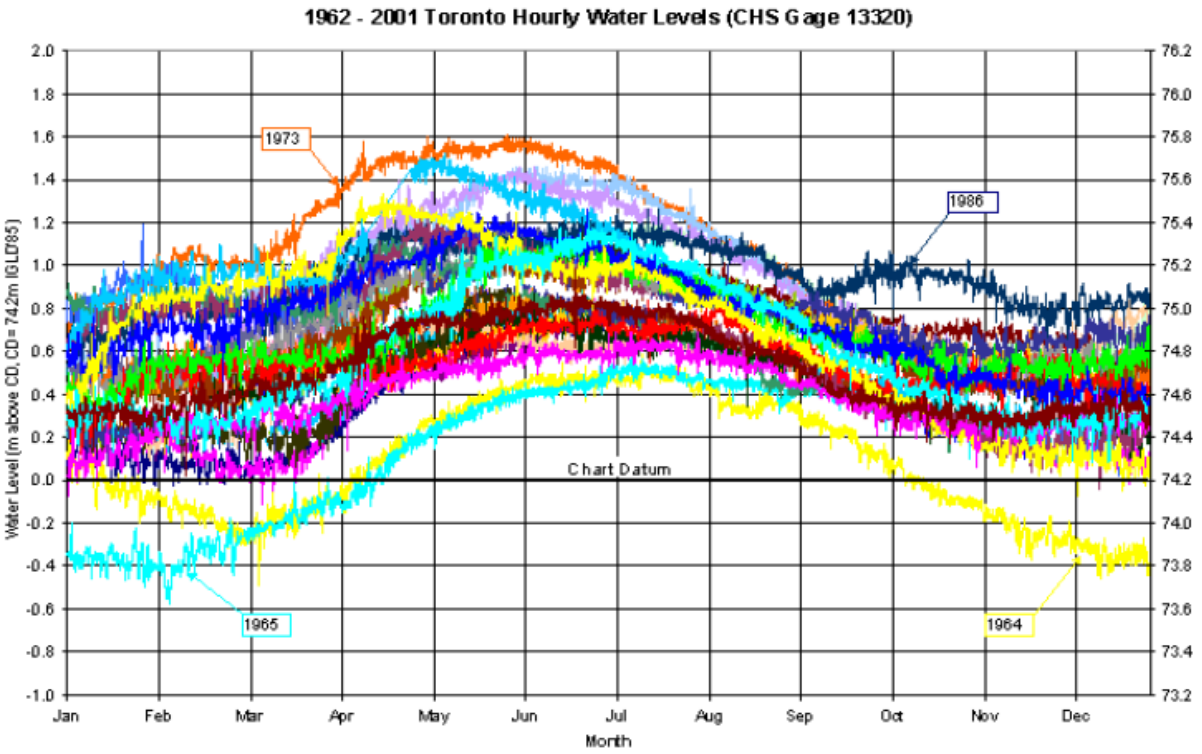
Water depth for this Study is based on Toronto Harbour Nautical Chart CHS 2085 by the Canadian Hydrographic Service (CHS).

Toronto Harbour Water Level

Water levels at Toronto Harbour (station 13320) relative to the chart datum are:

- Highest Recorded Water Level 1.84 m (2019-05-28)
- Lowest Recorded Water Level -0.58 m (1965-02-03

Figure 4-9: Hourly Water Level Time Series by Month

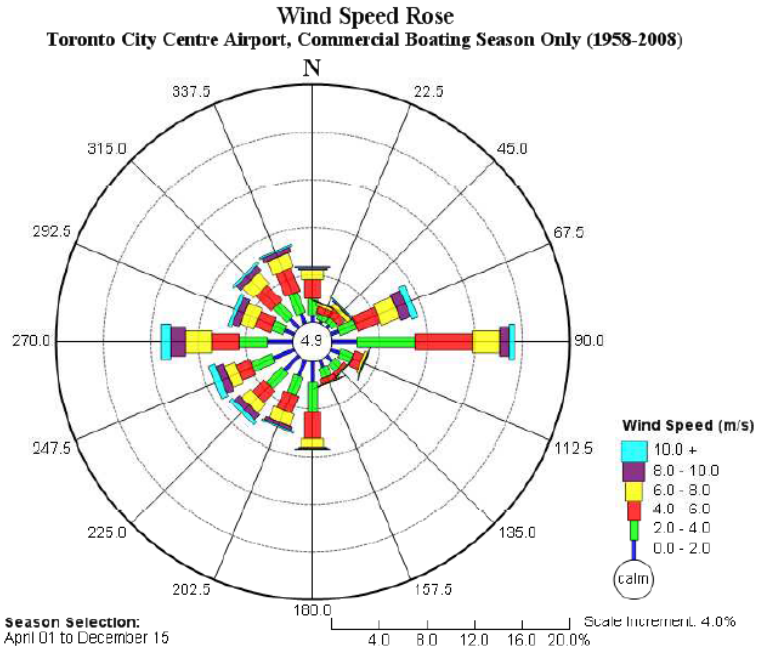


Source: Baird & Associates

Harbour Wind Conditions

Wind Rose for a long period of record located at Toronto's City Centre Airport (source: Baird & Associates). Wind characteristics including speed and direction are used for the infrastructure evaluation at each proposed location.

Figure 4-10: Wind Rose

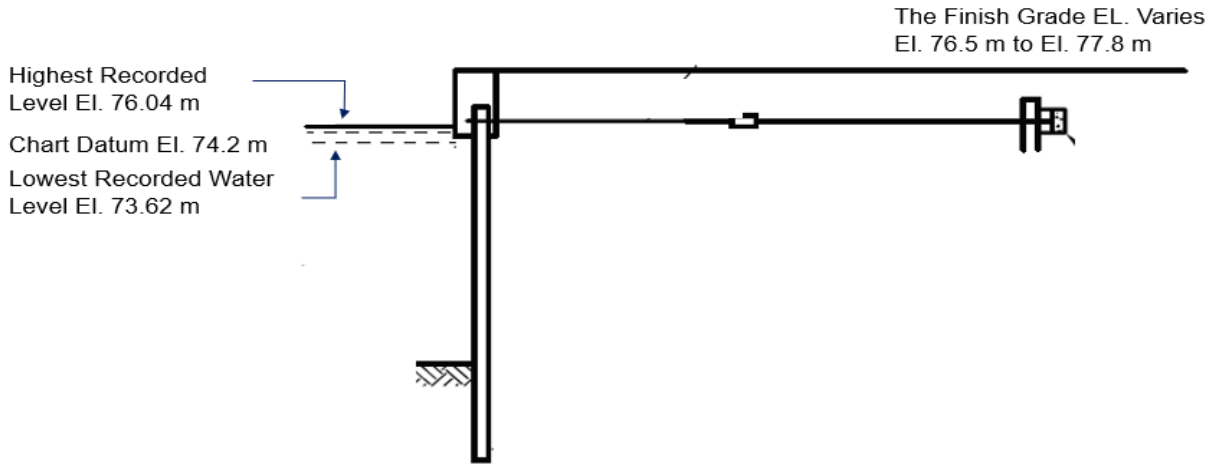


Source: Baird & Associates

Existing Seawalls and Slip Configurations

Toronto Harbour existing seawalls are primarily Steel Sheet Pile (SSP). For this study, it is assumed that most existing slips are based on the SSP type structures with a concrete cope beam.

Figure 4-11: Toronto Harbour Water Levels



Record construction drawings are required for each location to establish the existing seawalls structural configuration for detailed engineering. The Chart Datum is at EL. 74.2 m (I.G.L.D 1985). The finish grade elevation of various slips varies but most likely between EL. 76.5 m to EL. 77.8 m. The finished grade elevations are based on information from Google Earth.

Vessels Configuration

For the infrastructure conceptual design, the following vessels parameters were selected as outline in Table 4-31.

Table 4-31: Vessel Configuration Parameters

	Water Taxi	Seabus
Length	8.5m	24.5m
Beam	2.6m	7m
Draft	1m	2.3m

Note that the ferry vessel characteristics are as per current ferry fleet utilized within the harbour.

4.6.2 Marine Infrastructure

The floating dock arrangement for the Toronto Harbour was analyzed based on the following parameters:

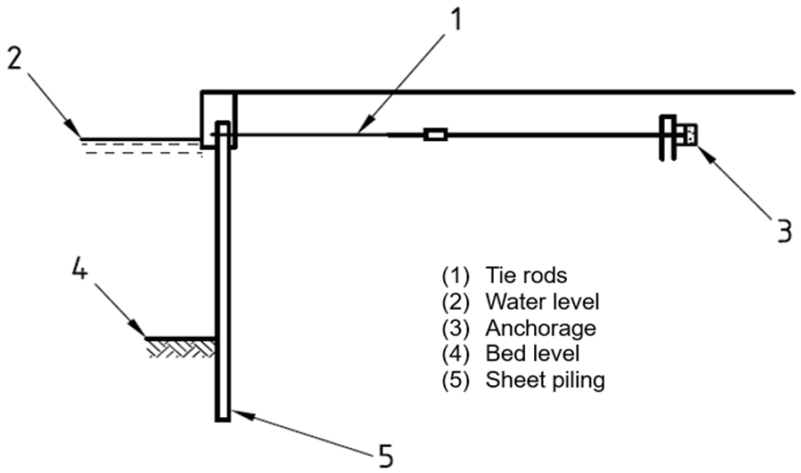
- Project requirements, specifically vessels type.
- Existing infrastructure and future planned development.
- Site environmental conditions include water depth, tidal fluctuation, wind, waves and ground conditions.

Based on the above, it is recommended that a sheet-pile system and a floating dock arrangement be used for the docks located within Toronto Harbour. Characteristics of each system are described in sections below.

Sheet Pile System

The proposed dock wall consists of sheet piles, tie rods, a concrete cope beam, and all associated excavation and backfilling work. It also includes ancillary elements such as fenders, mooring bollards, wheel guards, safety stations, and safety ladders. See Figure 4-12 below.

Figure 4-12: Proposed Sheet Pile Arrangement



Floating Dock System

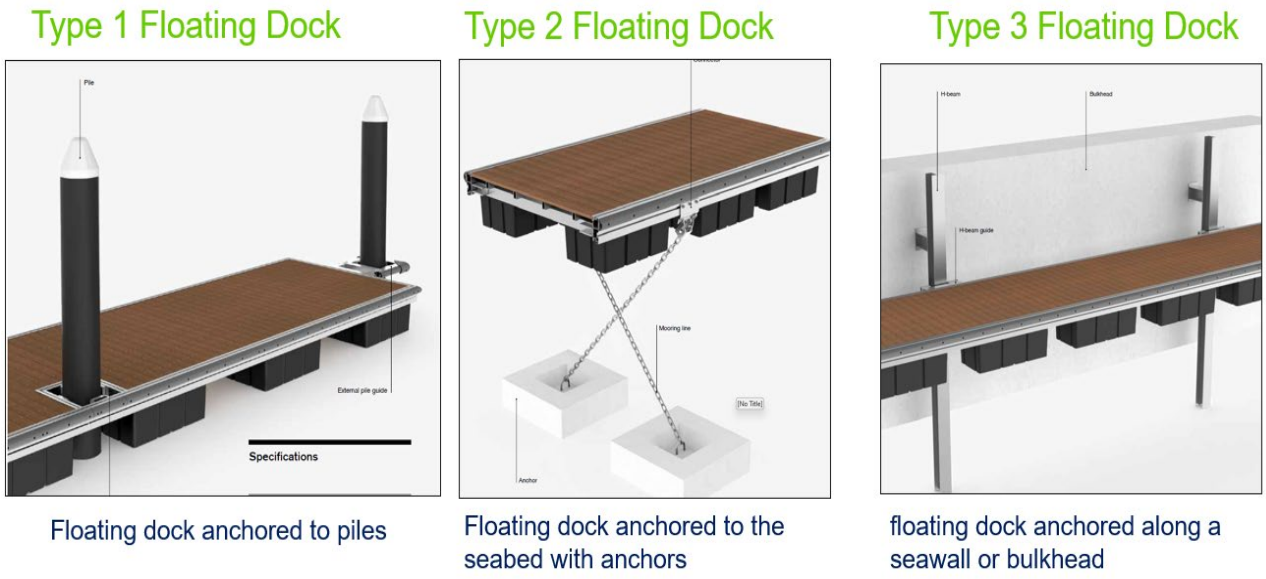
Various floating dock arrangements were analyzed for the Toronto harbour and for this phase of the project the following floating dock parameters were selected:

- The overall dock width of 3 m.
- The overall section length of 40 m.
- Floating dock of 600 mm freeboard.
- 1.9 kPa buoyance.
- A composite decking to ensure ease of maintenance and durability.
- 1.2 m wide clear anodized all-aluminum gangway.

The above floating dock parameters are based on floating dock specification as per MAADI Group, a Canadian firm that manufactures floating dock systems.

Figure 4-13 on the following page presents different floating dock options that can be used on the Toronto waterfront.

Figure 4-13: Floating Dock by MAADI Group (https://maadigroup.com/)



4.6.3 Technical Analysis of Each Potential Docking Location

This section provides an analysis of each potential docking location that includes a summary of its current infrastructure status, proposed water taxi and seabus docking location and a technical overview of the site's potential.

4.6.3.1 Ontario Place

The Ontario Place preferred redevelopment concept from the Government of Ontario's Engage Ontario Place document and is presented in Figure 4-14. The Ontario Place redevelopment plan was analyzed, and various potential locations were selected as potential docking locations for water taxis and seabuses as shown in Figure 4-15.

It was determined that wave and water currents should not have adverse impact on the moored vessels as the proposed marine offers shelter conditions.

Figure 4-14: Preferred Marina Concept (*Source: Gov. of Ontario – Engage Ontario Place*)

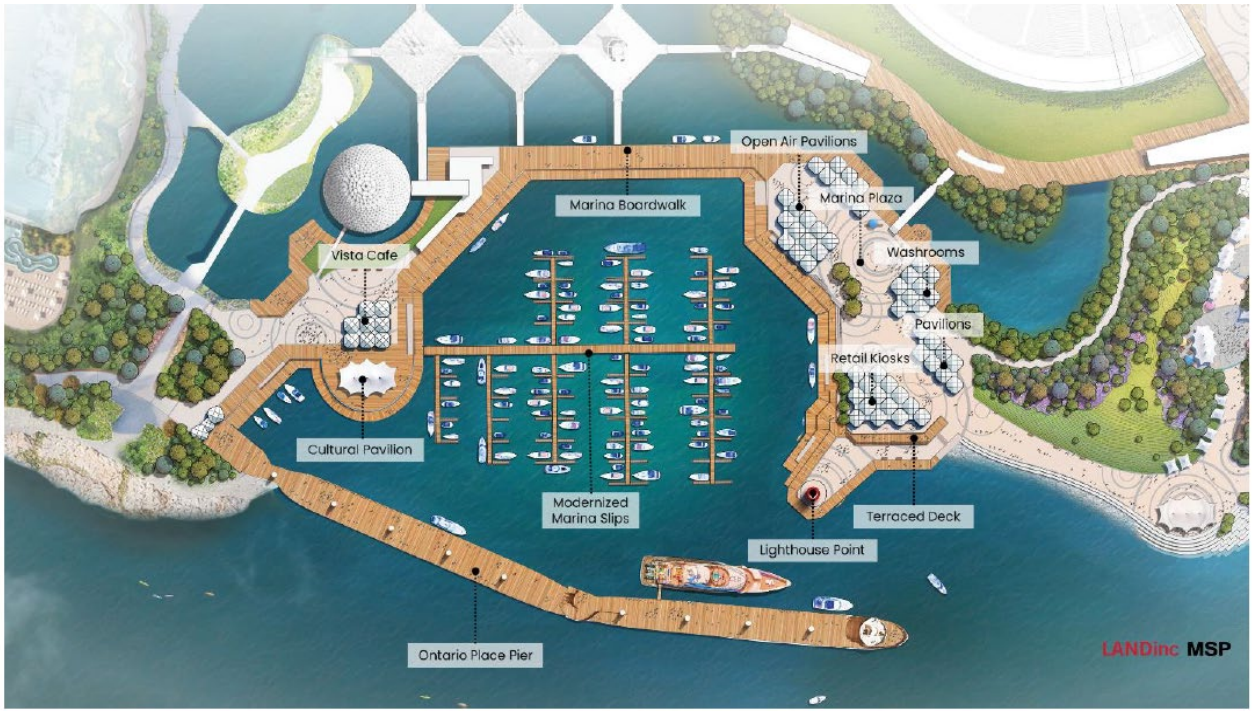


Figure 4-15: Proposed Water Taxi and Seabus Locations

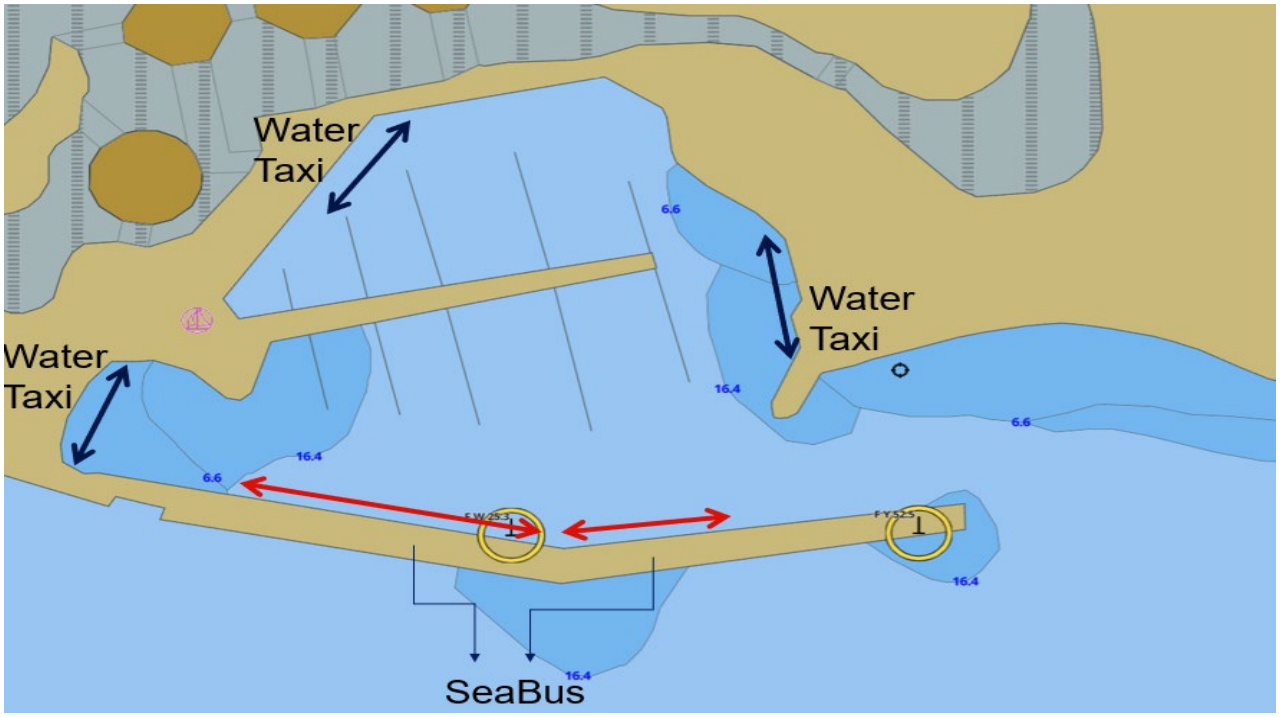


Table 4-32: Summary of Technical Review – Ontario Place

	Ontario Place* (Water Taxi / Seabus)
Bathymetric Review	As provided in the Master Plan for the Ontario Place redevelopment, it appears that the marina water depth will accommodate both water taxis and seabus vessels specified for this project.
Site Environmental Conditions	The proposed marina redevelopment offers shelter conditions, with no adverse impact of wind, waves, and water current on moored vessels.
Ownership	Waterlot: Province Dockwall: Province Land: Province
Operational Concerns	Potential for congestion in/out of Ontario Place with rest of marina activities, to be confirmed with Infrastructure Ontario.
Dredging Requirements	Capital dredging most likely be required as part of the initial development. Maintenance dredging most likely will not be required.
Existing Infrastructure	This area is designated for redevelopment. Sheet-pile arrangement or a floating dock is applicable.

*Note this analysis is based on post-revitalization of the Ontario Place location.

4.6.4 Portland Slip

The Portland slip is a functioning marine facility. It is a long and wide slip, and it can accommodate large vessels. The slip is based on a sheet-pile system. The slip arrangement offers protection to the moored vessels. A mooring location for water taxi and seabus was discussed during a meeting with the Project Team, and it was concluded that the preferred location is on the west side of the slip. If more mooring spaces are required, floating docks can easily be incorporated within the existing slip. See Figure 4-16 on the next page.

Figure 4-16: Proposed Water Taxi Seabus Location

Table 4-33: Summary of Technical Review – Portland Slip

	Portland Slip (Water Taxi / Seabus)
Bathymetric Review	The Portland slip water depth can accommodate water taxis or seabus vessels specified for this project.
Site Environmental Conditions	The Portland slip provides sheltered conditions and impact due to waves, wind, and water current on moored vessel at the dock will be minor.
Ownership	Waterlot: City of Toronto Dockwall: City of Toronto Land: City of Toronto
Dredging Requirements	This is the existing slip, and any dredging requirements should be as per the current operation.
Existing Infrastructure	The Portland Slip's existing infrastructure is based on the sheet-pile concept. The sheet-pile wall was recently upgraded. The extent of the refurbishment is not known at the time of this Study.
Assessment	To accommodate the project vessels, a floating dock could be considered as an option. The floating dock can be either anchored to the seawall or it can be anchored to driven piles.

4.6.5 Yonge Slip

Based on the Yonge slip future redevelopment and a discussion with the Project Team, the preferable location for the water taxi and seabus vessels is on the east side of the slip as shown in Figure 4-17. The slip structure is based on a sheet-pile system to which a floating dock can be anchored. The floating dock may provide operational flexibility. The slip arrangement offers protection to the moored vessels and adverse impact on moored ship due to wave and water current

would be negligible. It should be noted that any construction of new marine docking infrastructure on this slip will need to take into consideration the future Waterfront East LRT.

Figure 4-17: Yonge Slip Water Taxi and Seabus Preferred Location

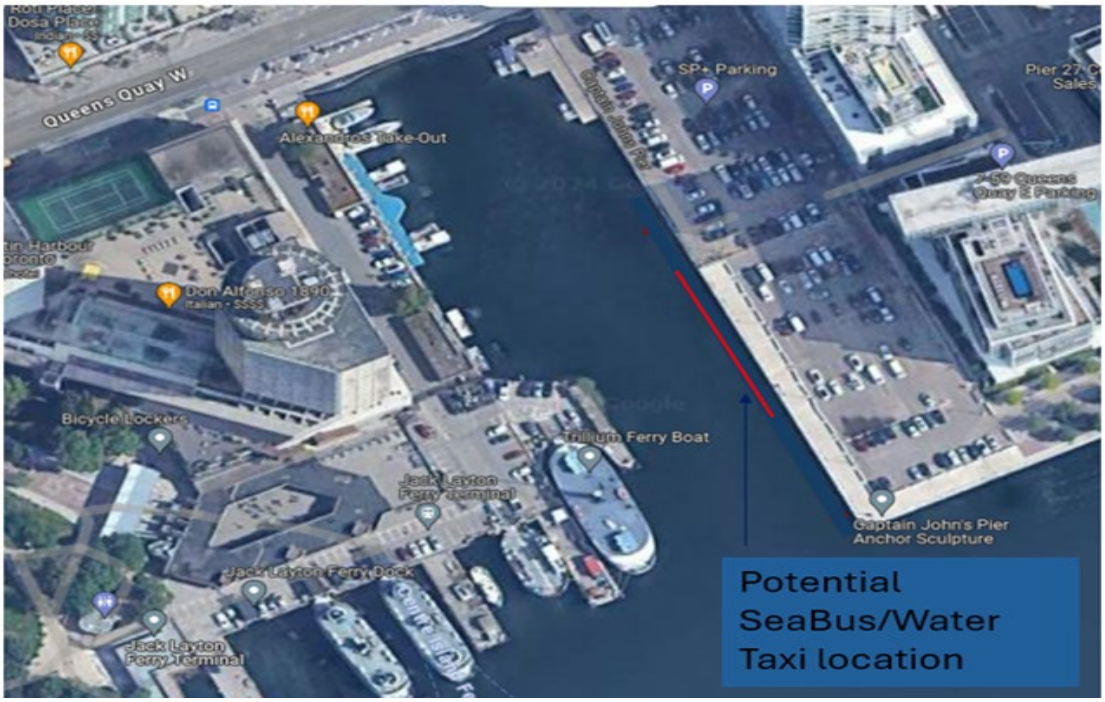


Table 4-34: Summary of Technical Review – Yonge Slip

	Yonge Slip (Water Taxi / Seabus)
Bathymetric Review	The Yonge slip water depth can accommodate the water taxi and seabus vessels specified for this project.
Site Environmental Conditions	The Yonge slip provides sheltered conditions and impact due to waves, wind, and water current on moored vessel at the dock will be minor.
Ownership	Waterlot: PortsToronto Dockwall: PortsToronto / Waterfront Toronto / City of Toronto Land: PortsToronto / Waterfront Toronto / City of Toronto
Dredging Requirements	This is the existing slip, and any dredging requirements should be as per the current operation.
Existing Infrastructure	The existing infrastructure is based on the sheet-pile system.
Assessment	Final development plan is required to establish marine structures. Floating platform are economical solutions for this location.

4.6.6 Parliament Slip

Based on the Parliament Slip future redevelopment, the preferable location for the water taxi and seabus in on the west side of the slip (see Figure 4-18). The slip structure is based on a sheet-pile system to which a floating dock can be anchored. The floating dock may provide operational flexibility. The slip arrangement offers protection to the moored vessels. However, the Don River sediment transport and water current should be considered while selecting the dock orientation once the final Don River redevelopment is finalized.

Figure 4-18: Proposed Water Taxi and Seabus Dock

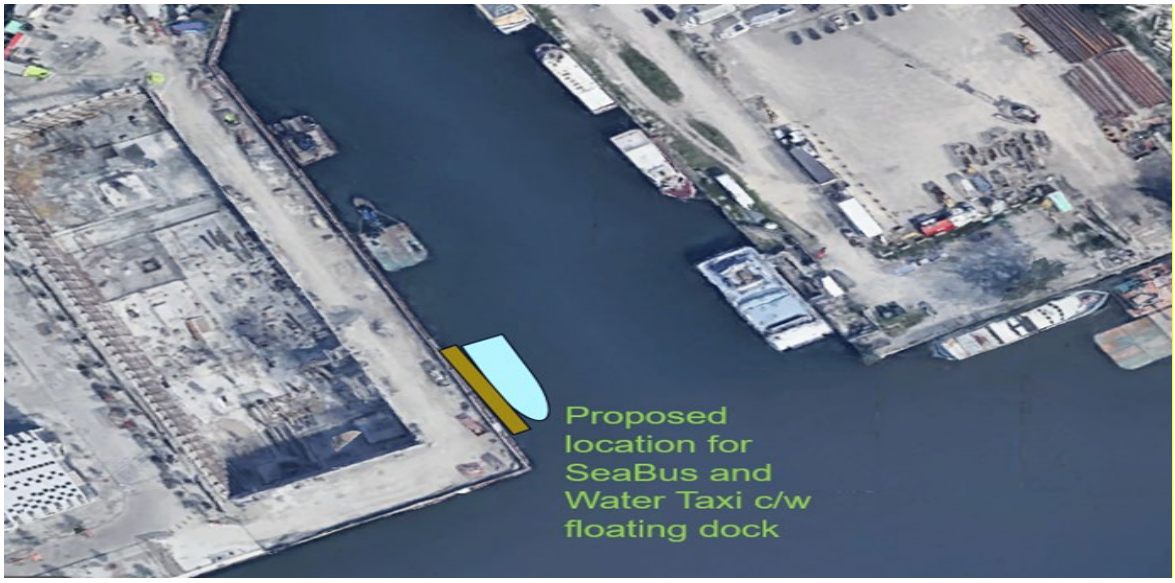


Table 4-35: Summary of Technical Review – Parliament Slip

	Parliament Slip (Water Taxi / Seabus)
Bathymetric Review	The Parliament slip water depth is sufficient for the water taxi and seabus vessels specified for this project.
Site Environmental Conditions	Don River sediment transport and water current to be considered once final Don River planning is finalized.
Ownership	Waterlot: Waterfront Toronto Dockwall: Waterfront Toronto Land: Waterfront Toronto and City of Toronto
Dredging Requirements	Water taxi and seabus dock to position to reduce impact of the Don River sediments and debris.
Existing Infrastructure	The existing infrastructure is based on the sheet-pile system.
Assessment	Refurbishment of the existing seawall and the area redevelopment most likely will occur in the future. Floating dock system for water taxis and seabuses should be incorporated within the overall master plan for the area.

4.6.7 Ookwemin Minising

Three locations on Ookwemin Minising are to accommodate water taxi and seabuses as detailed in Figure 4-19 (i.e., locations identified as 2, 3 and 4 on the map). Details on the configurations for these docking locations are not known at the time of this Study, but it appears that floating docks would be most applicable at these locations. The Don River sediment transport and water current should be considered while selecting the dock orientation once the final Don River redevelopment is finalized.

Figure 4-19 : Ookwemin Minising Redevelopment Plan provided by Waterfont Toronto

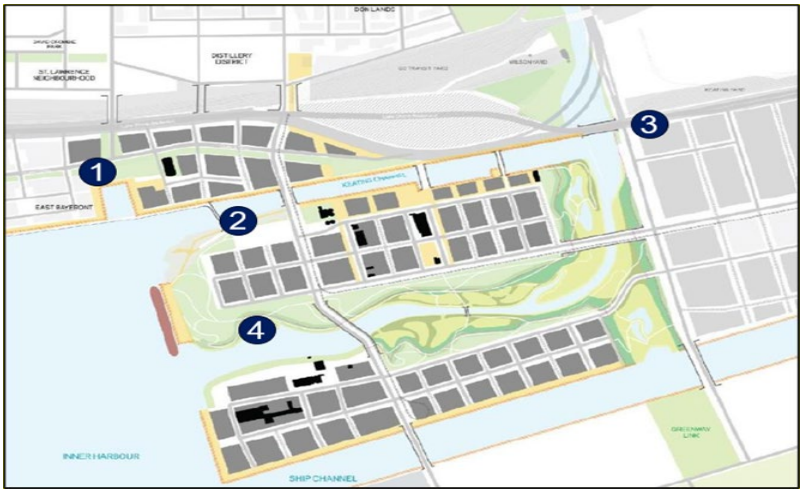


Table 4-36: Summary of Technical Review – Canoe Cove

	Canoe Cove (4) (Water Taxi / Seabus)
Bathymetric Review	This area is in planning phase by others.
Site Environmental Conditions	Don River sediment transport and the river's current need to be considered
Ownership	Waterlot: PortsToronto Dockwall: Waterfront Toronto Land: Waterfront Toronto
Dredging Requirements	TBD
Existing Infrastructure	This area is designated for major redevelopment.
Proposed infrastructure	Floating dock

Table 4-37: Summary of Technical Review – Keating Channel

	Keating Channel (3) (Water Taxi / Seabus)
Bathymetric Review	This area is in planning phase by others.
Site Environmental Conditions	Don River sediment transport and current to be considered for the water taxi and seabus docking arrangements.
Ownership	Waterlot: PortsToronto Dockwall: CreateTO / PortsToronto Land: CreateTO / City of Toronto
Dredging Requirements	TBD
Existing Infrastructure	This area is designated for major redevelopment.
Assessment	Most likely a floating platform moored to the dock wall. The detailed redevelopment plan is required to incorporate the dock structure for the project vessels.

Table 4-38: Summary of Technical Review – Promontory Park North (PPN)

	PPN (2) (Water Taxi / Seabus)
Bathymetric Review	This area is in planning phase by others.
Site Environmental Conditions	Don River sediment transport and currents need to be is considered for the water taxi and seabus docking arrangements.
Ownership	Waterlot: PortsToronto Dockwall: Waterfront Toronto Land: Waterfront Toronto
Dredging Requirements	TBD
Existing Infrastructure	This area is designated for a major park development.
Proposed Infrastructure	Most likely a floating platform moored to the dock wall. The detailed redevelopment plan is required to incorporate the dock structure.

4.6.8 Toronto Port Lands

Two potential locations were selected for a ferry slip within the Toronto Port Lands. Three different orientations were proposed for the ferry slip and the preferred option is as per the Figure 4-20 and Figure 4-21. The proposed ferry slip structural arrangement is a sheet pile system similar to the existing infrastructure. The proposed ferry slip's arrangements need to be further optimized in

detailed design. The optimalization of the ferry slips needs to consider the ferry maneuverability and the channel conditions.

It should be noted that these were investigated as possible vehicle ferry docking locations. As well, this report only examined the technical feasibility of these locations and not for commercial or organizational feasibility of providing vehicle ferry services.

Figure 4-20: Ferry Slip V1 – Shipping Channel

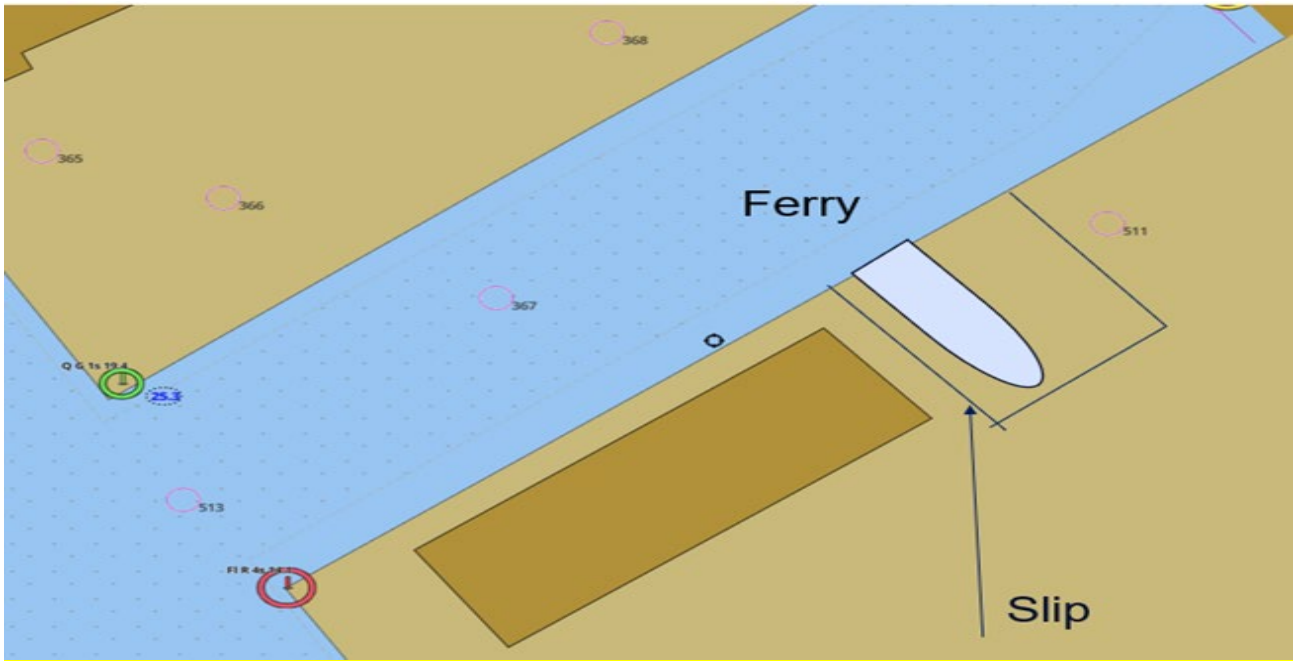


Figure 4-21: Ferry Slip V2 – Eastern Channel

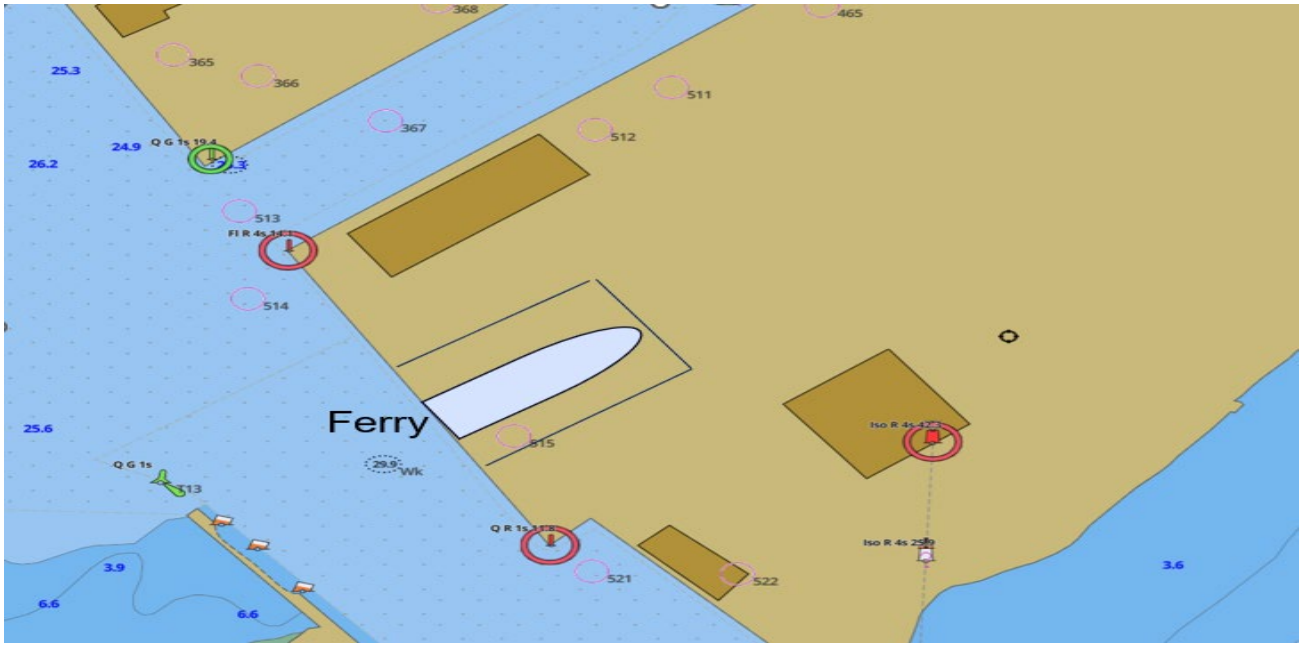


Table 4-39: Summary of Technical Review – Ports Land

	Toronto Ports Land	
	V1 – Shipping Channel	**V2 – Eastern Channel**
Bathymetric Review	Water depth is sufficient to accommodate the vehicle ferries as vessels specified for this project.	Water depth is sufficient to accommodate the vehicle ferries specified for this project.
Site Environmental Conditions	The slip provides sheltered conditions and impact due to waves, wind, and water current on moored vessel at the dock will be minor.	The slip provides sheltered conditions and impact due to waves, wind, and water current on moored vessel at the dock will be minor.
Ownership	Waterlot: PortsToronto Dockwall: PortsToronto Land: PortsToronto	Waterlot: PortsToronto Dockwall: PortsToronto Land: PortsToronto
Dredging Requirements	Initial dredging to construct a slip	Initial dredging to construct a slip
Existing Infrastructure	Sheet-pile system.	Sheet-pile system.
Notes	New sheet-pile slip system, and dolphins are required to construct a slip. The access to the site by vehicles also will need to be assessed.	New sheet-pile slip system, and dolphins are required to construct a slip. The access to the site by vehicles also will need to be assessed.

4.6.9 Outer Harbour Marina

Two locations are proposed for further evaluation at the Outer Harbour Marina as per Figure 4-22. The floating dock is within the Outer Harbour. However, this location offers sheltered conditions for vessel movement and docking. A floating dock or a sheet pile system is applicable to this location.

Figure 4-22: Proposed Dock Locations at Outer Harbour Marina

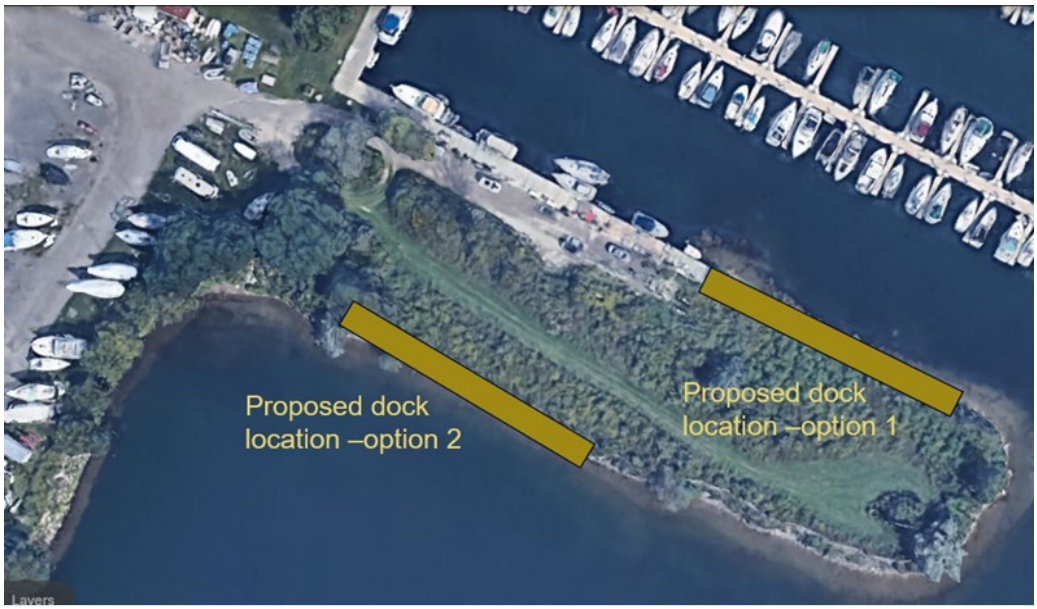


Table 4-40: Summary of Technical Review – Outer Harbour Marina

	Outer Harbour Marina (Water Taxi / Seabus)
Bathymetric Review	Water depth should accommodate the water taxi and seabus vessels specified for this project.
Site Environmental Conditions	Wave and wind impact should not be a concern as this is a sheltered marina.
Ownership	Waterlot: PortsToronto Dockwall: PortsToronto Land: PortsToronto
Dredging Requirements	None
Existing Infrastructure	Operating marina.
Assessment	Established marina can accommodate the project vessels. Additional new floating dock can be installed if required.

4.6.10 Ward's Island

Two potential locations were considered for the water taxi and seabus as per Figure 4-23.

- Option 1 – a floating dock to the east of the existing ferry dock
- Option 2 – a floating dock to the west of the existing ferry dock

Based on the water depth and the ferry movements, the preferable option is to position the floating dock to the west of the existing ferry dock. The floating dock is within the Inner Harbour which offers sheltered conditions for vessel movement and docking.

Figure 4-23: Ward's Island Proposed Locations for Water Taxi and Seabus

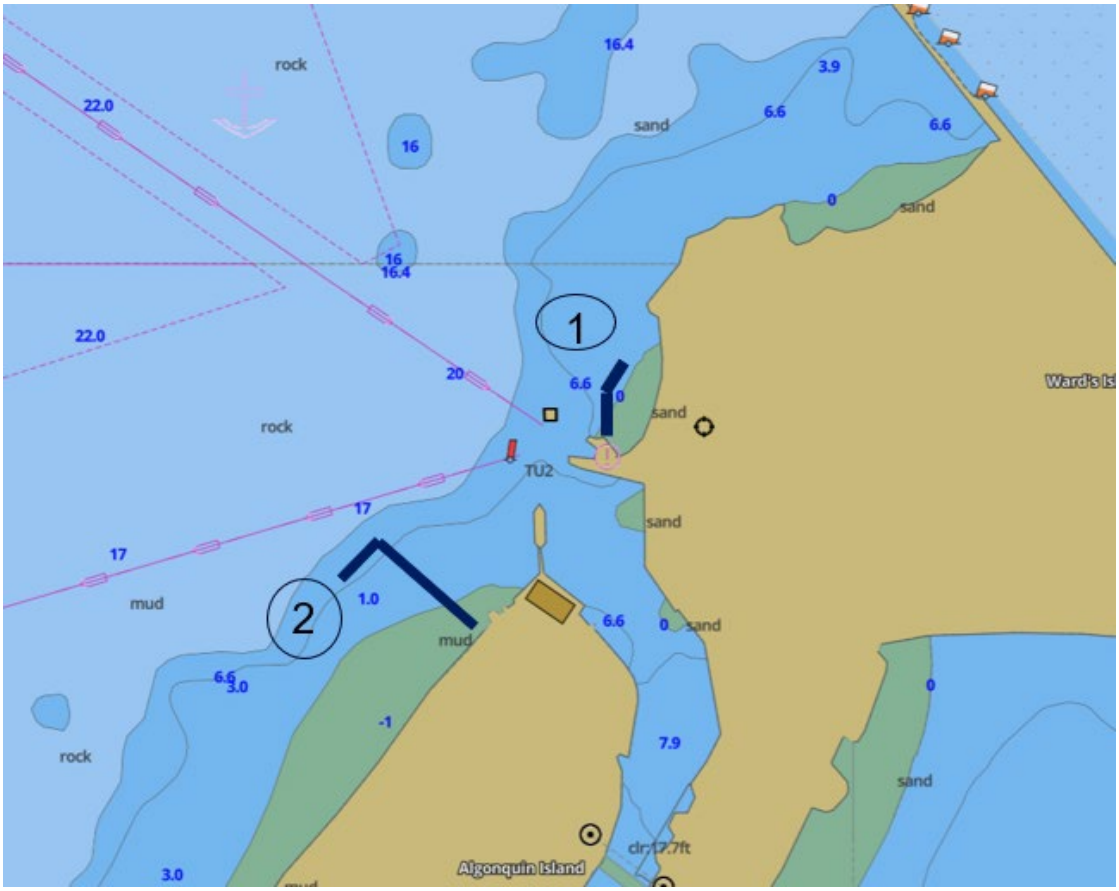


Table 4-41: Summary of Technical Review – Ward's Island

	Ward's Island (Water Taxi / Seabus)
Bathymetric Review	Shallow, near shore water is present.
Site Environmental Conditions	No major concern.
Ownership	Waterlot: TRCA / City of Toronto Dockwall: City of Toronto Land: City of Toronto
Dredging Requirements	It is recommended to construct a floating dock in water depth sufficient for the specified project vessels.
Existing Infrastructure	The existing infrastructure will not accommodate the project vessels.
Assessment	Floating dock moored to driven piles with a trestle is proposed for the project vessels.

4.6.11 Ward's Beach

Ward's Beach is on the south side of Toronto Islands. This area is fully exposed to waves. The floating structure will need to resist storm and wave conditions. Alternatively, a pile-based structure can be constructed. Wave conditions may limit vessels docking operation. The dock availability for vessels mooring will need to be evaluated in detailed design.

While it is technically feasible to locate a dock at this location, it may be cost prohibitive, and an alternative location may need to be explored.

Figure 4-24: Ward's Beach

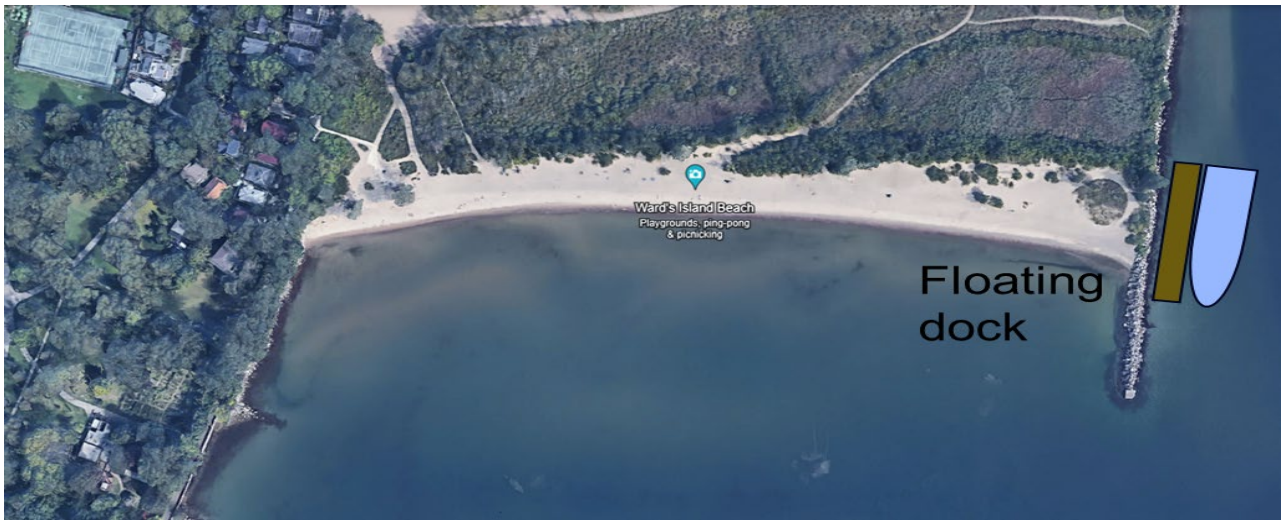


Table 4-42: Summary of Technical Review – Ward's Beach

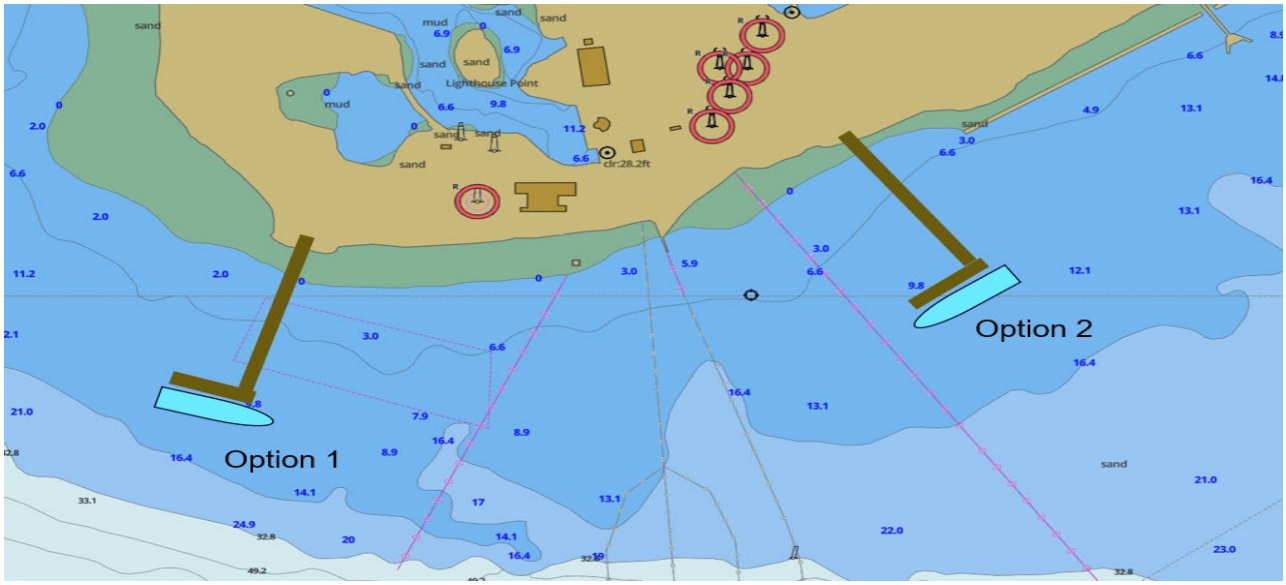
	Ward's Beach (Water Taxi / Seabus)
Bathymetric Review	Shallow, near shore water is present.
Site Environmental Conditions	Wave condition study is required to validate the viability of the dock in this location during detailed design.
Ownership	Waterlot: TRCA / City of Toronto Dockwall: City of Toronto Land: City of Toronto
Dredging Requirements	It is recommended to construct a floating dock in water depth sufficient for the project vessels.
Existing Infrastructure	None
Assessment	Floating dock moored to driven piles with a trestle is proposed for the project vessels. Waves will need to be assessed during detailed design.

4.6.12 Manitou Point

Manitou Beach is on the south side of Toronto Islands. This area is fully exposed to waves. The floating structure will need to resist storm and wave conditions. Alternatively, a pile-based structure can be constructed. Wave conditions may limit vessels docking operation. The dock availability for

vessels mooring will need to be evaluated in detailed design. Proposed options for the dock location are as per the Figure 4-25.

Figure 4-25: Manitou Point Proposed Dock Location



While it is technically feasible to locate a dock in this location, it may be cost prohibitive, and an alternative location may need to be explored.

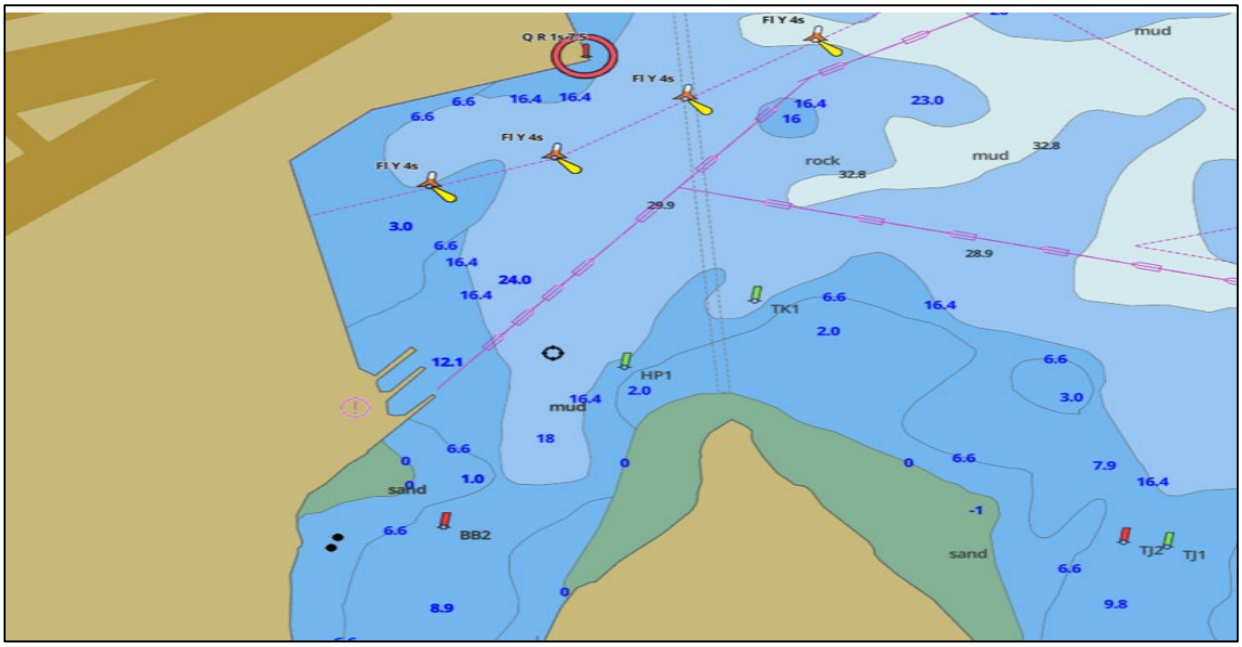
Table 4-43: Summary of Technical Review – Manitou Point

	Manitou Point (Water Taxi / Seabus)
Bathymetric Review	There is shallow water to a considerable distance from the shore.
Site Environmental Conditions	Wave and wind impact be further investigated during the project next phase.
Ownership	Waterlot: TRCA / City of Toronto Dockwall: City of Toronto Land: City of Toronto
Dredging Requirements	Proposed trestle of a sufficient length to reach water depth to accommodate the project vessels. Alternatively, the floating dock can be positioned to the east to reduce the trestle length.
Existing Infrastructure	None
Assessment	Floating dock moored to driven piles with a trestle is proposed for the project vessels.

4.6.13 Hanlan's Point

Based on the traffic analysis, additional infrastructure is not required at Hanlan's Point.

Figure 4-26: Hanlan's Point - Current Dock Location



4.6.14 Centre Island

Based on the water depth and the ferry movements, the preferable option is to position the floating dock to the east of the existing ferry dock. The floating dock is within the Inner Harbour which offers sheltered condition for vessels movement and docking.

Figure 4-27: Proposed Floating Dock for Centre Island

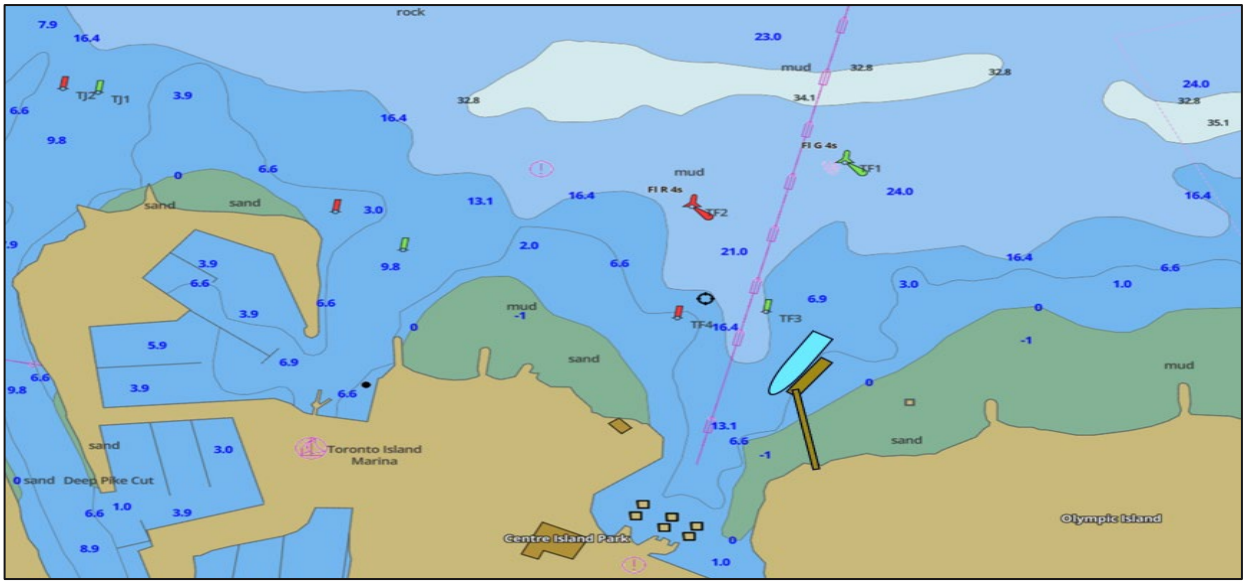


Table 4-44: Summary of Technical Review – Centre Island

	Centre Island (Water Taxi / Seabus)
Bathymetric Review	Shallow water near the shore.
Site Environmental Conditions	No major concern.
Ownership	Waterlot: TRCA / City of Toronto Dockwall: City of Toronto Land: City of Toronto
Dredging Requirements	It is recommended to construct a floating dock in water depth sufficient for the project specified vessels draft.
Existing Infrastructure	The existing infrastructure will not accommodate the project specified vessels.
Assessment	Floating dock moored to driven piles with a trestle is proposed for the project vessels.

4.6.4 Marine Infrastructure Cost Estimate

The cost estimate is an order of magnitude cost estimate, and it is based on 2023 construction cost in Canadian currency.

Floating Dock – Option 1 Cost Estimate

Floating dock – Option 1 applies to the following locations where there is no seawall:

- Ookwemin Minising - Promontory Park North and Canoe Cove
- Ward's Island
- Ward's Beach
- Centre Island
- Manitou Beach

Table 4-45: Floating Dock Cost Estimate (Option 1)

Description	Order of Magnitude Cost Estimate
Floating Dock • The overall dock width of 3 m. • The overall section length of 40 m. • Floating dock of 600 mm freeboard. • Mooring cleats • 1.9 kPa buoyance. • A composite decking to ensure ease of maintenance and durability.	$240,000
1.2 m wide clear anodized all-aluminum gangway	$60,000
Steel piles as the floating dock anchorage system	$90,000
Shore abutment	$80,000
Engineering, Permitting and Procurement	$20,000
Construction and installation cost	$ 220,000
Floating Dock Order of Magnitude Cost Estimate	**$ 710,000**

Floating Dock – Option 2 Cost Estimate

Floating dock – Option 2 applies to locations where there is a seawall:

- Portland Slip
- Yonge Slip
- Parliament Slip
- Keating Channel

Table 4-46: Floating Dock Cost Estimate (Option 2)

Description	Order of Magnitude Cost Estimate
Floating Dock • The overall dock width of 3 m. • The overall section length of 40 m. • Floating dock of 600 mm freeboard. • Mooring cleats • 1.9 kPa buoyance. • A composite decking to ensure ease of maintenance and durability.	$240,000
1.2 m wide clear anodized all-aluminum gangway	$60,000
Floating dock anchorage system	$90,000
Engineering, Permitting and Procurement	$20,000
Construction and installation cost	$ 180,000
Floating Dock Order of Magnitude Cost Estimate	**$ 590,000**

Notes on Cost Estimates:

- The cost of seawall repairs is not included due to unknown structural conditions.
- The seawall has the capacity to accommodate the project vessels. Floating docks are the project requirements.

Sheet-pile Ferry Slip Construction Cost Estimate

Sheet-pile slip applies to the ferry slip for Toronto Ports Land at both (V1) Shipping Channel and (V2) Eastern Channel locations. Based on current construction cost in Toronto area, the new dock wall will cost between $30,000 to $35,000 per liner metre. This includes the new dock wall, deadman, rods, a concrete cope beam and all associated excavation and backfilling work. The cost also includes the installation of ancillary elements such as fenders, mooring bollards, wheel guards, safety stations and ladders.

Table 4-47: Sheet-pile Slip Cost Estimation

Description	Order of Magnitude Cost Estimate
Estimated length sheet-pile length 280 m at $35,000 per unit length (material and construction cost)	$9,800,000
Dredging	$3,000,000
Ferry Slip Order of Magnitude Cost Estimate	**$12,800,000**

Construction Cost Estimate Summary

Below is an Order of Magnitude Cost Estimate for various locations.

Table 4-48: Construction Cost Estimate for Docking Locations

	Location	Order of Magnitude Cost Estimate	Current conditions and planning and development
1	Ontario Place	Excluded	Major redevelopment of the area in the planning phase by others.
2	Portland Slip	$ 590,000	The cost estimate is for the floating dock and does not include any repairs to the seawall.
3	Yonge Slip	$ 590,000	The cost estimate is for the floating dock and does not include any repairs to the seawall.
4	Parliament Slip	$ 590,000	The cost estimate is for the floating dock and does not include any repairs to the seawall.
5	Keating Channel East	$ 590,000	The cost estimate is for the floating dock and does not include any repairs to the seawall.
6	Canoe Cove - - Ookwemin Minising Promontory Park - -Ookwemin Minising	$ 710,000	Floating dock
7	V1 – Ship Channel	$12,800,000	Ferry slip
8	V2 - Eastern Channel.	$12,800,000	Ferry slip
9	Vehicle Ferry – Halan's Point		Infrastructure is not required.
10	Outer Harbour Marina	$ 710,000	Floating dock
11	Ward's Island Beach	$ 710,000	Floating dock
12	Manitou Beach	$ 710,000	Floating dock
13	Ward's Island	$ 710,000	Floating dock
14	Centre Island	$ 710,000	Floating dock

4.7 Step 3: Analyzing Options - Organizational Feasibility

Organizational feasibility includes a number of different aspects related to the management and operations of a service, including:

- operating model for new services or major changes implemented;
- legal or licensing requirements; and,
- major stakeholder considerations.

4.7.1 Operating Models

Three main operating models exist that could be implemented for new services: private commercially operated, concession, or publicly operated.

Private operations do not require planning of services or detailed approval by government organizations, but would require appropriate licenses and adherence to rules and regulations (in this case Transport Canada and TIDAL license if operating to Toronto Islands). If new services were to be left for private operations, the decision would be left to private companies and would largely be dependent on market need and overall demand for a service. Public organizations could incentivize operations at certain locations through development and management of slips. Overall, service could be partially managed (adherence to safety, certain local operational requirements such as reduced operating speeds, etc.) through the amendment or introduction of a new license to operate on the cityside.

A concession allows for the procurement of a specific service for a specified amount of time. In this arrangement public organizations would have a greater say in the types of services procured through outlining minimum operational requirements within the contract, while allowing for a private operator to operate the service day-to-day. Specific requirements are also laid out for cost and revenue sharing. It is important to ensure the proposed service to be procured as a concession has undergone appropriate feasibility studies including a stated preference survey and market sounding to inform the concession agreement and ensure successful procurement.

A publicly operated service is typically used for public transport systems and requires that the public organization undertake all planning and operations of a service and typically includes a subsidy for the public service. In the context of these studied marine routes, a publicly operated marine service may not be feasible for cityside connecting services due to the efficiency in operations a landside public transport service could provide year-round. If desired, a cost-benefit analysis could be conducted to compare the effectiveness of public funding for a marine service compared to a landside alternative.

The studied routes are best delivered through private operations or a concession. It is recommended a market study be conducted to understand the private sector's desire to operate desired routes.

4.7.2 Legal and Licensing Requirements

As discussed in Section 2, licensing requirements are set out by Transport Canada and differ by vessel size. No additional licenses would be required to operate the proposed services studied.

Currently a TIDAL license is required for commercial marine operations docking anywhere on the Toronto Islands. An amendment to the TIDAL license or a new license may be appropriate to manage new services as cityside access demand grows, this is discussed further in Section 5.6.

4.7.3 Stakeholder Comments

As discussed in Section 2.6, stakeholder engagement was undertaken as part of this study to understand any initial interests and concerns with scenarios to be analyzed as part of this feasibility study. While stakeholders were generally interested in new marine connections and opportunities to improve existing marine operations, a couple of items were identified for further coordination.

Safety

Stakeholders were primarily concerned with safety between non-motorized and recreational marine uses alongside motorized marine uses. This was disclosed about existing services (water taxis and other private vessels) and further concern was raised about the expansion of services, especially in the Cherry Beach area. While there is existing motorized vessel traffic to the Outer Harbour Marina, stakeholder concern is around commercial operations which are viewed to operate with less consideration for non-motorized and recreational users. There may be opportunities to manage safe

operations in this area through the implementation of precise route planning and space allocation, limits of number of vessels and frequency, speed reductions, and increased enforcement. Further study and stakeholder engagement should be conducted for any future service to ensure safe operations.

Congestion

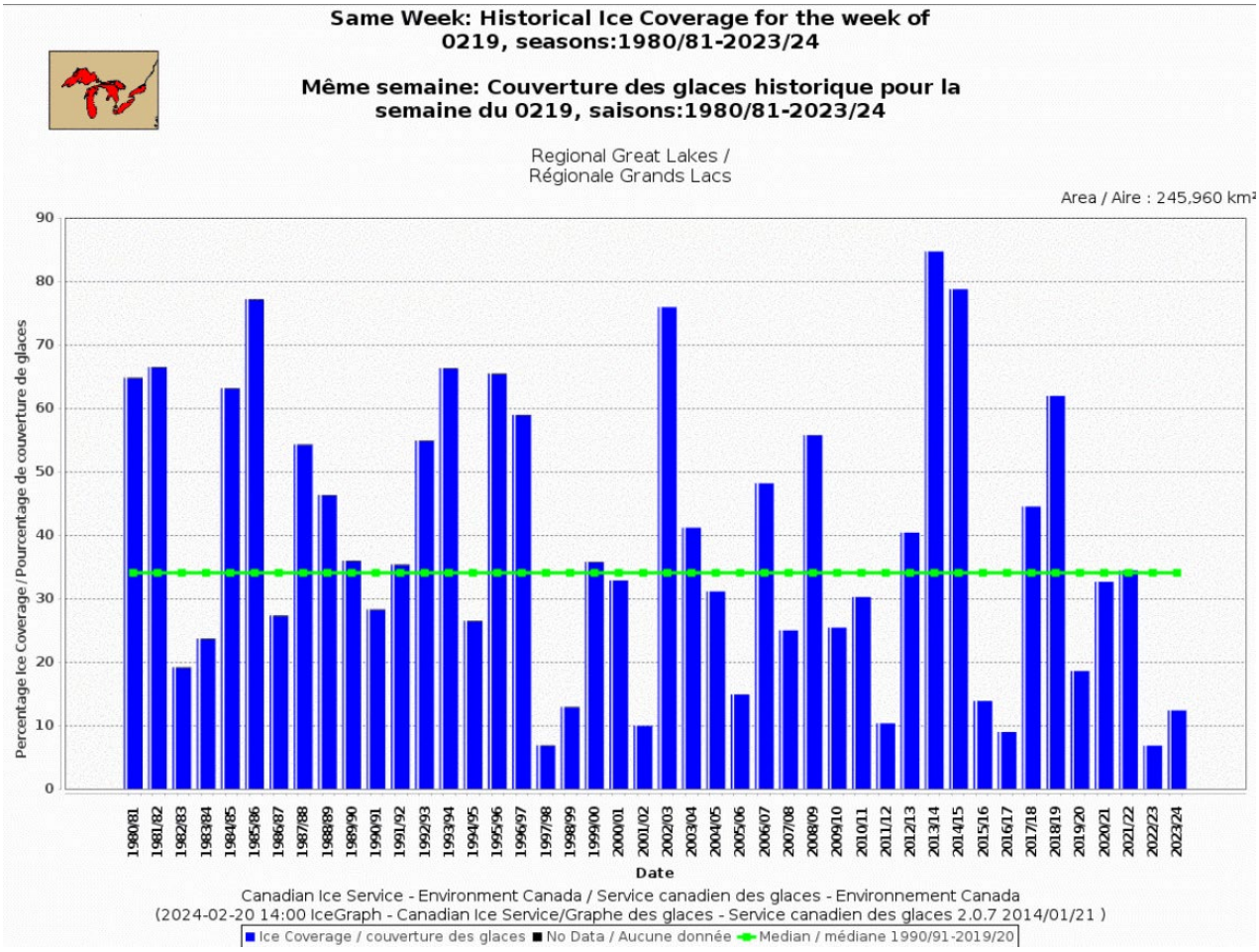
Stakeholders were concerned with landside congestion and the erosion of the waterfront experience as a result. Queen's Quay gets extremely congested during peak summer months especially in the central waterfront area. Opportunities to manage this high-traffic area would be beneficial for all. Several analyzed options, such as connecting future high-demand areas on the eastern waterfront directly to Toronto Islands and relocating vehicle ferry services to the Ports Lands, would help manage high-traffic areas in the central waterfront. These options are discussed further in Sections 5.2 and 5.3.

4.8 Winter Operations

While the service analysis outlined in Section 4 focuses on summer demand, this study considers year-round operations including, what can be, a harsh Canadian winter. Most metallic vessels can sail through some ice, especially thin first year ice. However, ice conditions can change rapidly in Lake Ontario, even within a day.

Figure 4-28 below shows the historical ice coverage on the Great Lakes for the second week of February from 1980 to 2023. It can be observed that a little over half of the past twenty years have experienced less than median (35%) ice coverage. There are still several instances where ice coverage can exceed 60% with 10 occurrences in the period of 1980 and 2023.

Figure 4-28: Historical Ice Coverage (Second week of February)



Source: GCC - Portail e-Nav - Cartes d'observation des glaces (canada.ca)

Ice forms starting from the shore and ending in middle of a body of water. Ice formation occurs earlier in protected bays and sheltered area such as Toronto Inner Harbour. According to Environment Canada,[68] ice on Lake Ontario begins forming in the Bay of Quinte during the third week of December. Ice coverage reaches its peak at the end of January and can cover around 17% of Lake Ontario. The maximum Lake Ontario ice average varies from 10% (mild winter) up to 65% during cold winters.

In Lake Ontario's protected bays, ice thickness is generally between 20 cm to 60 cm.[69] It can be thicker under some circumstances, such as a warm windy day after a period of cold temperature and the ice stacks-up in specific areas. This phenomenon increases the ice thickness but also increases the pressure on vessels travelling through the icy waters due to the wind pushing the ice on the vessel.

The information published by Environment Canada correlates the qualitative information the Project Team has gathered in discussions about the ice conditions that can be found in Toronto Inner Harbour.

[68] https://publications.gc.ca/collections/collection_2013/ec/En56-192-2010-fra.pdf
[69] Ibid

Considering these winter conditions, ice strengthened ferries would be required to ensure safe and reliable year-round service in the Toronto Inner Harbour. The CoT currently operates the ferry MV Ongiara, which is ice strengthened, year-round to the Toronto Islands. As well, the two new ferries that the CoT has purchased will have the ability to operate in icy conditions and are expected to be able to provide services to the Toronto Islands year-round. In addition, in extreme ice conditions, the CoT Fire Tug William Lyon Mackenzie, can break ice when required to allow the ferries to operate, as it currently does when required to support the MV Ongiara,

In terms of smaller, seabus size vehicles, there are some options. The Baltic Workboat Shipyard has built 24-passenger + 1 car ferry that has a 5 cm ice-capabilities (see Figure 4-29), but that is insufficient to operate the full-year in Toronto Inner Harbour due to ice conditions, without the assistance of a pilot boat with ice breaking capabilities.

Figure 4-29: Small Passenger Ferry with Limited Ice-Capabilities

Source: https://bwb.ee/vessel/baltic-150-ferry/**safe**

The ice conditions in the Toronto Inner Harbour vary from year to year. To ensure safe and reliable year-round services, vessels much have proper ice capabilities. Operating in the range of ice thickness (i.e., 20 cm to 60 cm) experienced in the Toronto Inner Harbour requires a vessel with a minimum size and power. Drawing from the performance of small pilot boats that have ice breaking capability to work in these conditions, a passenger ferry would need to be at least 16 m in length. This length would relate to a vessel that could carry around 75 passengers. Even a boat of this size may require periodic assistance of an ice breaking pilot boat at the upper end of the ice thickness range in the Toronto Inner Harbour.

As noted in Section 4.5, only Route D would require a vessel with a capacity of 75 passengers to meet with the anticipated estimated demand by 2050.

4.9 Step 4 - Feasibility Analysis

As outlined in Section 4.1, three elements of feasibility (technical, commercial, and organizational feasibility) were considered in the analysis of new marine transport services in Toronto. Findings for each service are summarized in the below sections.

In addition, next steps to possibly explore to the feasibility of routes with the most mid to long-term potential are explored at the end of this section, including piloting certain route options. A high-level rationale for pursuing these pilots is also identified.

4.9.1 Route A

The commercial, technical, and organizational feasibility of Route A are summarized in Table 4-49.

Based on the service analysis conducted in Section 4.5, a 12-passenger vessel would be required to service the demand in 2023 while a 24-passenger vessel and a 50-passenger vessel would be required to service the demand in 2035 and 2050 respectively.

In each of the study horizons, a minimum fare of $13.27, $11.31, and $11.01 per passenger (for 2023, 2023 and 2050 respectively) would be required to cover solely the operational costs, provided that the estimated demand is met. These minimum fare prices are within the relative range of marine transport fares and could be considered reasonable in the absence of a stated preference survey.

Figure 4-30: Route A Map

Table 4-49: Feasibility Study Findings - Route A

	2023	2035	2050
Vessel Type	12PAX	24PAX	50PAX
Resulting cost per PAX	$13.27	$11.31	$11.01
Total Operational Cost (annual)	$1.21 Million	$1.85 Million	$3.10 Million
Total Infrastructure cost	$3.13 Million	$3.13 Million	$3.13 Million
Feasibility	**Improbable**	**Potential**	**Potential**
Notes	Ontario Place and eastern waterfront (Parliament Slip, Ookwemin Minising) are undergoing redevelopment and are not yet destinations requiring marine transport connections.	Development at Ontario Place and some development on eastern waterfront is forecasted to be complete. Both locations may not have sufficient transportation connections and there may be increased demand which could be met with a marine service.	Full development of eastern waterfront is forecasted to be complete. Potential for competing landside transit alternatives to reduce demand for marine transport.

Based on the infrastructure analysis conducted in Section 4.6, the required infrastructure at Ontario Place, Portland Slip, Yonge Slip, Parliament Slip, and Ookwemin Minising would result in a total infrastructure cost of $3.13 million. This is a significant cost for infrastructure and may impact overall feasibility. Future consideration should include opportunities to align the required marine infrastructure with existing or planned projects.

The feasibility of a Route A service in 2023 was classified as **Improbable** as key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are currently undergoing redevelopment and do not yet require marine transport connections.

The feasibility of a Route A service in 2035 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, partial Eastern Waterfront/Ookwemin Minising) are forecasted to be complete; actual timeline of redevelopment completion will impact feasibility of service. The feasibility of this service may increase with the completion of these redevelopments and with limited landside transport options (e.g., delay in Ontario Line, no WELRT, etc.).

The feasibility of a Route A service in 2050 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are forecasted to be complete, which will significantly increase the demand for transport to and from the east. It is likely that WELRT will be completed by 2050, which would significantly compete with a marine transport service for utilitarian travel along the cityside waterfront.

It is recommended that further study be conducted to understand the potential demand for Route A (utilitarian and experiential). Coordination should be maintained with other agencies to understand completion timelines for Ontario Place, eastern waterfront redevelopment, Ontario Line, and WELRT.

4.9.2 Route B

Commercial, technical, and organizational feasibility of Route B are summarized in Table 4-50.

Based on the service analysis conducted in Section 4.5, a 12-passenger vessel would be required to service the demand in 2023 and 2035, while a 24-passenger vessel would be required in 2050.

In each of the study horizons, a minimum fare of $18.18, $10.79, and $15.13 per passenger would be required to cover solely the operational costs, provided that the estimated demand is met. While the minimum fares for 2035 and 2050 are within a similar range to existing marine transport fares in Toronto, a minimum fare of $18.18 in 2023 is significantly higher than existing fares and may negatively impact demand.

Figure 4-31: Route B Map

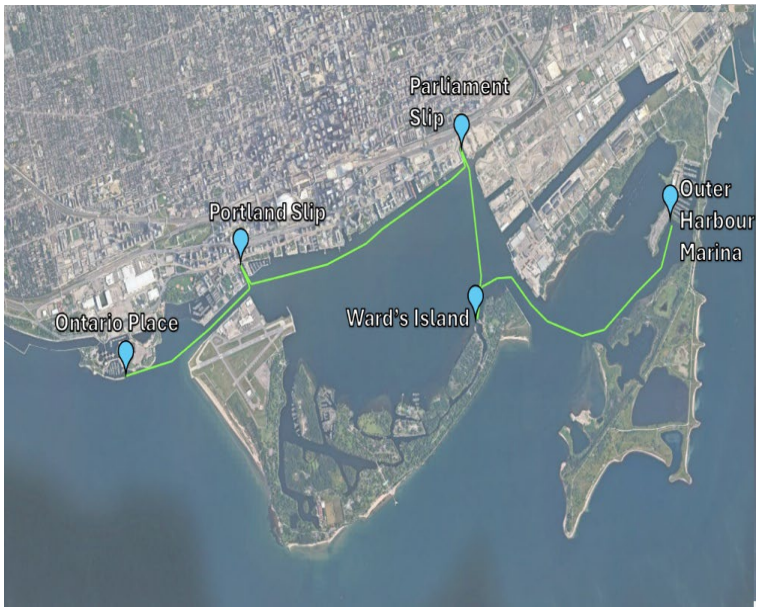


Table 4-50: Feasibility Study Findings - Route B

	2023	2035	2050
Vessel Type – based on capacity	12PAX	12PAX	24PAX
Resulting cost per PAX	$18.18	$10.79	$15.13
Total Operational Cost (annual)	$669,095	$669,095	$1.03 Million
Total Infrastructure cost	$2.72 Million	$2.72 Million	$2.72 Million
Feasibility	**Improbable**	**Potential**	**Potential**
Notes	Ontario Place and eastern waterfront (Parliament Slip, Ookwemin Minising) are undergoing redevelopment and are not yet destinations requiring marine transport connections.	Development at Ontario Place and some development on eastern waterfront is forecasted to be complete. Both locations may not have sufficient transportation connections and there may be increased demand which could be met with a marine service.	Full development of eastern waterfront is forecasted to be complete. Potential for competing landside transit alternatives to reduce demand for marine transport. Direct Toronto Islands connection would be beneficial for residents/visitors of eastern waterfront.

Based on the infrastructure analysis conducted in Section 4.6, the required infrastructure at Ontario Place, Portland Slip, Parliament Slip, Ward's Island, and Outer Harbour Marina would result in a total infrastructure cost of $2.72 million.

The feasibility of a Route B service in 2023 was classified as **Improbable** as key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are currently undergoing redevelopment and do not yet require marine transport connections.

The feasibility of a Route B service in 2035 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, partial Eastern Waterfront/Ookwemin Minising) are forecasted to be complete; actual timeline of redevelopment completion will impact feasibility of service. The feasibility of this service may increase with the completion of these redevelopments and with limited landside transport options (e.g., delay in Ontario Line, no WELRT, etc.).

The feasibility of a Route B service in 2050 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are forecasted to be complete, which will significantly increase the demand for transport to and from the east. It is likely that WELRT will be completed by 2050, which would significantly compete with a marine transport service for utilitarian travel.

With the expected developments in the eastern waterfront in 2035 and 2050, a direct connection between the eastern waterfront and Toronto Islands (at Ward's Island) would be extremely beneficial to meet expected local demand. Further study should be conducted to understand the appropriate location (Parliament Slip, Ookwemin Minising, Keating Channel, etc.) to best meet and manage the demand.

It is recommended that further study be conducted to understand the potential demand for Route B (utilitarian and experiential). Coordination should be maintained with other agencies to understand completion timelines for Ontario Place, eastern waterfront redevelopment, Ontario Line, and WELRT. Further studies and planning for Route B should carefully consider operations to the Outer Harbour Marina. This would require passing through the Eastern Channel (main access for industrial vessels) and the waters encapsulated by Cherry Beach and Tommy Thompson Park (popular with non-motorized marine users), both which require careful consideration for safety. This may include further stakeholder engagement, precise route planning and space allocation, speed reductions, and increased enforcement.

It is also worth considering that while Route B is classified as having **Potential** in 2035 and 2050 as a commercially viable route, the passenger forecasts for this route are significantly lower across all time periods in comparison to Routes A and D. This should be taken into account when determining the routes to possibly explore in more detail, including as a pilot.

4.9.3 Route C

The commercial, technical, and organizational feasibility of Route C are summarized in Table 4-51.

Based on the service analysis conducted in Section 4.5, a 12-passenger vessel would be required to service the demand in 2023, 2035, and 2050.

In each of the study horizons, a minimum fare of $12.61, $11.05, and $8.44 per passenger would be required to cover solely the operational costs, provided that the estimated demand is met. These minimum fare prices are within the relative range of marine transport fares and could be considered reasonable in the absence of a stated preference survey.

Figure 4-32: Route C Map

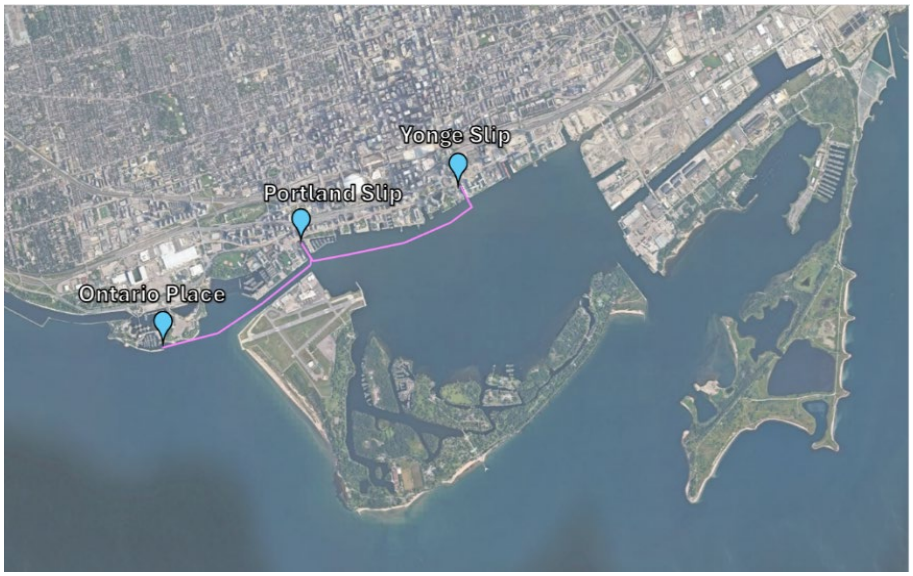


Table 4-51: Feasibility Study Findings - Route C

	2023	2035	2050
Vessel Type – based on capacity	12PAX	12PAX	12PAX
Resulting cost per PAX	$12.61	$11.05	$8.44
Total Operational Cost (annual)	$644,610	$644,610	$644,610
Total Infrastructure cost	$1.18 Million	$1.18 Million	$1.18 Million
Feasibility	**Improbable**	**Promising**	**Promising**
Notes	Ontario Place is undergoing redevelopment and is not yet a destination requiring a marine transport connection.	Ontario Place redevelopment is forecasted to be complete.	Assuming no alternative landside transport options service Ontario Place more directly than Exhibition Station.

Based on the infrastructure analysis conducted in Section 4.6, the required infrastructure at Ontario Place, Portland Slip, and Yonge Slip would result in a total infrastructure cost of $1.18 million.

The feasibility of a Route C service in 2023 was classified as **improbable** as a key destination (Ontario Place) is currently undergoing redevelopment and does not yet require marine transport connections.

The feasibility of a Route C service in 2035 was classified as **promising**. Redevelopment of a key destination (Ontario Place) is forecasted to be complete, and the Ontario Line is expected to be operational. The significant distance separating Ontario Place and Ontario Line (approximately 20-minute walk to Exhibition station) may entice some customers to instead use a more easily accessible marine service. This is assuming that no alternative landside transport options are made more conveniently available (i.e., parking, public transport on Lake Shore Boulevard W, etc.). This should be taken into consideration if project planning progresses.

The feasibility of a Route C service in 2050 was also found to be **promising**. Redevelopment of Ontario Place is forecasted to be complete. Additional landside transport options may be implemented by 2050 which may impact access to Ontario Place and along the waterfront. This should be considered closer to the study horizon for more accurate planning.

While Route C is classified as **promising** due to its commercial potential, it is important to note that its passenger forecasts are significantly lower across all time periods in comparison to Routes A and D. As a result, it requires a smaller capacity vessel than required for Routes A and D, with the exception of 2023 for Route A.

It is recommended that further study be conducted to understand the potential demand for Route C (utilitarian and experiential). Coordination should be maintained with other agencies to understand completion timelines for impacting projects (Ontario Place and Ontario Line), and opportunities for coordination of projects (e.g. coordination of marine infrastructure with Ontario Place redevelopment).

4.9.4 Route D

The commercial, technical, and organizational feasibility of Route D are summarized in Table 4-52.

Based on the service analysis conducted in Section 4.5, a 50-passenger vessel would be required to service the demand in 2023 and 2035, while a 75-passenger vessel would be required in 2050. In 2035 scheduled headway of the service would have to increase from 30 minutes to 15 minutes to accommodate the demand with 50-passenger vessels used in 2023.

In each of the study horizons, a minimum fare of $14.49, $17.40, and $12.08 per passenger would be required to cover solely the operational costs, provided that the estimated demand is met. While the minimum fares for 2023 and 2050 are within a similar range to existing marine transport fares in Toronto, a minimum fare of $17.40 in 2035 is significantly higher than existing fares. While this might be a deterrent for some customers, a route such as this has a higher potential to attract customers for experiential purposes, in which case the minimum fare may be reasonable and aligned to rates for experiential attractions. The length of the route may also be unattractive for users going to the Toronto Islands due to alternative faster and potentially less costly transportation options (i.e., city ferries and water taxis).

Figure 4-33: Route D Map

Table 4-52: Feasibility Study Findings - Route D

	2023	2035	2050
Vessel Type – based on capacity	50PAX (30 min headway)	50PAX (15 min headway)	75PAX
Resulting cost per PAX	$14.49	$17.40	$12.08
Total Operational Cost (annual)	$1.69 Million	$3.32 Million	$4.26 Million
Total Infrastructure cost	$4.16 Million	$4.16 Million	$4.16 Million
Feasibility	**Improbable**	**Potential**	**Potential**
Notes	Ontario Place and eastern waterfront (Parliament Slip, Ookwemin Minising) are undergoing redevelopment and are not yet destinations requiring marine transport connections. Significant infrastructure investment required may not make service feasible. Additional consideration should be given to operations alongside area for non-motorized marine uses near Cherry Beach.	Development at Ontario Place and some development on eastern waterfront is forecasted to be complete. Both locations may not have sufficient transportation connections and there may be increased demand which could be met with a marine service. Significant infrastructure investment required may not make service feasible. Additional consideration should be given to operations alongside area for non-motorized marine uses near Cherry Beach.	Full development of eastern waterfront is forecasted to be complete. Potential for competing landside transit alternatives to reduce demand for marine transport. Significant infrastructure investment required may not make service feasible. Additional consideration should be given to operations alongside area for non-motorized marine uses near Cherry Beach.

Based on the infrastructure analysis conducted in Section 4.6, the required infrastructure at all eight locations (Ontario Place, Portland Slip, Yonge Slip, Parliament Slip, Ookwemin Minising, Outer Harbour Marina, Ward's Beach, and Manitou Point) would result in a total infrastructure cost of $4.16 million. This is a significant cost for infrastructure and may impact overall feasibility. Future consideration should include opportunities to align the required marine infrastructure with existing or planned projects.

The feasibility of a Route D service in 2023 was classified as **Improbable** as key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are currently undergoing redevelopment and do not yet require marine transport connections, as well as the presence of faster and less costly transportation options to the Toronto Islands.

The feasibility of a Route D service in 2035 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, partial Eastern Waterfront/Ookwemin Minising) are forecasted to be complete. The feasibility of this service may increase with the completion of these redevelopments and with limited landside transport options (e.g., delay in Ontario Line, no WELRT, etc.).

The feasibility of a Route D service in 2050 was classified as **Potential**. Redevelopment of key destinations (Ontario Place, Eastern Waterfront/Ookwemin Minising) are forecasted to be complete, which will significantly increase the demand for transport to and from the east side of the waterfront. However, if the WELRT is completed by 2050 it would significantly compete with a marine transport service for utilitarian travel along the landside portion of the waterfront.

With the expected developments in the eastern waterfront in 2035 and 2050, a connection between the eastern waterfront and the Toronto Islands would be extremely beneficial to meet expected local demand. As Route D does not provide a direct connection (Outer Harbour Marina before Ward's Beach for clockwise service), this may be less desirable for customers and may lose customers to more direct marine transport services. Further, proposed stops of Parliament Slip and Ookwemin Minising may be too close in proximity and encroach on their respective catchment areas ultimately impacting operations. Further study should be conducted to understand the appropriate location (Parliament Slip, Ookwemin Minising, Keating Channel, etc.) to best meet and manage the demand.

As discussed in Section 4.5, Route D is envisioned to operate a clockwise and counterclockwise service. This would provide a significant advantage for customers wanting to access the Toronto Islands from Ontario Place, who otherwise would have to use an existing marine node in the central waterfront to access the islands. The feasibility of this service should be considered alongside any other future marine services that operate out of Ontario Place.

It is recommended that further study be conducted to understand the potential demand for Route D (utilitarian and experiential). Coordination should be maintained with other agencies to understand completion timelines for Ontario Place, eastern waterfront redevelopment, Ontario Line, and WELRT. Further studies and planning of Route D should carefully consider operations to the Outer Harbour Marina. This would require passing through the Eastern Channel (main access for industrial vessels) and the waters encapsulated by Cherry Beach and Tommy Thompson Park (popular with non-motorized marine users), both which require careful consideration for safety. This may include further stakeholder engagement, precise route planning and space allocation, limits of number of vessels and frequency, speed reductions, and increased enforcement.

4.9.5 Route E

The commercial, technical, and organizational feasibility of Route E are summarized in Table 4-53.

Based on the service analysis conducted in Section 4.5, a 12-passenger vessel would be required to service the demand in 2023 and 2035, while a 24-passenger vessel would be required in 2050.

In each of the study horizons, a minimum fare of $19.81, $9.34, and $5.67 per passenger would be required to cover solely the operational costs, provided that the estimated demand is met. While the minimum fares for 2035 and 2050 are within a similar range to existing marine transport fares in Toronto, a minimum fare of $19.81 in 2023 is significantly higher than existing fares and may negatively impact demand.

Figure 4-34: Route E Map

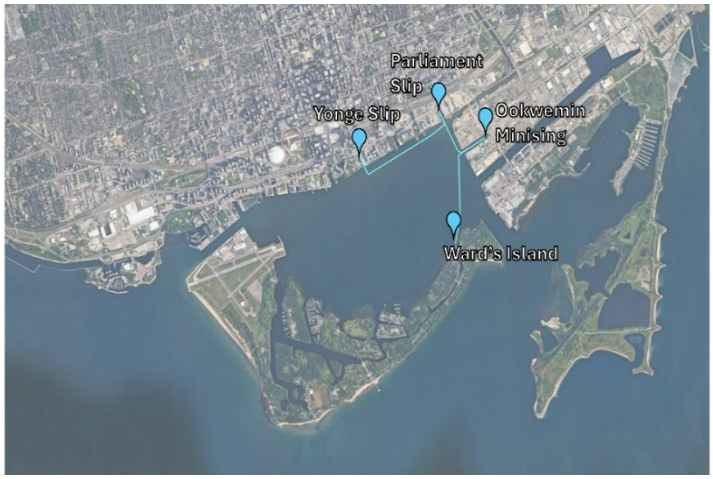


Table 4-53: Feasibility Study Findings - Route E

	2023	2035	2050
Vessel Type – based on capacity	12PAX	12PAX	24PAX
Resulting cost per PAX	$19.81	$9.34	$5.67
Total Operational Cost (annual)	$892,679	$892,679	$1.36 Million
Total Infrastructure cost	$2.72 Million	$2.72 Million	$2.72 Million
Feasibility	**Improbable**	**Potential**	**Promising**
Notes	Eastern waterfront (Parliament Slip, Ookwemin Minising) is undergoing redevelopment and is not yet a destination requiring marine transport connections.	Some development on eastern waterfront is forecasted to be complete. Eastern waterfront may not have sufficient transportation connections and there may be increased demand which could be met with a marine service.	Eastern waterfront developments are forecasted to be complete. Direct Toronto Islands connection would be beneficial for residents/visitors of eastern waterfront. Potential for competing landside transit alternatives to reduce demand for marine transport.

Based on the infrastructure analysis conducted in Section 4.6, the required infrastructure at Yonge Slip, Parliament Slip, Ookwemin Minising, and Ward's Island would result in a total infrastructure cost of $2.72 million.

The feasibility of a Route E service in 2023 was classified as **Improbable** as key destinations (Eastern Waterfront, Ookwemin Minising) are currently undergoing redevelopment and do not yet require marine transport connections.

The feasibility of a Route E service in 2035 was classified as **Potential**. Redevelopments of key destinations (Eastern Waterfront, Ookwemin Minising) are forecasted to be partially complete. The actual timeline of redevelopment completion will impact feasibility of service. The feasibility of this service may increase with the completion of these redevelopments and with limited landside transport options (e.g., no WELRT).

The feasibility of a Route E service in 2050 was also classified as **Promising**. Redevelopments of key destinations (Eastern Waterfront, Ookwemin Minising) are forecasted to be complete, which will significantly increase the demand for transport to and from the east. It is likely that WELRT will be completed by 2050, which would significantly compete with a marine transport service for utilitarian travel between Yonge Street and Ookwemin Minising.

With the expected developments in the eastern waterfront in 2035 and 2050, a direct connection between the eastern waterfront and Toronto Islands (at Ward's Island) would be extremely beneficial to meet expected local demand. Proposed stops at Parliament Slip and Ookwemin Minising may be too close in proximity and encroach on their respective catchment areas, ultimately impacting operations by adding additional travel time. Further study should be conducted to understand the

appropriate location (Parliament Slip, Ookwemin Minising, Keating Channel, etc.) to best meet and manage the demand.

A situation may arise where vessels become flooded with customers at Yonge Slip destined for Ward's Beach, impacting the number of customers from Parliament Slip and Ookwemin Minising who could access the service. This may occur in the event of significant delays or overflow demand from the CoT ferry service due to the proximity of Yonge Slip to JLFT. Planning and consideration should be given to minimize this operational scenario and manage travel to and from the islands in as direct a manner as possible.

It is recommended that further study be conducted to understand the potential demand for Route E (utilitarian and experiential). Coordination should be maintained with other agencies to understand completion timelines for eastern waterfront redevelopment and WELRT, and opportunities for coordination of projects (e.g., coordination of marine infrastructure with Parliament slip redevelopment).

As with Routes B and C, Route E is forecast to have significantly lower passenger demand than Routes A and D. Although Route E is identified as having **Potential** to be a commercially feasible route by 2035, and **Promising** in 2050, its lower overall passenger demand forecasted for the route should be considered when selecting possible routes to pilot in the near term.

4.9.6 Potential Next Steps to Test Feasibility of Routes

All the fixed route scheduled marine service routes analyzed above were deemed commercially unfeasible in 2023. This was primarily due to the insufficient development of landside attractors in some of the zones these routes are intended to serve.

However, as discussed in the sections above, Routes A and D stand out as strong candidates for further study and it is recommended that they both be considered to pilot as waterfront development progresses. As part of a pilot, these routes could be modified to serve only stops with sufficient development and established landside attractors. This would increase the feasibility of these routes in the near term.

Routes A and D would also be beneficial to pilot as between the two routes they encompass all the other routes studied, as well as having the highest forecasted passenger ridership in the peak month of service across all routes and time frames studied. This data is presented in Table 4-54 below.

Table 4-54: Total Peak Month Ridership per Route

Route	Total Peak Month Ridership (EB + WB)		
	2023	2035	2050
Route A	28,042	53,096	121,070
Route B	11,000	18,546	21,560
Route C	15,426	17,614	23,044
Route D	48,034	79,348	153,730
Route E	13,898	29,496	78,302

A pilot project should be operated with full access to detailed ridership data and plans to conduct customer surveys to inform further planning (expected ridership, fare, etc.) and decisions on ultimate operational model (private, concession, or public) and the feasibility of potential stop locations.

As part of the planning for this pilot stakeholders should be consulted with to ensure that any potential safety and congestion issues are addressed. Project partners should also be consulted to help design final routing for the pilot.

The design of the pilot should also involve conducting a preference survey of potential users of the service to better understand price sensitivities and the impact of other transport modes on demand for the routes being considered.

It will also be important to conduct market soundings to gauge potential interest of operators in being involved in a pilot of these routes. This market sounding can be designed to help assist in the planning and decision-making around the pilot and can explore issues including exclusive access and docking agreements, levels of services, willingness to invest, timing of services, etc.

5 Other Opportunities to Improve Marine Operations

Key chapter takeaway

This chapter considers other operational scenarios that may provide opportunities to improve marine operations in Toronto.

The opportunities examined are: the implementation of high-capacity ferries for Toronto Islands operations; changes to vehicle ferry service operations; integration of marine services with the public transport system; implementing a common docking system for water taxis: coordinated management of marine services; and, the implementation of alternative propulsion vessels.

High-capacity ferries expected by 2027 will improve service to the Toronto Islands and could impact existing and future marine passenger services by changing the pricing and demand environment. This will need to be considered when assessing the potential introduction of fixed route, scheduled marine passenger services.

Schedule coordination, wayfinding improvements, and other forms of integration with local public transportation may benefit the public through increased ease of payment and a more seamless travel experience.

Shared water taxi docking could be considered for Yonge Slip, Portland Slip and other locations along the landside portion of the inner harbour, including Ookwemin Minising where there is expected to be significant demand for multiple users in the future. Further study is also recommended to understand expected operational flow and challenges, especially between motorized and non-motorized marine uses. A pilot of a common water taxi docking system at one or more landside sites is recommended as part of this further study.

There is currently no coordination in the management of marine services on the Toronto Harbour. This should be examined; however, it is recognized that such an organization would be difficult to establish and fund.

Changes to TIDAL licence or the creation of a new licence for operations along cityside waterfront should be considered as demand for an E/W marine connection along Toronto's waterfront grows. This licence could be used to manage safety, operators approved for terminal use, and other elements of customer experience. As well, a mechanism for enforcement of the licence would be required for it to be most effective.

Alternative propulsion vessels options for electric, biodiesel, and LNG vessels currently exist. Each propulsion type has specific operational requirements and potential challenges. Further study of cost-benefit of alternative propulsion vessels for new services should be undertaken.

There is potential to relocate the existing vehicle ferry service to the Toronto Islands to help reduce the congestion at the Jack Layton Ferry Terminal. Further study could be conducted on passenger demand and requirements to accommodate passenger movements.

5.1 Introduction

As outlined in the *2020 Marine Use Strategy*, several opportunities to improve existing services were recommended for further feasibility. These opportunities are defined and discussed in further detail in Table 5-1.

Table 5-1: Marine Operations Improvement Scenarios

Study Opportunity	Opportunity Details
Opportunity 1: High-capacity Ferries	Existing CoT ferry service to the islands is enhanced via the purchase of two new higher-capacity ferries.
Opportunity 2: Modified ferry service for motor vehicles	As the JLFT continues to become busier, vehicle ferry operations may move to an alternate location(s) on the waterfront.
Opportunity 3: Better Transit Integration	Schedule coordination, wayfinding improvements, and other forms of integration with local public transportation may benefit the public through increased ease of payment and a more seamless travel experience.
Opportunity 4: Common Water Taxi Docking	A common water taxi docking system on the landside, similar to what currently exists on the island-side, may enhance the passenger experience through better wayfinding and traffic flow.
Opportunity 5: Management of Marine Services	A more managed/regulated marine system (ferries and water taxis) may allow for greater opportunities for coordination and may improve the passenger experience through greater clarity and consistency.
Opportunity 6: Alternative propulsion vessels	There may be opportunities for improving sustainability through electric/ sustainable vessel options.

Sections 5.2 through 5.7 provide greater detail and analysis for each opportunity and important considerations that may impact the waterfront and marine operations in Toronto. Section 5.8 summarizes the findings of each opportunity and next steps.

5.2 Opportunity 1 – High-Capacity Ferries

An opportunity to improve operations in the Inner Harbour could arise with operation of high-capacity ferries to Toronto Islands.

The CoT is commissioning four new high-capacity electric vessels to replace its aging fleet. The city has procured one passenger and vehicle electric ferry (ROPAX) with a capacity of 1,300 passenger, or with an alternative configuration of 650 passengers and 14 vehicles (or two large trucks). This vessel is also being designed for winter use with ice-crushing capabilities. The city has also procured one passenger only ferry (PAX) with a capacity of 1,300 passengers and will potentially procure two more of these ferries based on future city budget considerations. These vessels will not have ice-crushing capabilities.[70]

[70] Ultimate vessel operational capacity will be confirmed through the Transport Canada vessel inspection and certification program.

The two approved vessels are currently planned to be phased into operations as early as 2027. Figure 5-1 illustrates current artist rendering of the new electric ferries.

As part of the market analysis work undertaken in Section 4, an estimate for future visitation to Toronto Island Park was developed using existing ferry data and projected population growth rates for study horizons until 2050.

Figure 5-1: City of Toronto Ferry Replacement Designs (top: ROPAX, bottom: PAX)

Table 5-2: Projected Ferry Passengers

Year	Toronto Growth Projection	Downtown Growth Rate	Toronto Growth Rate	Composite Growth Rate	Projected Ferry Passengers
2016	-	3.2%	0.5%	1.8%	1,473,835
2017	-	3.2%	0.5%	1.8%	1,500,405
2018	-	3.2%	0.5%	1.8%	1,527,454
2019	-	3.2%	0.5%	1.8%	1,554,990
2020	-	3.2%	0.5%	1.8%	1,583,023
2021	-	3.2%	0.5%	1.8%	1,611,561
2022	2.5%	-	-	2.5%	1,651,857
2023	3.2%	-	-	3.2%	1,704,686
2024	2.7%	-	-	2.7%	1,751,513
2025	2.1%	-	-	2.1%	1,787,648
2026	1.7%	-	-	1.7%	1,817,776
2027	1.4%	-	-	1.4%	1,842,581
2028	1.4%	-	-	1.4%	1,868,651
2029	1.4%	-	-	1.4%	1,894,922
2030	1.4%	-	-	1.4%	1,921,393
2031	1.4%	-	-	1.4%	1,948,061
2032	1.4%	-	-	1.4%	1,974,927
2033	1.4%	-	-	1.4%	2,001,984
2034	1.4%	-	-	1.4%	2,029,228
2035	1.4%	-	-	1.4%	2,056,660
2036	1.3%	-	-	1.3%	2,084,282
2037	1.3%	-	-	1.3%	2,112,101

Year	Toronto Growth Projection	Downtown Growth Rate	Toronto Growth Rate	Composite Growth Rate	Projected Ferry Passengers
2038	1.3%	-	-	1.3%	2,140,117
2039	1.3%	-	-	1.3%	2,168,329
2040	1.3%	-	-	1.3%	2,196,742
2041	1.3%	-	-	1.3%	2,225,356
2042	1.3%	-	-	1.3%	2,254,174
2043	1.3%	-	-	1.3%	2,283,196
2044	1.3%	-	-	1.3%	2,312,427
2045	1.3%	-	-	1.3%	2,341,872
2046	1.3%	-	-	1.3%	2,371,533
2047	1.3%	-	-	1.3%	2,401,570
2048	1.3%	-	-	1.3%	2,431,988
2049	1.3%	-	-	1.3%	2,462,790
2050	1.3%	-	-	1.3%	2,493,983
Notes	Ont. Ministry of Finance projected growth rate for Toronto up to 2050. [71]	Avg. compound annual growth rate from StatsCan reported population growth for downtown Toronto (Toronto Centre and Spadina-Fort York 2016 – 2021)[72]	Compound annual growth rate from StatsCan reported population growth for Toronto (2016 – 2021)[73]		

Based on this analysis, demand for future visitation to Toronto Island Park could reach up to 2.4 million people in 2035 and 2.9 million people in 2050 because of future local and regional growth.[74]

The ability for high-capacity ferries to accommodate this demand is dependent on number of key considerations, these considerations are discussed below in further detail.

5.2.1 Key Consideration 1 – Jack Layton Ferry Terminal Capacity

Previous studies and details have not considered the capacity of JLFT. During peak days and peak hours there are capacity constraints at the Terminal because of constraints with the existing waiting area layout and ticketing system, coupled with increased demand. There is no official reporting on data of peak days or times, nor any previous study of the terminal capacity, although informally it is

[71] Source: https://data.ontario.ca/dataset/population-projections

[72] Source: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&SearchText=spadina%2Dfort%20york&DGUIDlist=2013A000435108,2013A000435101&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0

[73] Source: https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/details/page.cfm?Lang=E&GENDERlist=1,2,3&STATISTIClist=1,4&HEADERlist=0&DGUIDlist=2021A00053520005&SearchText=toronto

[74] This analysis is purely based on visitation growth as a result of local and regional population growth. This analysis does not consider capacity of Toronto Islands and potential for competing attractors which would compete with Toronto Islands.

reported from the CoT that the terminal is thought to have capacity to accommodate around 2 million visitors a year. In 2015, WT and the CoT developed the JLFT and Harbour Square Park Master Plan, however, the design and completion of the JLFT redevelopment is not currently funded.

While new high-capacity ferries could accommodate future demand, a pinch point at the terminal (such as insufficient waiting space or slower throughput due to ticketing queues) would have an overall impact on the total number of visitors the ferry system could accommodate and result in operational inefficiency. It is recommended that more aggregated data be collected outlining hourly ferry ridership data by route to be used for further study and analysis of future demand and infrastructure requirements at JLFT.

5.2.2 Key Consideration 2 – Impact of operational changes

The introduction of new high-capacity ferries will require operational changes to accommodate charging time for electric vessels. Charging requirements of the high-capacity ferries will be dependent on the battery capacity aboard the vessel and charging infrastructure installed; in-turn impacting the duration and frequency of charging. For example, installation of rapid chargers could require as little time as 10 minutes for charging, while slower chargers could take up to 8 hours to charge a vessel. Schedule changes may be required to accommodate additional charging time and may ultimately impact the overall service capacity to move visitors to and from Toronto Islands.

These considerations should be taken into consideration in the planning and design of the electric ferries and required charging infrastructure.

5.2.3 Key Consideration 3 – Impact of policy changes

The introduction of new high-capacity ferries may coincide with other policy changes, including changes in fare payment. These changes could include a change in ticket price or implementation of ticket validation to and from Toronto Islands.

The impact of such policy changes is dependent on various factors, some potential situations are discussed below.

No change in ticket price or trip validation process

It is understood that many Toronto Island visitors take advantage of the ‘free’ CoT ferry ride back from Toronto Islands.[75] In the situation where no change(s) in ticket price or validation process are implemented, a similar outcome will continue to occur. With the added capacity of the new vessels (1,300 vs 900 per trip), this may entice more visitors to use the CoT ferry services on their trips back from Toronto Island Park. This may impact on other marine operators with marine services between the cityside and the islands.

Change in ticket price or added two-way trip validation process

Current ticket prices between marine services to Toronto Islands are similar. Table 5-3, below, summarizes ticket prices in 2023 for marine transport services connecting downtown Toronto to Toronto Island Park.

[75] Existing data for CoT ferry services only reports ticket sales and therefore can only be associated with number of visitors travelling to Toronto Islands. It is informally estimated that city ferries take back an additional 25% of visitors back from the island. It is recommended that data is collected to confirm this assumption and inform future policy decisions.

Table 5-3: Summary of Ticket Prices for Toronto Island Park Marine Services

Operator	Price (2023)
CoT Ferry Services[76]	Adult - $9.11 Senior (65+) - $5.86 Youth (under 19) - $5.86 Junior (under 14) - $4.29 Infant (under 2) – Free
Toronto Harbour Water Taxi	Adult - $12.50 + card fee Infant (under 1 year) – Free
Pirate Taxi	Adult - $12.00
Tiki Taxi	Adult - $12.00 Kids - $12.00
T Dot Water Taxi	Passenger - $12.50 (+GST and 2% card fee) Children (under 2 years) - Free
Toronto Harbour Tours Inc.	Passenger - $12.50 (+1.50 card charge) Children (under 2 years) - Free

Source: City of Toronto and water taxi websites (2023)

Prices for an adult fare are similar between ferry and water taxi services. City ferries have a larger market share of island visitors on the principle of price, proximity to major public transport connections, and uniqueness of experience. Water taxi services serve island visitors who are typically less price sensitive[77], visitors who require an expedited trip[78], and visitors that want a unique and intimate experience.

A reduction in the adult fare for CoT ferry services (while maintaining same one-way ticket validation) would likely cause an increase in market share for the ferry services, until at which point capacity or operational concerns balance market share to an equilibrium between ferry and water taxi services. This could occur during peak days or hours when users must balance the trade-off between longer waiting times and fare price differential. The city ferries are likely to still retain users who are price sensitive.

An increase in the adult fare for CoT ferry services (while maintaining same one-way ticket validation) may cause a decrease in market share for these services. With a reduction in price differential between services some users may opt for a water taxi service, until at which point capacity or operational concerns balance market share to an equilibrium between ferry and water taxi services. With the same one-way ticket validation process, it is likely that users would only switch services for their trips to the islands and still use the 'free' CoT ferry service for their return trip from the islands.

Implementing a change to the fare validation process could have differing impacts depending on the solution implemented. If the same fare schedule is maintained and a system is implemented to allow for ticket validation to and from the island, this would likely cause an increase in market share for water taxis, until at which point capacity or operational concerns balance market share to an

[76] City of Toronto fare covers ferry trip to and from the islands.

[77] There are many factors that impact price sensitivity. Users who are typically more price sensitive (and who are more likely to take the City of Toronto ferry service) include families or large groups, and those with reduced fares (seniors, youth, and juniors).

[78] This refers who users for whom the generalized cost of travel time is high. This can include users who cannot accommodate travel plans to/from the island within the prescribed schedule and require an immediate on-demand service that is provided by water taxis, and users for whom travelling to Jack Layton Ferry Terminal + wait time is further than accessing a water taxi service. [79] https://issuu.com/bljournals/docs/mmg_sept_22_lr_/28

equilibrium between ferry and water taxi services. In this case the relative cost of a one-way trip would be almost a third of the price of a one-way trip via water taxi. While this increases market share, long queues and wait times would push less price sensitive users to opt for a water taxi service. If the Toronto Island Ferry fare structure changes, the potential impacts on water taxis need to be understood before planning future expansions.

5.3 Opportunity 2 – Modified Vehicle Ferry Service

The CoT operates a vehicle ferry service from JLFT to Hanlan's Point. Vehicle ferry services are only available for service vehicles (CoT and other approved organizations) as privately owned vehicles are prohibited from Toronto Islands. Queen's Quay West along the waterfront, and especially around JLFT, is extremely congested during the summer months. Additionally, it stands to experience greater congestion and access issues with future construction of WELRT. As such, relocation of some vehicle traffic away from JLFT may be beneficial.

The *Marine Use Strategy 2020* proposed the movement of vehicle ferry services from the Jack Layton Ferry Terminal to the Ports Land area south of Ookwemin Minising. Potential locations and infrastructure requirements were discussed further in Section 4.6.8.

Relocating vehicle ferry services from JLFT would be beneficial as users could avoid encountering and adding to an already congested road network and would additionally free up space at JLFT. A relocated vehicle ferry service would add approximately 1 nautical mile to the trip (0.89 nautical miles from JLFT vs. 1.84 nautical miles from Ports Land). While this is a significant change in total trip distance, it is not likely an issue for the intended users (service crews and vehicles).

Using existing or future CoT fleet vessels, this service could accommodate vehicles and passengers. This would allow for greater cost recovery on the service but may not have the required demand to sustain services as proposed locations are a considerable walking distance from demand generating locations (Ookwemin Minising). Additionally, there would be the added complication of managing vehicle and passenger movements within an industrial area. Additional investment would likely be required to create a terminal area suitable for passenger movements.

Care should be taken to confirm additional truck traffic to the potential Ports Land location (through Ookwemin Minising) is in alignment with transportation planning studies. Next steps should include further discussion and planning between the CoT and PortsToronto to solidify project requirements, costs, and benefits. This could also include further analysis on potential opportunities and impact of passenger service from this location if desired.

5.4 Opportunity 3 – Better Transit Integration

An opportunity to improve ferry services could include integration with local public transport services. Integration can include elements such as schedule, wayfinding, and fare integration; such integration with existing public transport services may benefit the public through a more seamless journey and increase overall ridership.

5.4.1 Schedule Coordination

Aligning schedules between water taxis or seabus systems with other public transit services such as the streetcars subways and regional trains is important in areas with high passenger transfers.

While significant alignment of schedules may not always be necessary due to varying service frequencies, ensuring as timely departures for water transport, can help passengers plan connections more effectively. Digital information displays for nearby public transit services at water

transport hubs/terminals could. benefit passenger experience although it may not directly increase ridership.

5.4.2 Wayfinding

A clear wayfinding signage system could be added along the waterfront to help connect visitors to water taxis, seabus services and various waterfront attractions, and transit connections. This will be increasingly more important as the waterfront undergoes changes (e.g., redevelopment of slips, future WELRT) with more destinations and modes of transport. This is likely to benefit passenger experience and may increase ridership to various transport services through providing better information to visitors.

5.4.3 Fare Integration

Multiple elements exist to fare integration include the use of a common fare payment system and aligning fare structure across transit modes.

Use of a common payment system for water taxis or seabus services would streamline the boarding process as well as optimizing fare validation at high-traffic docks to assist in managing queues and timely boarding during summer peaks.

Fare structure could follow those of other public transport services, like Vancouver's SeaBus and Halifax Transit's ferry, or a stand-alone fare structure for water transport. Implementing a similar price to public transit would make a marine transport service more attractive to customers but would require a significant subsidy, while implementing a separate fare structure for ferry services would allow the city to manage cost recovery as required.

The implementation of a common fare system (with or without an integrated fare structure) would likely increase ridership as it would create a seamless journey for customers.

5.5 Opportunity 4 – Common Water Taxi Docking System

An opportunity to improve operations in the Inner Harbour could include adoption of a common docking system for water taxis.

Existing water taxis operations provide service between the Toronto waterfront (cityside) and Toronto Islands; existing operations are discussed in further detail in Section 2. On the cityside, each water taxis operator has an exclusive space to operate their business, including boarding and alighting customers. This differs from operations on Toronto Islands where all water taxis share the same infrastructure for loading and unloading customers at Hanlan's Point, Centre Island, and Ward's Island. These two situations illustrate the operational differences in the Inner Harbour; one segregated operational area (cityside), and the other a common docking system (Toronto Islands).

In the case of Toronto Islands, the use of shared infrastructure has several impacts including additional wear and tear of infrastructure because of increased use and required coordination between all operators to manage a constrained space. Expanding a common docking system for marine services to other locations on the waterfront (to some or all nodes) will require careful consideration of operations to properly manage. These considerations are discussed below in greater detail.

Potential Common Shared Docking Operations

An example for a potential common shared docking system can be envisioned at Yonge Street Slip and Portland Slip for example. A larger floating dock (e.g., between 45m to 90m) could be installed at these locations to accommodate up to eight berths which could be shared by multiple operators – two berths would be used for drop-off and six berths would be used for queue/pick-up. Similar to taxi operations at an airport or a taxi stand, a shared marine docking system would operate with berths dedicated for passenger drop-off and passenger pick-up. Once a water taxi has dropped-off passengers, it would join a queue and wait until there is room on the berths for boarding new passengers. In this case, if boarding takes 5 minutes, the last water taxi would wait in line 25 minutes (in this example) before proceeding to boarding. Fortunately, a boarding dock, as per boarding taxi line at an airport, can accommodate more than one vessel at a time allowing for the waiting taxis to move up several spots to keep boarding passengers. A similar operation could also be considered for areas such as Parliament Slip or Ookwemin Minising which are expected to be significant passenger demand generators in the future.

The key factor for successful operations of transportation infrastructure with limited space is turn-over. By reducing the waiting time to board passengers, it reduces the spaces required for these waiting spaces for the passengers and the water taxis.

Critical Consideration 1: Peak hour operations

During peak operational times there is an excess of customer demand wanting to access marine transport services. In the case of existing marine operations in Toronto, demand is typically focused in one direction (early morning to Toronto Islands, and evening to cityside). There are also reports of bidirectional peak hour operations in the early afternoon when the early crowds are returning to the city and late crowds are wanting to access the islands.

Unidirectional peak hour operations may experience issues with crowd control waiting to board marine services. Bidirectional peak hours operations will have the added consideration of managing crowd control while alighting significant passenger volumes. To accommodate both operational scenarios, careful consideration should be provided to docking and landside space requirements for queuing. During peak hour operations there is a significant number of vessels in operation to meet this demand. For unidirectional peak hours there is a steady flow of operations as vessels occupy a berth space to allow for boarding or alighting. When this operation is done efficiently vessels spend the minimum amount of time required to pick-up or drop-off passengers. For bi-directional peak hours there may be some additional in-port time required to accommodate a full vessel disembarking and boarding. Peak hour operations may experience operational challenges with crowds of passengers looking to board and alight a vessel, challenges with multiple vessels boarding at once, and challenges with vessel movements in a constrained space potentially causing safety concerns. Some of this could be mitigated through additional allocation of space to facilitate operations and limiting of number of vessels (either by operator or total vessels) that can access the shared dock.

Critical Consideration 2: Off-peak hour operations – berthing spaces

During off-peak hours there will be more vessels in operation than customer demand. This would generate a need for berth spaces at marine nodes to wait for sufficient customers to board before departures. Since berth space is limited, other vessels might wait around that location causing congestion or require additional berthing space (either pertaining to each operator or a common berthing space) until vessels can be redeployed for service. While a first in first out rule is generally followed by operators at existing Toronto Islands common docks, conflicts may arise if common

docking systems are applied across all marine nodes and insufficient berthing spaces existed across the inner harbour to wait out off-peak hours.

Critical Consideration 3: Off-peak hour operations – maximum waiting time at berth

In the case of water taxi operations, vessels do not leave the boarding station as soon as they have one customer and typically wait to maximize the number of passengers before leaving. This causes a departure delay for the first customers who boarded waiting for others to show up. Through consultations, it was informally shared that water taxis generally do not wait more than ten minutes after boarding the first passenger before leaving. When a dock is exclusively used by one operator, this does not cause operational issues with a ten-minute wait during off-peak hours, but in the case of a shared dock this may cause conflicts between operators.

Critical Consideration 4: Managing activity at Yonge Street slip

This situation would occur when the Yonge Street slip, for example, reaches maximum capacity. Since limited space forces operations to adopt a rapid turn-over process, passenger flow (boarding and alighting) and the movements of vessels needs to be managed effectively. To ensure the water taxi turn-over is fast at boarding, passengers must pay and be checked-in prior to boarding to accelerate the flow of water taxis. A system would need to be put in place to manage fare payment for all operators that use the docks at this location for boarding or alighting passengers.

Critical Consideration 5: Managing multiple destinations options with limited berth space

This situation would occur when the infrastructure is under pressure due to the flow of passengers. Since there is limited space at the boarding zone there may not room for a dedicated boarding zone for the passengers for heading to different destinations, for example such as Hanlan's Point, Centre Island or Ward's Island. How the space is managed to accommodate passengers heading to different destinations needs to be examined, as well as understanding the demand between the locations so that the appropriate dedicated space can be provided, if possible.

Critical Situation 6: Where to berth inactive water taxis

In the case of low activity where many water taxis are not being used or for overnight storage, operators would need to find berthing spaces for their vessels. While some vessels could berth overnight at one of the slips there would not likely be sufficient space to accommodate all vessels. This would require additional berthing space pertaining to each operator to manage their vessels overnight and during off-peak times or during seasonal ramp-up/ramp-down. This would be increasingly difficult to do if many or all locations became common docking terminals. Berthing on the Toronto Islands may also be an option, as some operators currently use Toronto Island locations for storing their water taxis.

Critical Consideration 7: Infrastructure Maintenance

Multiple operators will use the docking infrastructure and would cause additional wear and tear especially if there is a larger throughput of operations. Licensing and access of node could be managed with a new licence as laid out by landowner or with an organizational body having jurisdiction (this is discussed further in Section 5.6). This will be an important future consideration as currently there are issues with the state of good repair at existing common docking terminals. In planning for the possible implementation of new common docking terminals, a thorough review of lessons learned should be conducted to ensure future application is appropriate.

Conclusion

Common water taxi docking infrastructure at busy locations along the landside of the Inner Harbour could have benefits for passengers and help better manage congested dockside areas. There is potential for improved services (e.g. less waiting time, easier to identify loading areas) for passengers, while at the same time reducing costs for operators by lowering their dock-related maintenance and construction costs.

To achieve the benefits of a common water docking system for water taxis challenges identified in this section in operating such a system would need to be studied and addressed. Opening the infrastructure for use by multiple or all water taxi operators would require a well thought out operational flow at each location (including considerations for peak and off-peak operations), and land side management to oversee ticketing and crowd control. Further study and planning are recommended, including the consideration of a piloting, in one or more landside locations, a common water taxi docking system .

5.6 Opportunity 5 – Management of Marine Services

One opportunity to improve services could be achieved through the management of marine services. This could include a separate organization whose mission is to ensure coordination of all marine services to best benefit all uses on the waterfront. This would allow for a more coordinated manner in planning and operating marine services to manage demand for marine services and improve passenger experience through greater clarity and consistency among services. The introduction of a new East/West marine service may prompt the need for greater coordination and management of marine services in Toronto's Inner Harbour.

Marine services are partially managed through the TIDAL licence required by the CoT, although this only manages services that are allowed to operate on Toronto Islands and is not required for any services operating only on the cityside. A review of this licence or a separate licence should be considered as demand for a marine connection along Toronto's waterfront grows. This licence could be used to manage safety, operators approved for terminal use, and other elements of customer experience; a mechanism for enforcement would be required for it to be most effective.

A new organization with the appropriate mandate and regulatory powers would be difficult to start and maintain on an on-going basis but would be beneficial from a decision-making perspective, especially as land ownership varies across the waterfront. Management of marine services may become easier to manage if future land ownership along the waterfront changes.

It should be noted that none of the studied jurisdictions had a separate overarching organization that managed through such an organization, typically competing priorities were managed on a project-by-project basis. Toronto also has a different operating context to studied jurisdictions (unique compared to any others in North America) where many competing uses are managed within a small geographic area.

The Project Team's attempts at investigating the management of multiple operators at multiple docks spaces with varied ownership (such as in Vancouver's False Creek) were limited in their success. Future engagements between government agencies may be more successful in understanding Vancouver's operations and gathering lessons learned to be applied to the Toronto context. Section 5.5 above discusses some operational considerations of multiple operators sharing dock spaces, this should be taken into consideration with any further planning or decision making of managing multiple operators.

5.7 Opportunity 6 – Alternative propulsion vessels

In the marine sector, there are several alternative options to reduce emissions. Typically, electrification and alternative propulsion technology is concentrated on larger vessels operating long-haul marine transport as this is the largest opportunity to reduce emissions. There are a few opportunities which apply to smaller vessels such as the water taxis and the ferries operating in Toronto Inner Harbour area, these opportunities are discussed in further detail below.

5.7.1 Electric Propulsion

Electric propulsion for boats and vessels has existed for many decades; electric motor technology is proven, very effective and reliable even in a marine environment. One significant operational constraint is the capacity to carry and store sufficient energy on board to have enough autonomy, closely tied is the required charging time and schedule. Lithium-iron batteries solve many of the energy storage and charging issues. Indeed, compared to standard lead-acid batteries, lithium-iron batteries can be discharged at 80% of its capacity without damage it compared to only 50% for conventional lead-acid equivalent. Furthermore, for the same energy storage capacity, lithium-iron batteries are much lighter than their counterpart, further extending the operating range. Further, lithium-iron batteries can be charged at a faster charging rate than lead-acid batteries. Most lithium batteries can be fully charged in a little bit more than an hour with the appropriate charging station. Fully electric passenger only ferries are being built and implemented more often especially for short distance crossings. This reduces the autonomy requirement and with an adapted schedule, electric ferries can recharge at specific times. For example, Damen Shipyard have stopped producing diesel only passenger ferries to offer only the fully electric or hybrid versions.

Figure 5-2: Fully Electric Passenger Ferry

Source: Damen (electric city ferries operating in Copenhagen)

Fully electric propulsion ferries tend to be more expensive to purchase. The reason being the relatively high purchase cost of the batteries.[79] However, the cost of electricity is generally lower than the cost of diesel fuel. Depending on the sources and the technology involved, fully electric propulsion energy cost tends to be between 50% to 60% cheaper than conventional fossil fuels counterparts.

In one case study regarding the conversion of twelve metre lobster fishing boats in Nova Scotia concluded that the propulsion purchase cost of the electric option would be $100,000 more expensive than a diesel.[80] On the other hand, after 20 years of operation, the energy and maintenance cost of the electric option would be $195,000 cheaper. This leads to a long-term net gain of $95,000 for the electric option.

Emission reductions is the main advantage of electric propulsion. The potential draw backs come from the material used in battery manufacturing and the ability to recycle them. The net emission reductions also depend on the energy-mix used to produce electricity.

There are a number of notable electric passenger vessels in Canada. The Marilyn Bell I was Canada's first zero emission electric ferry. The vessel connects passenger, vehicles, and supplies between the Toronto waterfront and Billy Bishop Toronto City Airport. Marilyn Bell I is a fully electric ferry with lithium-ion power and propulsion system containing no diesel components. The vessel was first upgraded to accommodate biodiesel in 2018 and underwent further upgrades in 2021 to remove diesel generators and engines to make way for components (electric power and propulsion systems and lithium-ion batteries) to support electric operations. The operation is powered by 100% renewable electricity and is estimated to reduce the airport's direct emissions by 530 tonnes of CO_2 per year.[81]

Many other agencies are ordering electric vessels. BC Ferries recently awarded an order to Damen for four new hybrid electric vessels to operate off the coast of Vancouver Island. The vessels will be equipped with 2,000 kW batteries to allow for 100% electric operations but will also contain auxiliary diesel engines for back-up and redundancy. Vessels will be charged using rapid charging stations during disembarking/embarking at each terminal end.[82]

Infrastructure Canada has also announced funding for the Mill Cover regional commuter ferry project in Halifax. The project has a $260M price tag and includes the purchase of five electric vessels, one new ferry terminal at Mill Cove, upgrades to existing Halifax Ferry terminal, and a new bridge to connect Bedford to the new Mill Cove ferry terminal across the existing CN rail line. Table 5-4 below summarizes vessel and infrastructure costs of the ongoing BC Ferries and Halifax Transit marine electrification projects.

[79] https://issuu.com/bljournals/docs/mmg_sept_22_lr_/28

[80] https://atlantic.ctvnews.ca/most-of-nova-scotia-s-lobster-fleet-well-suited-to-go-electric-study-1.6571630

[81] https://billybishop.wpenginepowered.com/destination-ytz/billy-bishop-airport-marilyn-bell-i-is-now-canadas-first-truly-zero-emission-lithium-ion-electric-ferry/

[82] https://www.offshore-energy.biz/damen-wins-bid-to-build-four-hybrid-electric-vessels-for-bc-ferries/

Table 5-4: Notable Canadian Marine Passenger Electrification Projects

Agency	Vessel Cost	Infrastructure Cost	Project Details
BC Ferries	$50M (4 vessels)	$40M (electrical upgrades and 4 terminals + charging equipment)	Vessel will be designed to accommodate 47 vehicles and 390 passengers. Vessels will be hybrid (including both electric and diesel components). This is mainly for redundancy, and current planning is to use only electric operations.
Halifax Regional Municipality	Total project cost: $260 M This includes purchase of 5 vessels, one new terminal, one terminal upgrade, associated electrical charging equipment and upgrades, a new bridge and engineering.		Vessels are planned to accommodate 150 passengers.

Electrical Infrastructure

Boats powered by electrical motors will require battery charging stations (EVSE-Electrical Vehicle Supply Equipment).

It is viable to install electrical charging stations at all marine locations. The number and power rating of chargers will depend on the overall demand at each site and the available spare power capacity of the utility.

The installation of EVSE at the locations on shore could be easily implemented due to the existing Toronto Hydro infrastructure for power supply. For the Centre Island ferry dock, an assessment of the spare power capacity is required and availability for the use by the future EVSE stations.

As the needs are defined, quantity and charging power level can be selected. A modular approach is recommended to facilitate off season removal (if the docks are pulled out of the water).

5.7.2 Biodiesel

This alternative fuel has existed for many decades and operational tests have demonstrated that there are emission reductions benefits associated with biodiesel use compared to conventional diesel. Biodiesel is a diesel fuel alternative produced through chemical refining of vegetable oils. Pure biodiesel is most often added to conventional diesel fuel to create blends of 5%, 10%, 20% - referred to as B5, B10, B20 respectively.[83] While biodiesel is a drop-in fuel, additional maintenance will be required to clean additional fuel filter deposits. Additives may be required to accommodate cold weather operations with higher biodiesel fuel percentages.

The main advantage of this option is the ease of implementation since a conventional diesel engine can also accommodate biodiesel. Some preparation has to be made before switching to biodiesel.

[83] Conventional diesel fuel can have anywhere up to 4% biodiesel without being considered a biodiesel.

Indeed, biodiesel has good cleaning properties which tend to clog fuel filters if used without a good clean-up of the boat fuel tanks and supply lines.

Around 20 years ago, a demonstration project to use biodiesel on board different small passenger vessels in Montreal was done with positive results.[84] At that time, the study concluded the technical feasibility of using 100% biodiesel as a fuel source, but from an economical perspective a 20% blend would be less expensive for the private boat operators.

Easy to implement, biodiesel offers interesting emission reductions advantages. Biodiesel when produced from waste fat sources is virtuous since it diverts matters from garbage. However, the amount of waste fat is not sufficient to entirely replace diesel and would require the growing of plants, to supplement waste fat, for the sole purpose of producing biofuel. This can raise ethical question on whether crops should be grown for fuel and instead of food for people and animals.

5.7.3 Liquified Natural Gas (LNG)

This alternative fuel is being implemented for the last 20 years in northern Europe as well as in Canada. Both the *Société des traversiers du Québec* and BC Ferries own and operate such ferries for some years. This alternative fuel allows the reduction of emissions, especially SOx and NOx. To facilitate the adoption of this alternative fuel, engine manufacturers have developed the so called “dual-fuel” engine which can operate with either marine diesel or LNG. This allow the operator to switch fuel if there is an issue with the supply of LNG.

In the marine industry, this technology tends to be used mostly in larger ferries since the storage and management of LNG on board vessels requires complex mechanical systems and operational knowledge that usually exceed those required for small ferry operations in sheltered waters.

This alternative fuel offers reduced emissions in a significant manner but involves more complex propulsion systems beyond the ferries size that would be used in Toronto Inner Harbour. In addition, there are environmental issues regarding LNG production.

5.7.4 Conclusion

Electric propulsion is reliable, reduces emissions and increases passenger comfort. In the long term, the energy and maintenance costs reduction overcome the greater investment compared to diesel propulsion. Based on this overview, this option seems to offer many advantages in the context of the Toronto Inner Harbour.

If the objective is to reduce emissions but with minimal technological and operational risk, then biodiesel seems to be the best option. Further study should be undertaken to understand the operational requirements, risks, and costs and benefits of alternative propulsion vessel prior to future investment.

[84] http://www.sinenomine.ca/Download/BioMer_fra.pdf

5.8 Conclusions – Other Opportunities to Improve Marine Operations

A number of additional opportunities were studied to understand the possibilities to improve existing marine operations and implementation alongside future potential marine services. Table 5-5 outlines the findings for each opportunity analyzed.

Table 5-5: Marine Operations Improvement – Opportunity Analysis Findings Summary

Opportunities	Opportunity Details	Findings	Next Steps
Opportunity 1: High-capacity ferries	Existing CoT ferry service to the islands is enhanced via the purchase of two new higher-capacity ferries.	New high-capacity ferries will increase the number of visitors to the island. Considerations such as peak hour operations and peak hour spreading, as well as the capacity of ferry terminal will all play a role in overall impact of high-capacity ferries.	Further study including detailed ridership data collection to track changes from high-capacity ferries and adapt future planning.
Opportunity 2: Modified ferry service for motor vehicles	As the Jack Layton Ferry Terminal continues to become busier, vehicle ferry operations may move to an alternate location(s) on the waterfront.	Relocating vehicle ferry operations to Port Lands will alleviate congestion and landside operational issues near Jack Layton Ferry Terminal. Added passenger service (with same vessel) may not experience significant usage and may face challenges of managing operations in an industrial area.	Further study and planning of future Port Lands terminal. Further study of passenger demand and requirements to accommodate passenger (if needed).
Opportunity 3: Better Transit Integration	Schedule, coordination, wayfinding improvements, and other forms of integration with local public transportation networks may benefit the public through increased ease of payment and a more seamless travel experience and may increase marine ridership.	Use of shared payment system for water taxis or seabus services would streamline boarding process. Integrating schedule displays for connecting across transit modes, and wayfinding will improve customer experience and may increase ridership.	Further examine opportunities towards an integrated fare structure and services.

Opportunities	Opportunity Details	Findings	Next Steps
Opportunity 4: Common Water Taxi Docking	A common water taxi docking system on the landside, similar to what currently exists on the island-side, may enhance the passenger experience through better wayfinding and traffic flow.	While there are benefits for passengers and potentially for operators running a common water taxi docking system, there could also be significant operational considerations which would have to managed. This opportunity should be further studied and could include piloting a common water taxi docking system at locations such as Yonge Slip, Portland Slip or Ookwemin Minising where it is expected that there will be significant demand in the future.	Further study of operational flow and challenges including exploring piloting a landside common water taxi docking system
Opportunity 5: Management of Marine Services	A more managed/regulated marine system (ferries and water taxis) may allow for greater opportunities for coordination and may improve the passenger experience through greater clarity and consistency.	Creation of a new organization with mandate and regulatory powers to coordinate marine operations would be difficult to start and fund on an on-going basis. Amendment of TIDAL licence or creation of new licence could be used to manage safety, operators approved for terminal use, and other elements of customer experience as demand increases for cityside marine transport.	Further study on opportunities to amend TIDAL licence.

Opportunities	Opportunity Details	Findings	Next Steps
Opportunity 6: Alternative propulsion vessels	There may be opportunities for improving sustainability through electric/ sustainable vessel options.	Options exist for electric, biodiesel, and LNG vessels. Each propulsion type has specific operational requirements and potential challenges.	Further study of cost-benefit of alternative propulsion vessels for new services, including engagement with Toronto Hydro regarding capacity of electrical grid within waterfront area. Further discussions with existing operators regarding requirements to support future sustainable vessels.

6 Final Recommendations

Key chapter takeaway

This chapter summarizes the work undertaken as part of this study, analysis findings, and recommendations.

This study focused on the feasibility of new marine transportation services within Toronto's Inner Harbour and opportunities for improvement of the existing marine transport system. This work was presented in the following manner:

- **Chapter 2** reported on the **existing state of marine operations** on Toronto's waterfront, including stakeholder engagement of existing operations and initial feedback on study topics.
- **Chapter 3** presented a **jurisdictional scan of best practices** for marine transport and management from four locations in North America.
- **Chapter 4** reported the **feasibility methodology and analysis** of five proposed marine routes (including commercial, technical, and organizational feasibility).
- **Chapter 5** reported on **other opportunities to improve marine operations** on Toronto's waterfront.

Table 6-1 provide a summary of recommendations presented throughout the report.

Table 6-1: Study Recommendations Summary

Finding	Detail	Recommendation / Next Steps	Related Chapter
Development of Future Seabus Routes	Feasibility of proposed seabus services ranges from **improbable** to **promising** based on specific route and study horizon. Ontario Place, Eastern Waterfront and Toronto Islands will be major local and regional attractors and may warrant marine transport connections. **Marine infrastructure can be built at all required locations**, some routes may require **significant investment**, ultimately reducing their feasibility.	**Routes A and D** are recommended for consideration to be piloted, due to these routes capturing all of the waterfront connections modelled in this study, as well as having the highest forecasted peak month passenger demand. The timing of a pilot a fixed route seabus system is dependent on the development of housing and landside attractors. A pilot should consider modifications to the route design to eliminate stops	Sections 4.5 – 4.9

Finding	Detail	Recommendation / Next Steps	Related Chapter
	Services may be best served through **private or concession operating models** to balance meeting demand and investment of public funds.	that do not generate demand due to the lack of current landside attractors. It is recommended that a market be conducted to understand the potential demand (utilitarian and experiential) for each route of interest. Further consultation should be undertaken to gain clarity on development timelines, and address stakeholder concerns. Detailed planning of infrastructure requirements should be undertaken once final decision is made on future service and required vessels.	
High-capacity ferries	New high-capacity ferries will **increase visitorship** to the island. Considerations such as changes in **peak hour operations and peak hour spreading, and capacity of ferry terminal** will all **play a role in overall impact** of high-capacity ferries.	Data should be collected to measure the impact of the introduction of high-capacity ferries on the demand for other forms of marine passenger services (i.e. seabus and water taxis). This would include collecting detailed ridership data to track changes from high-capacity ferries and adapt future planning. Further planning and study of elements that may impact new ferry operations. (e.g. capacity of ferry terminal, peak hour operations, etc.).	Section 5.2

Finding	Detail	Recommendation / Next Steps	Related Chapter
Modified Vehicle Ferry Service	Relocating vehicle ferry operations to Port Lands will **alleviate congestion and landside operational issues near** Jack Layton Ferry Terminal. Added **passenger service** from the Port Lands (with same vessel) **may not experience significant usage and may face challenges** of managing operations in an industrial area.	Further study and planning of future Port Lands terminal. Further study of passenger demand and requirements to accommodate passenger (if needed).	Section 5.3
Better Transit Integration	Integration of a **common fare payment system** for water taxis and seabuses to facilitate faster boardings and improved services for passengers. **Better coordination with public transit schedules, digital schedule displays and developing clearer wayfinding** will improve customer experience and may also increase ridership.	Further study on opportunities to integrate transit services	Section 5.4
Common Water Taxi Docking System	There are **potential benefits to both passengers and water taxi operators of implementing a common water taxi docking system** at various landside locations along the harbour such as Yonge Street Slip, Portland Slip and Ookwemin Minising, where it is expected that there is significant demand. There are operational considerations which would need to be resolved to successfully implement such a system and these need to be further studied.	Move forward to conduct a pilot study of a common water taxi docking system at key locations on the landside of the inner harbour where there is currently significant demand such as Yonge Slip and Portland Slip. As part of this pilot, further study operational challenges and develop potential solutions to areas such as ticketing, berthing, operational flows. Work with stakeholders to identify solutions and to develop the pilot.	Section 5.5

Finding	Detail	Recommendation / Next Steps	Related Chapter
Management of Marine Services	While there are benefits of having a single entity be responsible for the management of marine services on the Toronto waterfront. The creation of a new organization with mandate and regulatory powers to coordinate marine operations would be difficult to start and fund on an on-going basis. **Amendment of TIDAL licence or creation of new licence** could be used to manage safety, operators approved for terminal use, and other elements of customer experience **as demand increases for cityside marine transport**	Determine the feasibility of the creation of an organization or formalized multi-agency committee with the responsibility to manage marine service on the Toronto waterfront. Review opportunities to amend TIDAL licence to improve operations, customer experience and safety.	Section 5.6
Alternative propulsion vessels	**Options exist for electric, biodiesel, and LNG vessels**. Each propulsion type has specific operational requirements and potential challenges.	Further study of cost-benefit of alternative propulsion vessels for new services, including engagement with Toronto Hydro regarding capacity of electrical grid within waterfront area. Further discussions with existing operators regarding requirements to support future sustainable vessels.	Section 5.7

Findings and ultimate recommendations point to further study required, particularly study of demand of utilitarian and experiential demands and a stated preference survey. The analysis conducted focused on utilitarian travel, although it is recognized that the majority of existing marine travel is for experiential reasons. To accurately plan any future services a thorough study experiential demand and a stated preference survey is recommended. To supplement further study, a pilot-project could be undertaken. This would allow for the Marine Coordination Committee to test a scheduled service and gather data and important feedback to aid in future decision making.

Appendix A – Stakeholder Engagement Summary

Marine Strategy - Water Taxi and Seabus (WTSB) Feasibility Study

Stakeholder Touchpoint #1

Monday, November 6, 2023 – 1:00 PM - 3:00 PM (EST)

Project Team: Rei Tasaka (Waterfront Toronto), Christopher Glaisek (Waterfront Toronto), Patrick Meredith-Karam (Waterfront Toronto), Michela Comparey (Waterfront Toronto), James Dann (City of Toronto), Heather Inglis Baron (City of Toronto), Neha Panjwani (City of Toronto), Nithya Vijayakumar (Access Planning), Lisa Salsberg (Access Planning), Alexi Katsanis (Access Planning), Veiko Parming (CPCS), Nic Parent (CPCS), Diana Soroaga (CPCS)

Stakeholders:

Art & Water - Mat Vales
City Experiences Hornblower - Brendan Leach
Friends of Cherry Beach - Jessica Campbell, Paul Howard
Friends of the Spit - Garth Riley, John Robert Carley
Harbourfront Canoe and Kayak - Dave Corrigan, Lisa Wright
Lake Ontario Waterkeeper - Mark Mattson
Ontario Sailing - Glenn Lethbridge
Toronto Island Community Association - Tony Farebrother
Waterfront BIA - Oliver Hierlihy
Waterfront for All – Ed Hore
Windsor Salt - Lena Kaleva
Water Taxi Association – Bill Duron (York Bay Marine Services), Gordon Ballentyne (Toronto Island Marina)

Introduction

On November 6, CPCS held a meeting with the Marine Use Stakeholders to provide an update on the Water Taxi and Seabus Feasibility Study. The purpose of this meeting is to provide an overview of the project goals and work completed to date. This includes a review of the existing context, what we heard during the Marine Strategy, and a summary of best practices from other cities. We will also share the different operation models we will be investigating during the feasibility study. Stakeholders were invited to ask questions and give feedback on the information shared.

The meeting was organized as follows:

1. Introduction
2. Project overview
3. Summary of Phase 1 – existing conditions and jurisdictional scan
4. Summary of Phase 2 – describing feasibility scenarios
5. Discussion – feedback from interest holders on the Phase 2 feasibility scenarios
6. Wrap Up and Next Steps

Summary of Feedback Received

The following section provides a high-level summary of participant input. This is not intended to act as a verbatim summary of all feedback received. Detailed questions and feedback are included in Appendices A and B.

Engagement clarified some of the existing constraints and challenges of the waterfront for existing residents and current users. Interest holders would like the study outcomes to acknowledge and address current issues (safety, congestion). The study will need to balance concerns of existing interest holders along with the benefits of new services/connections.

Below are some of the key concerns that interest holders identified:

- Safety
    - Outer Harbour operations would disrupt non-motorized marine users (e.g., windsurfers, kiteboarders, kayakers, and swimmers)
    - Inner Harbour operations could be compromised by increased traffic from private vehicle operators and reduced police marine enforcement.
- Congestion
    - There are concerns about high-traffic congestion landside, especially in the Bay / Queens Quay area (e.g., construction, increased users)
- Interest
    - There is interest in alternate location for vehicle ferry service, which could reduce congestion on the Central Waterfront and support increased non-motorized users.
    - Integration with PRESTO for ferry services could create a more seamless travel experience and be more user friendly for tourists or recreational users.

Phase 1 Feedback

An overview of existing conditions and lessons learned from other jurisdictions was presented.

<u>High Level Takeaways</u>

- There is already a lot of conflicts between non-motorized recreational use and boat traffic.
- It is challenging to plan for or consider new developments (e.g., Ontario Place or Villiers Island) that have uncertain timelines for completion.
- For the jurisdictional scan there was interest in learning about governance models for other waterfront transportation services.

Phase 2 Feedback

The scenarios that will be assessed as part of this feasibility study were presented.

Participants used Mentimeter to provide feedback on the proposed scenarios. They were asked to rank their interest in the scenarios as unimportant, slightly important, moderately important, important, and very important. Participants were asked to provide feedback on their scores (Table 2). In the second activity, participants were asked to identify opportunities and challenges, which are captured in Table 2.

A summary of feedback is provided in Tables 1 and 2.

Table 1: Feedback on feasibility scenarios

Interest in new-east west connections
• There are already so many current recreational and commercial activities in the Inner Harbour, and this would create even more traffic. People struggle to understand the dynamics of the Inner Harbour. • There are poor boating habits from existing services that offer passenger carriage, and this could become worse if more connections were in service. • What projects are currently approved? Villiers Island isn't open yet and Ontario Place is a long way from being constructed. It is not clear what the timeline is for these projects that would warrant new marine connections. • All three east-west connections are important. There are a lot of projects that will change how the waterfront is used. It is important to be planning this infrastructure in a thoughtful and mindful way now, rather than waiting for these things to start. • There needs to be viable business cases to support increasing services. • Is there demand for this service: could a private vendor or the City provide viable services?
Interest in expanded City-Island marine Services
• Concern about more City-Island motorized boat traffic be added to the waterfront • Low priority for implementing more services. • A new loop serving the Outer Harbour could have severe impacts on current users. • A marine access point to Cherry Beach could be very useful if it could be implemented in a way that doesn't offend other users. It is a long bike ride from the west, and there is no transit access. • Safety is a big concern. There are already conflicts between water taxis and recreational users. • There needs to be more enforcement of water taxis and other motorized vehicles to regulate how they operate in the water. • It seems like the study is looking at the financial feasibility of people getting out to the islands. I was wondering, especially for people who live on the island and have business there: is it going to be too congested there, rather than being a great experience? • Water safety is my major concern.
Alternate ferry departure point for vehicles
• There is so much congestion on a summer weekend and a lot of imminent construction projects (e.g., 50 Bay, the old convention centre, the underground tunnel for the LRT). There cannot be this much congestion around the ferry terminal, and we have known for years that there is a great opportunity to use the other unused ferry terminal. • The different points of access [for vehicles and people] would better serve the harbour. There could also be a better schedule, because the ferry can be very cozy if you get on the ferry with kids at a time when vehicles are coming on board. Even if there was a way to change it so vehicles wouldn't be on the normal passenger ferry, it would serve the ferry and the number of people [that use it]. • There is a lot of congestion on the waterfront, and it is very unsafe. Cars and buses are trying to park, and trucks are trying to pull in. Queen's Quay is a disaster, and anything that can move vehicles away from there is better for the vehicles and for people. The waterfront would be

wonderful without vehicles. I think the idea of having the vehicles leave from a different point [of access] would be great, making it more of a pedestrian and green space.
Interest in operational improvements to existing City-Island marine services
• Being able to use PRESTO on the ferry as part of the City's transportation. It is confusing enough to be a tourist and figure out how to pay. A co-pay would be fine. • We currently don't have a water taxi service. I would like to see a service where there is a reliable schedule regardless of weather. There is no relationship between people's needs and the service. It would be better to see it as a service, so there is a better package of options for people. It should be service focused, rather than profit driven. • Need to consider whether more enforcement from Toronto Police Services marine unit are required as part of operational improvements.

Table 2: Feedback on opportunities and challenges from Mentimeter

New East-West Connections *What key opportunities or challenges do you see in implementing new east-west marine services?*	Expanded City-Island Marine Services *What key opportunities or challenges do you see in implementing expanded City-Island Marine Services?*	Operational Improvements to City-Island Marine Services *What key opportunities or challenges do you see in implementing operational improvements to City-Island services?*
Opportunities • This would be great for tourists and getting people between tourist hubs. • Ensure that existing and new operators are visible, abide by strict safety standards and follow designated routes. • Competitive offerings for commuters (streetcar, Uber, bike, pedicab, walking). Central waterfront to Cherry Beach for locals to access. • A "hop on hop off" waterfront loop for visitors. • Docking, speed enforcement, keeping to schedules, and ensure ridership supports the cost of implementation. • Need visible speed limit signs! Only one sign now for the whole harbour. Visiting boaters may not be aware. • The existing speed limits are too high (e.g., 10 km in western Gap). Challenges • Viable business case	Opportunities • Get trucks, vehicles, and passengers away from an already super busy Jack Layton terminal. • Makes it possible to get to the island from the east side of the city and Villiers. • There are more opportunities in the Port Lands for people to park. • So many potential hazards and congestion along the waterfront. Getting traffic away from Queens Quay is better for traffic; it makes the waterfront healthier and greener. Challenges • Do the islands lose their special charm by increasing the capacity of people accessing the islands? • Inner and outer harbours are probably at their maximum capacity for water traffic. May need to set up some kind of licensing requirement to manage all watercrafts. • It is very challenging to manage watercraft use when there are few	Opportunities • Great for tourists as ferry ticketing is confusing and not clear. Also, water taxis are not well identified and difficult for tourists to find. • Accessible infrastructure on the Island for water taxis (floating accessible docks). • Dock wall improvements • Common water taxi docking could alleviate some of the safety concerns of water taxis running all over the place. • Direct water taxi routes could minimize conflicts with paddlers. • Reduce speed limits and increase the number of signs. Challenges • Safety • Cost of building and maintaining necessary infrastructure • Interferences with freight vessels. • Congestion • Teaching nonlocal people about options and payments.

New East-West Connections *What key opportunities or challenges do you see in implementing new east-west marine services?*	Expanded City-Island Marine Services *What key opportunities or challenges do you see in implementing expanded City-Island Marine Services?*	Operational Improvements to City-Island Marine Services *What key opportunities or challenges do you see in implementing operational improvements to City-Island services?*
• Nodes need to be established before this can be visualized. Maybe start with an inner harbour loop. • Safety – taxis go too fast. More taxi-like boats may be a problem, especially if they have high horsepower. Why not electric mini ferries like at False Creek, Vancouver? • Service to Outer Harbour is essential - safety concerns are paramount. • A connection into the Outer Harbour marine is not desirable on both safety grounds and conservation grounds. • Demand is not clear right now but that may change as the waterfront develops.	accessible waterways in an area with a massive population. • Water safety and island capacity is a challenge. • Infrastructure build-out and maintenance is a challenge. • It's okay if new services stay out of the Outer Harbour. • Harbour traffic is already very high, and the use of larger passenger capacity vessels would ease this.	• Accommodating increased service demand

Appendix A – Detailed Questions and Answers

Phase 1 Questions and Feedback

C: The City Ferry, is 1.4 million return trips, possible more return, not one way

Q: Is there any reason that there are no water taxi stands envisioned in the Eastern Waterfront (East Bayfront)?

A: There was one location around Parliament Slip where services were considered.

A: When we did the Marine Strategy 2020 Update, we looked at potential locations for finger piers, and Parliament Slip Concept speaks to activating in relation to the Quayside Development, the Bayside Development, where you see Aqualuna under development, as well as Galleria Block 5, which will have some culture activation on the site. There is a concept to expand the Water's Edge Promenade, as well as a pedestrian bridge.

Q: On Governance, did any of the studied jurisdictions have governance models that seemed particularly functional over the others?

A: Governance was highly influenced by the historical context, mainly multiple operators (public and private) that focused on providing services for their market/to align with their policies without interfering with other operators. All jurisdictions seemed to have a lack of consistency across providing marine services across a greater region.

Q: In the operating model column of the Jurisdictional Scan, what is meant by Concession?

A: Concession refers to a public organization contracting out services to a private operator. These are typically multi-year contracts where the public organization mandates routes, schedules, fares, and other requirements they may have to deliver consistent service for customers.

Phase 2 Questions and Feedback

Q: As a part of the feasibility study, will we be looking to enter pilot projects? We've investigated offering operating services to Cherry Beach, and we are interested in offering a pilot to assist with the feasibility.

A: The pick-up and drop-off (PUDO) for a kiss and sail is also part of our recommendations under moorings. This feasibility study isn't looking at that, but it is a priority that the Marine Coordination Committee is looking at. We are looking into a kiss and sail as we heard of the need for a PUDO, but the challenge is the space for it. These are things we're looking into while considering space availability, as well as fit for us, and understanding the timeframe to manage that.

C: We have about 1,800 human powered and wind powered vessels based within our group and area. And we simply do not want any more motorized vessel congestion within that area. There is that M6 node within the Outer Harbour. Most of the locations are tourism based, and the outer marina is not for that purpose - it is for boat owners and their guests on the landside. We question the safety and the need for more motorized vessels. I would just question even testing an Outer Harbour node.

A: There are several dimensions to feasibility, and one is in relation to other activities. Those dotted lines [presented] were from the Marine Use Strategy a few years ago, we haven't adjusted them at this point, as part of our study, we are taking it as background into our feasibility. Those are not necessarily routes that we have identified.

Q: In the other jurisdictions that you studied where there are several places of dock walls for transportation and for docking of vessels, was there one authority or several authorities that are responsible for the dock wall's improvements, as well as the maintenance of those dock walls?

A: We found the responsibility remained with the landowners. In many jurisdictions, the landowners were often the organizations that were planning and delivering ferry services, so it's a bit of a different context. They are often ferry terminals for different vessel uses.

Q: In the feasibility study, is there research about the capacity of the lands to have the activity? How is the business of the waterfront area being factored into feasibility? Take the ferry dock area when it is busy - it is the buses, the cars, and the pedestrians. Where does that factor in? There is the factor of the capacity if you were to offer more options. And what impact will more boats taking people to new areas have? Also, is enforcement included in the study? I'm sure most of us are concerned about the lack of enforcement now. I didn't see the police, or marine police - were they included in feasibility? If there is more traffic and more people we need more enforcement and we don't have enough now.

A: These are factors that we would take into consideration under the technical feasibility of running services. Some operations require more space on the landside such as areas for queuing, fare payment and so forth. And then if we're talking of smaller, more nimble operations, then it would mean additional vessel movements, and I agree that it does get very busy on a nice summer's day. We will consider those.

Q: Has anyone priced out the presented scenarios, and have you looked at the amount of traffic within the inner harbour

A: Part of our study will be analyzing the commercial feasibility (market demand, pricing model, high-level capital and operating costs).

C: Until we get better on-water behavior, on-water rules, and on-water enforcement it is difficult to get excited about expansion.

Q: Are any private operators or is City of Toronto interested in docking at Jack Layton or Parliament St that would run high speed boats to the Niagara area? Should we consider that as far as congestion?

A: Regional services are not part of the scope of this study, although we will be noting that there are some regional services that are envisioned by private organizations. At this time, we are not aware of any of these private services that would be operated in the near term and that would impact the inner harbour operations.

Q: The focus of this work seems to be on the Inner Harbour and tourism. There is node at M6, at the Outer Harbour Marina. This is not a tourist destination and adds to the congestion of motorized vessels in an area that is primarily used by human and wind powered vessels. Is there a need?

A: Demand will be analyzed as part of the Phase 2 feasibility work. We will take this into consideration along with safety alongside non-motorized marine uses.

Q: Loop service opportunities serving the Outer Harbour suggests that they may be necessary to "connect to new locations" in the Outer Harbour. What would those new locations be?

A: New locations may include areas identified as ‘Future Potential Marine Nodes’ as part of the Marine Use Strategy 2020 work (Map 4 – Future Potential Public Marine Transportation Map). Work to confirm feasibility of these locations is ongoing.

Appendix B – Detailed Feedback from Discussion Exercise

C: The questions on the survey are vague and there is no way to show disagreement. Better worded questions with response options ranging from 'strongly disagree to strongly agree' might have brought a more realistic response from the group.

Q: *(Regarding the option on integrating transit and ferry services)* Are we talking that if you get to TTC, the fare will also cover the ferry? Or would a PRESTO card also cover the ferry price?

A: It is at a conceptual level to improve the integration of the two. It could mean being able to use PRESTO on the ferry, it could mean a co-fare, or simply wayfinding or other things. We're interested in your comments about the different dimensions - what would be interesting to you.

WATERFRONToronto

MARINE USE STRATEGY – WATER TAXI / SEABUS FEASIBILITY STUDY STAKEHOLDER ADVISORY COMMITTEE MEETING #2

Wednesday, July 23, 2025
5:00 - 6:00 p.m.
Online via Microsoft Teams

MEETING SUMMARY

On Wednesday, July 23, 2025, Waterfront Toronto (WT) hosted the second (2nd) meeting of the Marine Use Strategy Stakeholder Advisory Committee (SAC). The meeting's purpose was to provide an update on the Water Taxi / Seabus Feasibility Study.

The Marine Coordination Committee (Waterfront Toronto, PortsToronto, City of Toronto, CreateTO, Harbourfront Centre and TRCA) with Grant Osborn, Senior Advisor, Advance Markets at CPCS (lead consultant), provided insight into the findings of the feasibility study including: jurisdiction scan and best practices for Toronto, feasibility analysis, and findings and recommendation from Water Taxi / Seabus Feasibility Study. At the beginning, Waterfront Toronto shared a detailed overview of the study and its context.

The intention was to share information, answer questions and gather feedback. Additional feedback received from SAC members outside of the meeting is included in Appendix A.

The meeting was attended by fifteen (15) SAC members and staff from WT, City of Toronto, Ports Toronto, CreateTO and Toronto and Region Conservation Authority (TRCA). The agenda and participant list are included in Appendix B and Appendix C, respectively.

The questions, feedback, advice, and considerations by participants at the meeting are captured in this summary. It reflects the main points shared by participants during the meeting and is not intended to be a verbatim transcript.

SUMMARY OF STAKEHOLDER QUESTIONS AND COMMENTS

- SAC members raised questions about Seabus service frequency, potential seasonal adjustments, and the possibility of conflicts with industrial shipping traffic.
- There was interest in how the Seabus pilot would integrate with existing harbour activities, including safety, vessel size, and regulatory compliance.

- Stakeholders highlighted the importance of gathering real-world data through a water taxi pilot to inform private sector investment and discussed challenges related to mooring and common docking infrastructure.
- SAC members sought clarification on the study's geographic scope, noting interest in extending service to locations such as Palace Pier, Mimico, and the Beaches.

STUDY OVERVIEW AND CONTEXT

The first part of the meeting was presented by Waterfront Toronto's Director, Urban Design, to provide an overview of the study, including its purpose, context and background, and existing marine services on Toronto's waterfront, followed by a recap of SAC meeting #1.

Q. Did the study consider extending the commuter service to farther locations like Palace Pier, Mimico, or the Beaches to reduce travel times?

> **A.** (WT) The study focused on the area defined in the Marine Strategy Study, (Toronto Inner Harbour and Outer Harbour area) and was based on the future potential water-based transportation map from the Marine Strategy 2020 report. As a result, services beyond that area, such as Palace Pier, Mimico, or the Beaches, were not modelled.
>
> **C.** (Friends of Cherry Beach) Those two locations (Palace Pier and Mimico) would likely be quite popular additions to the service.

SEABUS FEASIBILITY ANALYSIS AND OPPROTUNITIES

The second part of the meeting was presented by CPCS' Senior Advisor, Advance Markets, to provide an update on the jurisdictions that were scanned in the study in comparison to Toronto and lessons learned from the scan, an overview of the routes evaluated for Seabus Feasibility Study, operating cost per boarding passenger, vessel and dock requirements/assumptions, followed by the findings of the study and a detailed view on next steps. A brief summary of other opportunities to improve marine transportation was shared at the end.

Q. What are the long-term considerations for winter operations of the SeaBus pilot, and how do other jurisdictions manage this?

> **A.** (CPCS) There is potential for winter operations using ice-breaking capabilities in the harbour. In other jurisdictions studied, ice was not a significant issue due to saltwater conditions. However, Toronto's inner harbour experiences thicker ice, which was not incorporated into the commercial feasibility model. The current

model assumes operation during the existing water taxi season. Should demand arise for year-round service, appropriate technology is available to support it.

Q. Regarding the future of the water taxi industry and the common docking system, how is mooring being addressed given the loss of slips due to park development and increased demand at island locations?

A. (CPCS) This issue has been identified and will need to be addressed as part of the pilot project. While the island may offer more mooring potential, a definitive solution has not yet been determined. Waterfront Toronto will engage with operators to explore options. Docking stations are envisioned similarly to taxi stands at airports, where different operators share a common pick-up location.

C. (WBIA) A suggested approach to establishing a common docking system is to begin with a pilot at locations currently free of leases, such as East Bayfront, and gradually expand from there.

Q. What is the expected speed gain or service gain from a Seabus service along the east-west route as opposed to an LRT/BRT?

A. (CPCS) The expected speed for the Seabus service is around eight knots within the inner harbor, with about six minutes allocated for loading and unloading at each stop. More stops increase travel time, creating a trade-off. Its competitiveness depends on how it compares to other options like TTC service along Queen's Quay or even walking. Demand forecasts were based on people traveling from point A to B, with speed being a factor in evaluating the likelihood of choosing water-based transportation.

A. (WT) In addition to the speed and stop trade-offs mentioned, further spacing between stops on the water can help the Seabus operate more effectively in moving people from point A to point B, especially since much of the travel time is spent docking. The service also adds value by connecting new and existing destinations, including the islands and areas farther east and west, offering more travel options. While there may be an experiential benefit, the overall effectiveness will also depend on factors not covered in the study, such as operations, pricing, governance, and integration with transit. Moreover, even with two LRT lines planned for the eastern waterfront, additional capacity like the Seabus could help support demand, particularly during large-scale events.

Q. Will these slides be distributed following the meeting?

A. (WT) Yes, the slides will be shared tomorrow, and the meeting minutes will be distributed within the next two weeks.

Q. What is the intended frequency?

> **A.** (CPCS) The intended frequency starts at a minimum of every 30 minutes. As demand increases, the service would move to every 15 minutes, based on the modeled increments.

Q. Given the intended service frequency of 15 to 30 minutes, is there any anticipated conflict between the Seabus operations and industrial shipping activities, particularly with cargo vessels navigating or turning around in the inner harbor before entering the ship channel?

> **A.** (CPCS) That is an important consideration and something that will need to be looked at as the service evolves. From a modeling perspective, the service was based on 30-minute intervals, increasing to 15 minutes when demand supported it. However, operational approaches could vary, such as adjusting frequency seasonally with less service during off-peak periods and more frequent service in peak months. The potential for conflict with industrial shipping is acknowledged and will need to be addressed in future planning.
>
> **C.** (Windsor Salt) Typically, cargo vessels operate from late March to early January on a 24/7 schedule without fixed timing. This is an important factor to consider.

Q. Considering the inner and outer harbour systems, how is the Seabus pilot expected to integrate with existing water activities, including both motorized and non-motorized vessels?

> **A.** (Ports Toronto) The Seabus pilot adds just one vessel to thousands already in the harbour, which includes about 7,000 powered water vessels, as well as human-powered boats, city ferries, tour vessels, and cargo ships. Because reliability is essential, the vessel must be substantial in size to operate consistently, which increases costs. While future expansion is possible, the pilot will focus on the inner harbour where conditions are more controlled and suitable for smaller vessels. Current speed limits, enforced with the Toronto Police Marine Unit, help ensure safe coexistence, and the Seabus will adhere to these limits. Transport Canada regulations also restrict how far smaller vessels can operate offshore, reinforcing the focus on the inner harbour for this pilot.

Q. Based on the feasibility study and projected ridership, is there sufficient market potential for a private operator to invest in the watercraft and operating costs? Or would a more detailed market study be required before a private investor commits? Alternatively, is starting with a small-scale pilot using water taxi operators a preferred approach?

> **A.** (CPCS) Starting with a water taxi pilot is a lower-risk option, using familiar vehicles and locations. While the study includes a commercial feasibility assessment, private operators would likely conduct their own detailed analyses

before investing. The current study provides a useful starting point, but the pilot will generate valuable real-world data on ridership, fares, and travel patterns. This data will be crucial for private operators to make informed decisions beyond modeling assumptions.

C. (Water Taxi Association) The pilot involving water taxis would require several operators to participate, with ridership and related data collected for analysis.

C. (CPCS) Important data includes ridership numbers, origin and destination, and willingness to pay. This information will help determine whether the pilot can be self-sustaining or needs subsidies. Pricing and demand sensitivity are key factors under consideration by Waterfront Toronto.

C. (Water Taxi Association) Water taxi operators carry relatively low risk as they have already made the capital investment in the watercraft.

C. (CPCS) Operators possess their own ridership data, which is commercially sensitive. Estimates suggest they transport approximately 450,000 to 500,000 passengers annually.

C. (Water Taxi Association) One of the initial risks involves building and operating common docks, especially at the eastern and western locations.

Q. What are the next steps after this meeting?

A. (WT) The next steps involve finalizing the report based on the findings from the modeling and key recommendations shared today. Input from this group will be considered before completing the report, which is expected to be released to the public.

Q. What is the best way to reach Waterfront Toronto with more questions?

A. (WT) Please reach out to: info@waterfrontoronto.ca

WATERFRONToronto

APPENDIX A: SUMMARY OF COMMENTS AND QUESTIONS FROM SAC MEMBERS

Feasibility & Demand

- There was agreement that Route A (east-west/Linear option) is not feasible today and perhaps even unlikely in the next 5 to10 years. Most agree that demand does not seem to exist now and is unlikely until after major developments (Ontario Place, Quayside, Keating, Ookwemin Minising) are advanced or complete (~2030+).
- There was a general consensus that if demand for east-west service existed, water taxis would already be filling the gap.

Preferred Options (Route A/Route D)

- Route D (Loop option) was seen as more promising, but members noted that it still requires careful study.
    - A member noted that it could relieve congestion at Jack Layton Ferry Terminal, particularly during construction at Queens Quay/Bay and WELRT work.
    - There was concern that ridership estimates in the study may not fully account for construction displacement or integrated ferry volumes.
    - 5-knot speed limit would slow operations and could affect efficiency.
- Members noted concerns at Outer Harbour area for Route D, including:
    - Increased motorized traffic conflicts with heavy recreational use (member noted that there are 8,000+ users annually – kayaking, sailing, rowing, etc.), raising accident and congestion risks.
    - Risks to tranquility, ecological zones, and wildlife near Tommy Thompson Park.
    - Outer Harbour Sailing Federation and Friend of Cherry Beach/Outer Harbour did not support Route D stop in the Outer Harbour.

Governance & Regulation

- Member noted the lack of a clear governance model for marine transportation could be a major barrier (multiple overlapping authorities, unclear enforcement).
- Passenger safety - especially for non-motorized craft - requires stronger rules and enforcement before new service is introduced.

Integration with Existing Services

- Member noted that there is a need to consider impacts on ferry volumes and pricing (some passengers use taxis only one-way, relying on ferries for return).
- Ensure alignment with ferry modernization and avoid conflicting service models.

Other Specific Clarifications Requested

- Confirm pilot timeline (i.e. - is Route D pilot targeted for 2026?)
- Clarify service frequency (every 15 minutes?) and operating season for the pilot.
- Confirm if vessels would stay within motorized channels to minimize conflicts with recreation users.
- Report should acknowledge existing east-west water taxi activity (i.e. - event-based service at Polson Pier).

Future Planning & Considerations

Development & Demand Growth
- Demand for east-west service may change post-2030 with redevelopment and WELRT completion, therefore it should be re-evaluated then.
- Parking solutions (especially to the east) may be needed to support future water transit demand

Governance & Enforcement
- Broader governance issues (i.e. - regulating seadoos, rentals, speed enforcement) need long-term resolution.

Economic & Feasibility Analysis
- Future studies should include full costing (docks, infrastructure, etc.), pricing models, and willingness-to-pay analysis to test true demand.
- Ensure any service is financially sustainable and not overly reliant on subsidy

Innovation / Alternative Modes
- Consider amphibious vehicles as a complementary or alternative service
- Could reduce docking pressures, use flexible loading points, and support hop-on/hop-off tourism models.
- Potential role in early pilots or demonstration projects.
- Would require regulatory adaptations (licensing, dockwall access, ramp infrastructure, approvals).
- Explore eco-friendly (electric/hybrid) options for sustainability.

Outer Harbour Planning
- If Route D is reconsidered, ensure consultation with OHSF and FoCBOH, plus environmental review with TRCA.
- Landing spot positioning at Outer Harbour Marina must minimize ecological disruption while supporting user access (e.g., APSC members).

Phasing & Piloting
- Members supported to pilot both Route D and Route A.
- One member suggested piloting Route A (despite current low demand) first to gather baseline data before committing to Route D.
- Route D should only proceed with clear safety, ecological, and governance safeguards in place.

APPENDIX B: MEETING AGENDA

Item	Presenter
1. Welcome & Agenda • Land Acknowledgement • Agenda Review • Introductions	Rei Tasaka, Waterfront Toronto

2. Study Overview & Context	Rei Tasaka, Waterfront Toronto
3. Jurisdiction Scan and Best Practices	Grant Osborn, CPCS
4. Seabus Feasibility Analysis & Opportunities	Grant Osborn, CPCS
5. Study Findings & Recommendations	Grant Osborn, CPCS
7. Questions & Answers	Facilitated by Emma Conway, Waterfront Toronto

APPENDIX C: MEETING ATTENDEES

The following lists the participants who attended the second Marine Use Strategy SAC Meeting on Wednesday, July 23, 2025.

SAC Members	
Adam Zhelka	Toronto Island Community Association
Bill Duron	Water Taxi Association
Charles Ivey	Harbour Hopper Toronto
Ed Hore	Waterfront for All
Garth Riley	Friends of the Spit
Gordon Ballantyne	Toronto Island Marina
Jennifer Penney	Outer Harbour Sailing Federation (OHSF)
John Carley	Friends of the Spit
Julie Breen	York Quay Neighbourhood Association (YQNA)
Leena Kaleva	Windsor Salt
Megan Medlock	Ontario Sailing
Oliver Hierlihy	Waterfront BIA
Pat Dunn	Toronto Passenger Vessels
Peter Suchanek	Outer Harbour Sailing Federation (OHSF)
Steve Hulford	Friends of Cherry Beach

Waterfront Toronto
Christopher Glaisek

Emma Conway
Patrick Meredith-Karam
Rei Tasaka
Shrishti Mittal

CPCS
Grant Osborn

City of Toronto
Wai Ming Lo

Ports Toronto
Mike Riehl

CreateTO
Bryan Bowen
Neil Finlayson

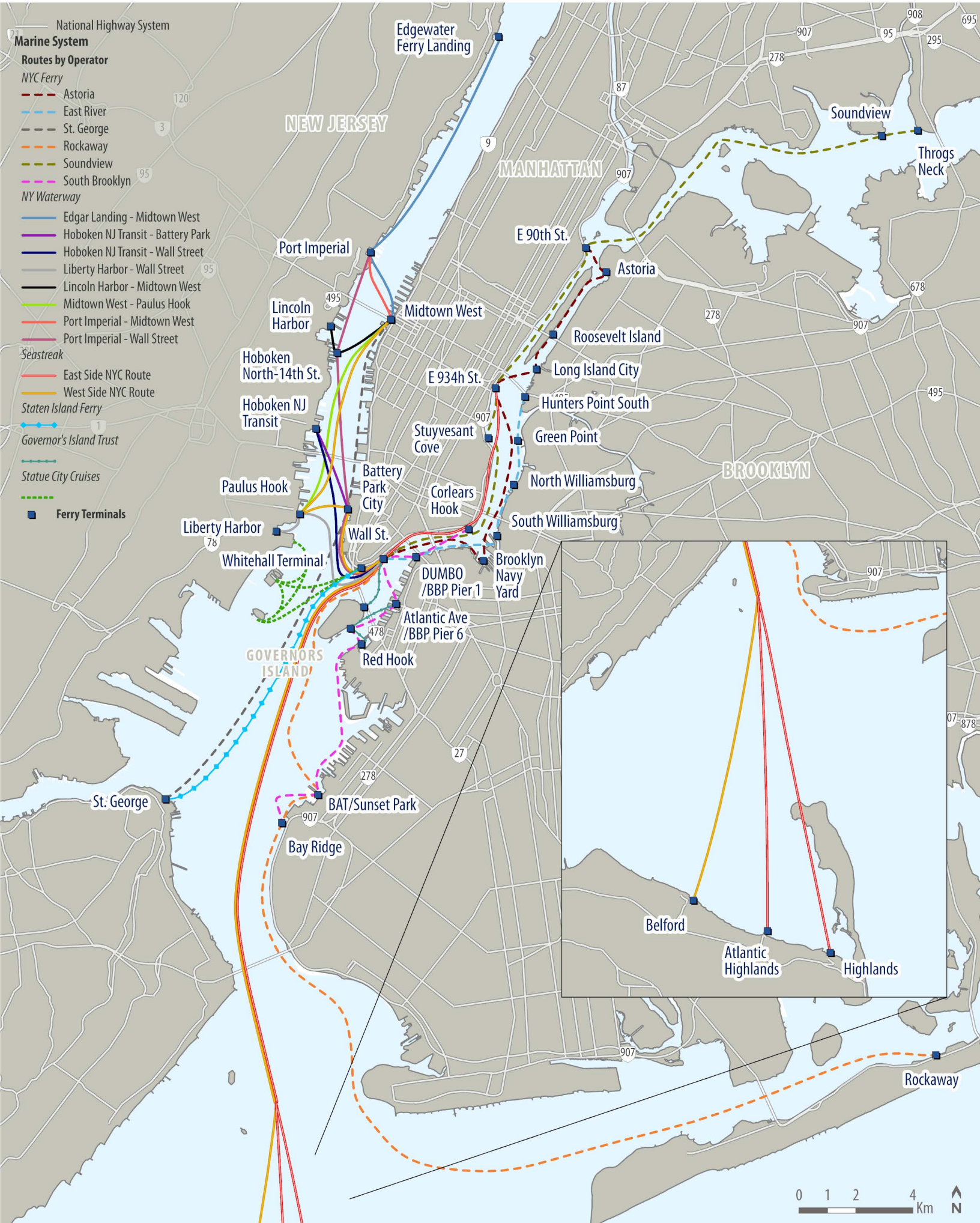
TRCA
Matthew Colenbrander

Appendix B – Jurisdictional Scan Maps

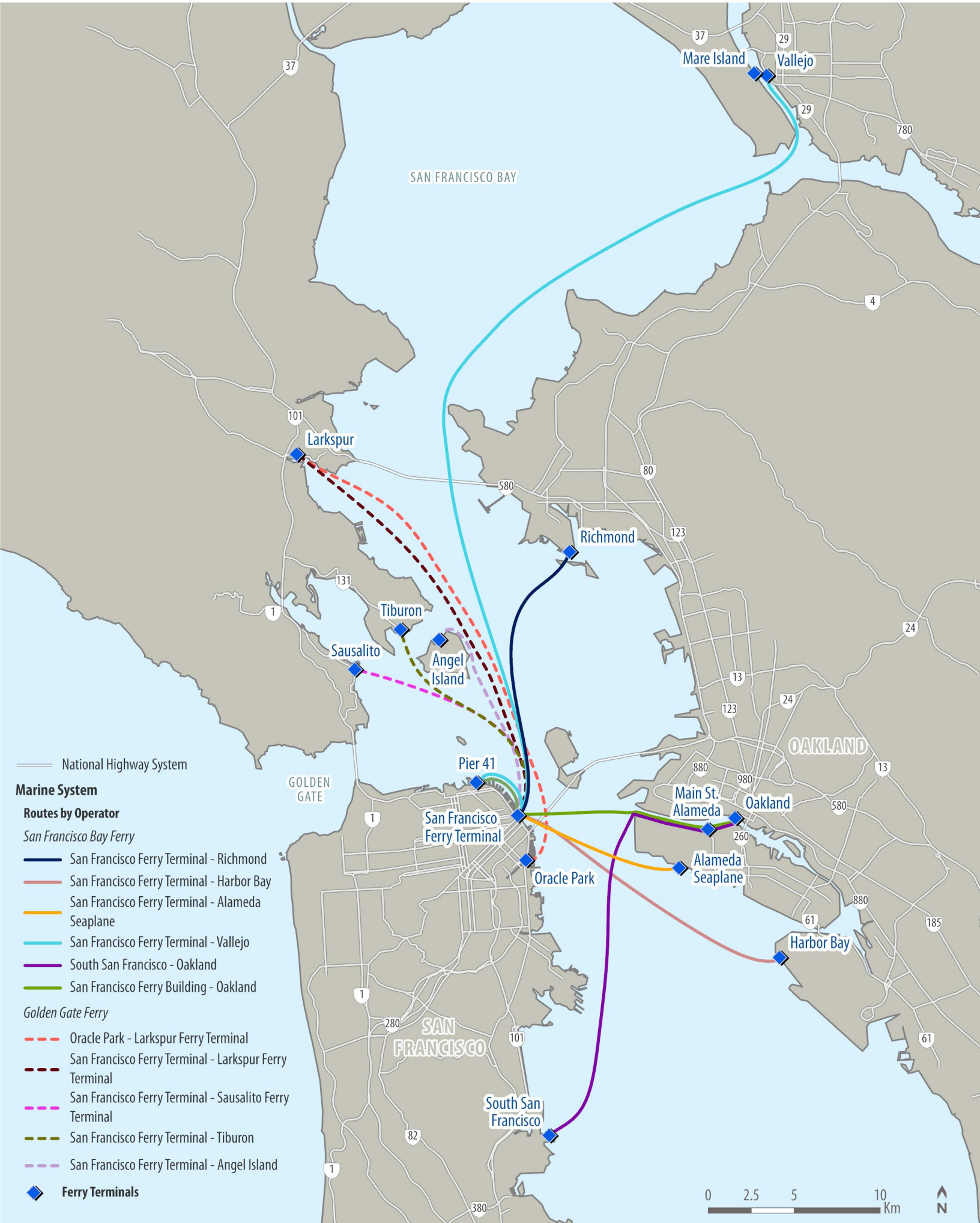
VANCOUVER MARINE PASSENGER TRANSPORTATION SYSTEM

HALIFAX MARINE PASSENGER TRANSPORTATION SYSTEM

NEW YORK MARINE PASSENGER TRANSPORTATION SYSTEM



SAN FRANCISCO MARINE PASSENGER TRANSPORTATION SYSTEM



Appendix C – Additional Modelling Assumptions

	Constant	Unit	Source	Comment
Landside Assumptions				
Assumptions				
% of annual visitation in occuring during peak season	0,8		Analysis of CoT ferry data	*presented in decimal format for use in model*
Waterfront peak season	6	months	Visitation data + Interviews	*Represents May to October peak season*
Interim Horizon Year	2035	year	assumption	
Future Horizon Year (Full-build)	2050	year	assumption	
Annualization factor	365	factor		
Peak Monthly visitation factor	0,15	factor	assumption	
Growth Rate (2023 - 2035)	0,28	factor	calculated based on Toronto Island Projecti	*to be used for existing waterfront visitation (Zone 1,2,3,6)*
Growth Rate (2023 - 2050)	0,55	factor	calculated based on Toronto Island Projecti	*to be used for existing waterfront visitation (Zone 1,2,3,6)*
Event Space Staff	4000		https://www.cbc.ca/sports/toronto-teams-special-assistance-fund-event-staff-covid-19-coronavirus-1.5498767	
Event Space Capacity	57000			*capacity of Scotiabank Arena, BMO Field and Coca-Cola Coliseum*
Event staff ratio	0,07	calculated		
Budweiser Stage capacity	16 000		https://en.wikipedia.org/wiki/Budweiser_Stage#:~:text=The%20amphitheatre%20has%20a%20capacity,an%20unreserved%20capacity%20of%201%2C000.	
Estimated Busweiser Stage employees	1 123	calculated		
Waterfront BIA Visitation Data				
Waterfront Total Daily Visits (Jan- Oct 2022)	56 507 368	visits	Waterfront Visitor Data 2022 (Waterfront BIA)	
Waterfront Total Daily Visits (Jan- Dec 2019)	85 613 714	visits	Waterfront Visitor Data 2022 (Waterfront BIA)	
Waterfront Total Daily Visits (Jan- Oct 2019)	73 100 000	visits	estimated	*based on Total Daily Visits by Month 2019-2022 graph; used to estimate 2022 projection full year data*
% of total daily visits occuring Oct - December	0,17		calculated	
Waterfront Total Daily Visits (Jan- Dec 2022)	66 180 652	visits	calculated	
Waterfront Total Daily Visits - estimated 2035	84 670 005	visits	calculated - assuming 2023 - 2035 growth rate	
Waterfront Total Daily Visits - estimated 2050	102 674 001	visits	calculated - assuming 2023 - 2050 growth rate	
Zone 1 - estimated visitor split (2023)	0,30	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 2 - estimated visitor split (2023)	0,60	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 3 - estimated visitor split (2023)	0,10	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 1 - estimated visitor split (2035)	0,20	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 2 - estimated visitor split (2035)	0,50	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 3 - estimated visitor split (2035)	0,20	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 4 - estimated visitor split (2035)	0,10	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 1 - estimated visitor split (2050)	0,17	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 2 - estimated visitor split (2050)	0,50	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 3 - estimated visitor split (2050	0,17	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Zone 4 - estimated visitor split (2050)	0,16	factor	assumption - based off Waterfront Visitor Data 2022 (Waterfront BIA) and current land attractors	
Park Visitation Estimation (2023)				
Trinity-Bellwoods Visitation (Peak Day - Weekend)	10 000	visitors / w	https://www.cbc.ca/news/canada/toronto/trinity-bellwoods-outbreak-contact-tracing-1.5583916	
Trinity-Bellwoods Size	0,16	squared km	Google Earth	
Trinity Bellwoods - Estimated Park Visitation / km2	62 500	visitors/ km	calculated	
Coronation Park size (including Yacht Club)	0,14	squared km	Google Earth	
Estimated Coronation Park Visitation (Peak Day - Weekend	8 750	visitors / w	calculated	
Tommy Thompson Park - Annual Visitation	300 000	visitors / ye	Tommy Thompson Park Update (toronto.ca)	*Confirmed with Client that this covers only TTP/The Spit*
Cherry Beach - beach size	0,024	squared km	Google Earth	
Cherry Beach - Peak weekend visitation	1 500	visitors / w	calculated	
Cabana Poolbar - peak weekend visitation	5 000	visitors / w	2,500 person capacity; only open on Saturday and Sunday during summer season	
Zone 6 - Annual Visitation	473 333	visitors/year		
Future Eastern Waterfront Unique Visitation (2035)				
Villiers Island - PLFP	750 000	no. annual	WT Landside Assumptions (provided Nov 2)	

Villiers Island - DP	750 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - Events Park	700 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Parliament Slip	300 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Block 5 Cultural	500 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Other	250 000	no. annual	WT Landside Assumptions (provided Nov 2)	

Future Eastern Waterfront Unique Visitation (2050)

Villiers Island - Art Trail	250 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - PLFP	750 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - DP	750 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - Event Parks	700 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - Sports & Rec Centre	75 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Villiers Island - Other	250 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Parliament Slip	300 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Block 5 Cultural	500 000	no. annual	WT Landside Assumptions (provided Nov 2)	
Quayside - Other	250 000	no. annual	WT Landside Assumptions (provided Nov 2)	

Existing Horizon (2023)

Existing - Residents

Ontario Place	0	people	WT Landside Assumptions (provided Nov 2)	*no existing residents*
Central Waterfront	27 600	people		
Lower Yonge	5 900	people		
East Bayfront	3 800	people	WT Landside Assumptions (provided Nov 2)	
Keating West	0	people		*no existing residents*
Keating East	0	people		*no existing residents*
Villiers Island	0	people		*no existing residents*
West Don Lands		people	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	0	people		*no existing residents*
Polson Quay & South River	0	people		*no existing residents*
Media City	0	people		*no existing residents*
Turning Basin	0	people		*no existing residents*
East Harbour	0	people		*no existing residents*
Toronto Islands	700	people		
Total existing residents	38 000	people	WT Landside Assumptions (provided Nov 2)	*matches WT estimate of 40,000 residents*

Existing - Employment

Ontario Place	1 123	jobs	Ontario Place venues to be closed by province |	**assumption for existing budweiser stage*
Central Waterfront	12 500	jobs	WT Landside Assumptions (provided Nov 2)	
Lower Yonge	2 700	jobs	WT Landside Assumptions (provided Nov 2)	
East Bayfront	5 200	jobs	WT Landside Assumptions (provided Nov 2)	
Keating West	0	jobs		*no existing employment*
Keating East	0	jobs		*no existing employment*
Villiers Island	0	jobs		*no existing employment*
West Don Lands		jobs	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	0	jobs		*no existing employment*
Polson Quay & South River	100	jobs		*no existing employment*
Media City	1 080	jobs		*no existing employment*
Turning Basin	0	jobs		*no existing employment*
East Harbour	0	jobs		*no existing employment*
Toronto Islands	50	jobs		
Total existing jobs	22 703	jobs	WT Landside Assumptions (provided Nov 2)	*matches WT estimate of 21,000 jobs*

Existing Visitation - Annual

Ontario Place	2 900 000	visitors / ye	2.9 million visited Ontario Place in 2022: internal letter - The Trillium	
Central Waterfront	19 854 196	vists / year	calculated	
Lower Yonge	39 708 391	vists / year	calculated	
East Bayfront	6 618 065	vists / year	calculated	
Keating West	-	isitors / year		*no existing visitation*
Keating East	-	isitors / year		*no existing visitation*
Villiers Island	-	isitors / year		*no existing visitation*
West Don Lands	-	visitors / year		*removed from assumption due to previous direction*
McCleary District	-	isitors / year		*no existing visitation*
Polson Quay & South River	-	visits / year		
Media City	-	visits / year		
Turning Basin	-	isitors / year		*no existing visitation relevant for study*
East Harbour	-	isitors / year		*no existing visitation relevant for study*
Toronto Islands	1 910 195	isitors / year		
Zone 6 (Cherry Beach, Tommy Thomspon Park, Cabana Poc	473 333	isitors / year		
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	0	isitors / year		*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs. In 2023 no visitorship is assumed to occur*

Existing Visitation - peak monthly

Ontario Place	386 667	visitors / m	Calculated using assumption of % of waterfront visitation during peak season	
Central Waterfront	2 647 226	visits / mor	Calculated using assumption of % of waterfront visitation during peak season	
Lower Yonge	5 294 452	visits / mor	Calculated using assumption of % of waterfront visitation during peak season	
East Bayfront	882 409	visits / mor	Calculated using assumption of % of waterfront visitation during peak season	
Keating West	-	visitors / month		*no existing visitation*
Keating East	-	visitors / month		*no existing visitation*
Villiers Island	-	visitors / month		*no existing visitation*
West Don Lands	-	visitors / month		*removed from assumption due to previous direction*
McCleary District	-	visitors / month		*no existing visitation*
Polson Quay & South River	-	visitors / month		
Media City	-	visitors / month		
Turning Basin	-	visitors / month		*no existing visitation relevant for study*
East Harbour	-	visitors / month		*no existing visitation relevant for study*
Toronto Islands	286 529	visitors / month		
Zone 6 (Leslie Split, Cherry Beach, Tommy Thomspon Park,	71 000	visitors / month		
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	0	visitors / month		*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs. In 2023 no visitorship is assumed to occur*

Future Horizon (2035)

Future - Residents (2035)

Ontario Place	-	people	Ontario Place Revitilization Plans	*no future residents*
Central Waterfront	27 900	people	WT Landside Assumptions (provided Nov 2)	
Lower Yonge	10 000	people	WT Landside Assumptions (provided Nov 2)	
East Bayfront	15 100	people	WT Landside Assumptions (provided Nov 2)	
Keating West	8 000	people	WT Landside Assumptions (provided Nov 2)	
Keating East	0	people	WT Landside Assumptions (provided Nov 2)	
Villiers Island	5 400	people	WT Landside Assumptions (provided Nov 2)	
West Don Lands		people	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	0	people	WT Landside Assumptions (provided Nov 2)	
Polson Quay & South River	0	people	WT Landside Assumptions (provided Nov 2)	
Media City	-	people	WT Landside Assumptions (provided Nov 2)	*no future residents*
Turning Basin	-	people	WT Landside Assumptions (provided Nov 2)	*no future residents*
East Harbour	3 150	people	WT Landside Assumptions (provided Nov 2)	
Toronto Islands	700	people		
Total future residents (2035)	70 250	people	WT Landside Assumptions (provided Nov 2)	*slightly higher than WT's estimate of 88,000 new residents (98,000 based on comparison of existing and future)*

Future - Employment (2035)

Ontario Place	5 000	jobs	https://engageontarioplace.ca/how-we-got-her	*included as part of economic benefits*
Central Waterfront	17 100	jobs	WT Landside Assumptions (provided Nov 2)	
Lower Yonge	3 100	jobs	WT Landside Assumptions (provided Nov 2)	
East Bayfront	7 500	jobs	WT Landside Assumptions (provided Nov 2)	
Keating West	2 500	jobs	WT Landside Assumptions (provided Nov 2)	
Keating East	0	jobs	WT Landside Assumptions (provided Nov 2)	
Villiers Island	2 000	jobs	WT Landside Assumptions (provided Nov 2)	
West Don Lands		jobs	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	450	jobs	WT Landside Assumptions (provided Nov 2)	
Polson Quay & South River	100	jobs	WT Landside Assumptions (provided Nov 2)	
Media City	3 800	jobs	WT Landside Assumptions (provided Nov 2)	
Turning Basin	1 000	jobs	WT Landside Assumptions (provided Nov 2)	
East Harbour	200	jobs	WT Landside Assumptions (provided Nov 2)	
Toronto Islands	50	jobs	estimate	
Total future jobs (2035)	42 800	jobs		

Future Visitation - Annual (2035)

Ontario Place	5 000 000	visitors / ye	https://engageontarioplace.ca/how-we-got-her	*midpoint of OP revitilization programming (under economic benefits)*
Central Waterfront	16 934 001	visitors / year		
Lower Yonge	42 335 002	visitors / year		
East Bayfront	16 934 001	visitors / year		
Keating West	1 050 000	visitors / ye	WT Landside Assumptions (provided Nov 2)	*Quayside assumed build-out in 2030*
Keating East	-	visitors / year		*no future visitation relevant for study; Distillery District not included*
Villiers Island	2 200 000	visitors / ye	WT Landside Assumptions (provided Nov 2)	*Villiers early activation*
West Don Lands	-	visitors / year		*removed from assumption due to previous direction*
McCleary District	-	visitors / year		*no visitation assumed in 2035 as per landside build-out assumptions*
Polson Quay & South River	-	visitors / year		*no visitation assumed in 2035 as per landside build-out assumptions*
Media City	-	visitors / year		*no visitation assumed in 2035 as per landside build-out assumptions*
Turning Basin	-	visitors / year		*no visitation assumed in 2035 as per landside build-out assumptions*
East Harbour	-	visitors / year		*no visitation assumed in 2035 as per landside build-out assumptions*
Toronto Islands	2 443 860	visitors / year		
Zone 6 (Leslie Split, Cherry Beach, Tommy Thomspon Park,	605 572	visitors / year		
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	8 467 000	isitors / year		*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs.*

Future Visitation - peak monthly (2035)

Ontario Place	666 667	visitors / m	Calculated using assumption of % of waterfront visitation during peak season	
Central Waterfront	2 540 100	visitors / month		
Lower Yonge	6 350 250	visitors / month		
East Bayfront	2 540 100	visitors / month		
Keating West	140 000	visitors / m	Calculated using assumption of % of waterfront visitation during peak season	
Keating East	-	visitors / month		*no future visitation relevant for study; Distillery District not included*
Villiers Island	293 333	visitors / m	Calculated using assumption of % of waterfront visitation during peak season	
West Don Lands	-	visitors / month		*removed from assumption due to previous direction*
McCleary District	-	visitors / month		*no visitation assumed in 2035 as per landside build-out assumptions*
Polson Quay & South River	-	visitors / month		*no visitation assumed in 2035 as per landside build-out assumptions*
Media City	-	visitors / month		*no visitation assumed in 2035 as per landside build-out assumptions (employment only)*
Turning Basin	-	visitors / month		*no visitation assumed in 2035 as per landside build-out assumptions (employment only)*
East Harbour	-	visitors / month		*no visitation assumed in 2035 as per landside build-out assumptions*
Toronto Islands	366 579	visitors / month		
Zone 6 (Leslie Split, Cherry Beach, Tommy Thomspon Park,	90 836	visitors / month		
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	1 270 050	visitors / month		*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs.*

Future Horizon (2050)

Future - Residents (2050)

Ontario Place	0	people	Ontario Place Revitilization Plans	*no future residents*
Central Waterfront	27 900	people	WT Landside Assumptions (provided Nov 2)	
Lower Yonge	18 400	people	WT Landside Assumptions (provided Nov 2)	
East Bayfront	14 200	people	WT Landside Assumptions (provided Nov 2)	
Keating West	7 750	people	WT Landside Assumptions (provided Nov 2)	
Keating East	5 350	people	WT Landside Assumptions (provided Nov 2)	
Villiers Island	16 000	people	WT Landside Assumptions (provided Nov 2)	
West Don Lands		people	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	11 300	people	WT Landside Assumptions (provided Nov 2)	
Polson Quay & South River	10 000	people	WT Landside Assumptions (provided Nov 2)	
Media City	0	people	WT Landside Assumptions (provided Nov 2)	*no future residents*
Turning Basin	0	people	WT Landside Assumptions (provided Nov 2)	*no future residents*
East Harbour	7 450	people	WT Landside Assumptions (provided Nov 2)	
Toronto Islands	700	people		
Total future residents	119 050	people	calculated	

Future - Employment (2050)

Ontario Place	5 000	jobs	**https://engageontarioplace.ca/how-w**	*included as part of economic benefits*
Central Waterfront	17 100	jobs	WT Landside Assumptions (provided Nov 2)	
Lower Yonge	10 400	jobs	WT Landside Assumptions (provided Nov 2)	
East Bayfront	7 300	jobs	WT Landside Assumptions (provided Nov 2)	
Keating West	3 300	jobs	WT Landside Assumptions (provided Nov 2)	
Keating East	3 700	jobs	WT Landside Assumptions (provided Nov 2)	
Villiers Island	2 900	jobs	WT Landside Assumptions (provided Nov 2)	
West Don Lands		jobs	WT Landside Assumptions (provided Nov 2)	*removed from assumption due to previous direction*
McCleary District	4 000	jobs	WT Landside Assumptions (provided Nov 2)	
Polson Quay & South River	4 600	jobs	WT Landside Assumptions (provided Nov 2)	
Media City	6 500	jobs	WT Landside Assumptions (provided Nov 2)	
Turning Basin	2 700	jobs	WT Landside Assumptions (provided Nov 2)	
East Harbour	50 000	jobs	WT Landside Assumptions (provided Nov 2)	
Toronto Islands	50	jobs	estimate	
Total future jobs	117 550	jobs		

Future Visitation - Annual (2050)

Ontario Place	5 000 000	visitors / ye	https://engageontarioplace.ca/how-we-got-her	*midpoint of OP revitilization programming (under economic benefits)*
Central Waterfront	17 454 580	visitors / year		
Lower Yonge	51 337 000	visitors / year		
East Bayfront	17 454 580	visitors / year		
Keating West	1 050 000	visitors / year		
Keating East		visitors / year		
Villiers Island	2 775 000	visitors / ye	WT Landside Assumptions (provided Nov 2)	Villiers Island visitation assumed during full build-out
West Don Lands		visitors / year		*removed from assumption due to previous direction*
McCleary District		visitors / year		
Polson Quay & South River		visitors / year		
Media City	-	visitors / month		*no visitation assumed in 2050 as per landside build-out assumptions (employment only)*
Turning Basin	-	visitors / month		*no visitation assumed in 2050 as per landside build-out assumptions (employment only)*
East Harbour		visitors / year		
Toronto Islands	2 963 516	visitors / year		
Zone 6 (Leslie Split, Cherry Beach, Tommy Thomspon Park,	734 339	visitors / year		
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	16 427 840	isitors / year		*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs.*

Future Visitation - peak monthly (2050)			
Ontario Place	666 667	visitors / m	Calculated using assumption of % of waterfront visitation during peak season
Central Waterfront	2 618 187	visitors / month	
Lower Yonge	7 700 550	visitors / month	
East Bayfront	2 618 187	visitors / month	
Keating West	140 000	visitors / month	
Keating East		visitors / month	
Villiers Island	370 000	visitors / m	Calculated using assumption of % of waterfront visitation during peak season
West Don Lands		visitors / month	*removed from assumption due to previous direction*
McCleary District		visitors / month	
Polson Quay & South River		visitors / month	
Media City	-	visitors / month	*no visitation assumed in 2050 as per landside build-out assumptions (employment only)*
Turning Basin	-	visitors / month	*no visitation assumed in 2050 as per landside build-out assumptions (employment only)*
East Harbour		visitors / month	
Toronto Islands	444 527	visitors / month	
Zone 6 (Leslie Split, Cherry Beach, Tommy Thomspon Park,	110 151	visitors / month	
Zone 4 (Villiers, McCleary, Polson Quay + South River, Med	2 464 176	isitors / year	*based on assumption that Waterfront BIA Visitorship also visits Zone 4 as development occurs.*

Appendix D – Intermediary O/D Tables

Base Year (2023)

	Ontario Place Zone 0	*W. Waterfront* Zone 1	*C. Waterfront* Zone 2	*E. Waterfront* Zone 3	*Villiers* Zone 4	*Islands* Zone 5	*Cherry* Zone 6	Notes
Input values								
Residents	0	27,600	5,900	3,800	0	700	0	*see Market Assumptions Tab*
Employees	1,123	12,500	2,700	5,200	1,180	50	0	*see Market Assumptions Tab*
Annual visitation	2,900,000	19,854,196	39,708,391	6,618,065	0	1,910,195	473,333	*see Market Assumptions Tab*
Total Residents + Employees	1,123	40,100	8,600	9,000	1,180	-	-	***60,003***
% of Total Cityside Residents + Employees	2%	67%	14%	15%	2%	-	-	**For use in assigning Island trips to Cityside (for along waterfront)*
Assumptions for residents and employees								
Employee/resident ratio	0.0	0.5	0.5	1.4	0.0	0.1	0.0	
Daily trip generation per resident	0.9	2.3	2.3	3.8	0	1.2	0	*See TTS Analysis - Trip Gen Tab*
Estimated monthly trip origins	30,316	1,925,248	411,557	437,571	0	24,734	0	
Travel destination share:								
Pct. internal within own zone	3%	3%	3%	3%	3%	3%	3%	*assumption to account for trips that stay within respective Zone, these are removed from consideration for marine transport*
Pct. within study zones	3%	3%	3%	3%	3%	3%	3%	
Pct. outside study zones	94%	94%	94%	94%	94%	94%	94%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Assumption for visitors								
Peak season month factor	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Estimated pk season monthly trip origins	435,000	2,978,129	5,956,259	992,710	0	286,529	71,000	
Travel destination share:								
Pct. internal within own zone	0%	0%	0%	0%	0%	0%	0%	*assumed that visitor trips do not occur within own travel zone*
Pct. within study zones	5%	2%	2%	2%	2%	5%	5%	*lower % based on hotels map and assumption that most visitors not coming from along the waterfront*
Pct. outside study zones	95%	98%	98%	98%	98%	95%	95%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Estimated peak season monthly one-way trip totals								
Residents/employees - within study zones	909	57,757	12,347	13,127	0	742	0	
Visitors - within study zones	21,750	59,563	119,125	19,854	0	14,326	3,550	
Visitors - transiting through study zones						272,203		
SUM (Visitors)	21,750	59,563	119,125	19,854	0	286,529	3,550	

Interim Horizon (2035)

	Ontario Place Zone 0	*W. Waterfront* Zone 1	*C. Waterfront* Zone 2	*E. Waterfront* Zone 3	*Villiers* Zone 4	*Islands* Zone 5	*Cherry* Zone 6	Notes
Input values								
Residents	0	27,900	10,000	23,100	8,550	700	0	*see Market Assumptions Tab*
Employees	5,000	17,100	3,100	10,000	7,550	50	0	*see Market Assumptions Tab*
Annual visitation	5,000,000	16,934,001	42,335,002	17,984,001	10,667,000	2,443,860	605,572	*see Market Assumptions Tab*
Total Residents + Employees	5,000	45,000	13,100	33,100	16,100	-	-	***112,300***
% of Total Cityside Residents + Employees	4%	40%	12%	29%	14%	-	-	**For use in assigning Island trips to Cityside (for along waterfront)*
Assumptions for residents and employees								
Employee/resident ratio	0.0	0.6	0.3	0.4	0.9	0.1	0.0	
Daily trip generation per resident	0.9	2.5	1.9	2.5	3.1	1.2	0	*See TTS Analysis - Trip Gen Tab*
Estimated monthly trip origins	135,000	2,112,434	568,993	1,749,004	800,210	24,734	0	
Travel destination share:								
Pct. internal within own zone	3%	3%	3%	3%	3%	3%	3%	*assumption to account for trips that stay within respective Zone, these are removed from consideration for marine transport*
Pct. within study zones	6%	6%	6%	6%	6%	6%	6%	
Pct. outside study zones	91%	91%	91%	91%	91%	91%	91%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Assumption for visitors								
Peak season month factor	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Estimated pk season monthly trip origins	750,000	2,540,100	6,350,250	2,697,600	1,600,050	366,579	90,836	
Travel destination share:								
Pct. internal within own zone	0%	0%	0%	0%	0%	0%	0%	*assumed that visitor trips do not occur within own travel zone*
Pct. within study zones	3%	2%	2%	2%	3%	5%	5%	*Reduction in % for OP as redevelopment likely to result in more regional visitors. Increase in % for Villiers as development may attract new hotels and accomodations for visitors increasing 'local' visitors.*
Pct. outside study zones	97%	98%	98%	98%	97%	95%	95%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Estimated peak season monthly one-way trip totals								
Residents/employees - within study zones	8,100	126,746	34,140	104,940	48,013	1,484	0	
Visitors - within study zones	22,500	50,802	127,005	53,952	48,002	18,329	4,542	
Visitors - transiting through study zones						348,250		
SUM (Visitors)	22,500	50,802	127,005	53,952	48,002	366,579	4,542	

Future Horizon (2050)

	Ontario Place Zone 0	*W. Waterfront* Zone 1	*C. Waterfront* Zone 2	*E. Waterfront* Zone 3	*Villiers* Zone 4	*Islands* Zone 5	*Cherry* Zone 6	Notes
Input values								
Residents	0	27,900	18,400	27,300	44,750	700	0	*see Market Assumptions Tab*
Employees	5,000	17,100	10,400	14,300	70,700	50	0	*see Market Assumptions Tab*
Annual visitation	5,000,000	17,454,580	51,337,000	18,504,580	19,202,840	2,963,516	734,339	*see Market Assumptions Tab*
Total Residents + Employees	5,000	45,000	28,800	41,600	115,450	-	-	***235,850***
% of Total Cityside Residents + Employees	2%	19%	12%	18%	49%	-	-	**For use in assigning Island trips to Cityside (for along waterfront)*
Assumptions for residents and employees								
Employee/resident ratio	0.0	0.6	0.6	0.5	1.6	0.1	0.0	
Daily trip generation per resident	0.9	2.5	2.5	2.3	4.1	1.2	0	*See TTS Analysis - Trip Gen Tab*
Estimated monthly trip origins	135,000	2,112,434	1,393,146	1,904,322	5,502,003	24,734	0	
Travel destination share:								
Pct. internal within own zone	3%	3%	3%	3%	3%	3%	3%	*assumption to account for trips that stay within respective Zone, these are removed from consideration for marine transport*
Pct. within study zones	9%	9%	9%	9%	9%	9%	9%	
Pct. outside study zones	88%	88%	88%	88%	88%	88%	88%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Assumption for visitors								
Peak season month factor	0.15	0.15	0.15	0.15	0.15	0.15	0.15	
Estimated pk season monthly trip origins	750,000	2,618,187	7,700,550	2,775,687	2,880,426	444,527	110,151	
Travel destination share:								
Pct. internal within own zone	0%	0%	0%	0%	0%	0%	0%	*assumed that visitor trips do not occur within own travel zone*
Pct. within study zones	3%	2%	2%	2%	3%	5%	5%	*Reduction in % for OP as redevelopment likely to result in more regional visitors. Increase in % for Villiers as development may attract new hotels and accomodations for visitors increasing 'local' visitors.*
Pct. outside study zones	97%	98%	98%	98%	97%	95%	95%	*assumption to account for trips that are made to outide of Study Zones (i.e. out of Zones 0-6); these are removed from consideration for marine transport*
Estimated peak season monthly one-way trip totals								
Residents/employees - within study zones	12,150	190,119	125,383	171,389	495,180	2,226	0	
Visitors - within study zones	22,500	52,364	154,011	55,514	86,413	22,226	5,508	
Visitors - transiting through study zones						422,301		
SUM (Visitors)	22,500	52,364	154,011	55,514	86,413	444,527	5,508	

*O/Ds are developed such that %'s add up to 100% by Zone Origin

Proposed O/D (by Zone) - Residents/Employees 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	30%	50%	20%	0%	0%	0%
Zone 1	5%	0%	55%	35%	0%	0%	5%
Zone 2	5%	45%	0%	45%	0%	0%	5%
Zone 3	5%	40%	50%	0%	0%	0%	5%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	5%	20%	60%	10%	0%	0%	5%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Notes (2023):

- assumed trip purpose for typical employee/residential uses (i.e. not visitation/entertainment)
-Internal trips within zones (i.e. Zone 1 to Zone 1 above) have been set to 0 as they are caluclated seperately in the Trip Tables (rows 15 and 22 in #Trips sheets) and will not be candidates for marine travel

Proposed O/D (by Zone) - Residents/Employees 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	0%	0%	0%	0%	0%	0%
Zone 1	5%	0%	45%	35%	10%	0%	5%
Zone 2	5%	25%	0%	10%	50%	0%	10%
Zone 3	5%	25%	30%	0%	35%	0%	5%
Zone 4	0%	20%	50%	30%	0%	0%	0%
Zone 5	5%	20%	60%	10%	0%	0%	5%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Notes (2035):

- Assumed Ontario Place and Interim Villiers Island activation will be operational
-Internal trips within zones (i.e. Zone 1 to Zone 1 above) have been set to 0 as they are caluclated seperately in the Trip Tables (rows 15 and 22 in #Trips sheets) and will not be candidates for marine travel

Proposed O/D (by Zone) - Residents/Employees 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	0%	0%	0%	0%	0%	0%
Zone 1	5%	0%	35%	20%	35%	0%	5%
Zone 2	5%	25%	0%	10%	50%	0%	10%
Zone 3	5%	25%	30%	0%	35%	0%	5%
Zone 4	0%	20%	50%	30%	0%	0%	0%
Zone 5	5%	20%	60%	10%	0%	0%	5%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Notes (2050):

-Internal trips within zones (i.e. Zone 1 to Zone 1 above) have been set to 0 as they are caluclated seperately in the Trip Tables (rows 15 and 22 in #Trips sheets) and will not be candidates for marine travel

Number of Peak Monthly Trips by Zone Check - 2023 Residents/Employees

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	273	455	182	-	-	-
Zone 1	2,888	-	31,767	20,215	-	-	2,888
Zone 2	617	5,556	-	5,556	-	-	617
Zone 3	656	5,251	6,564	-	-	-	656
Zone 4	-	-	-	-	-	-	-
Zone 5	37	148	445	74	-	-	37
Zone 6	-	-	-	-	-	-	-

Number of Peak Monthly Trips by Zone Check - 2035 Residents/Employees

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	6,337	-	57,036	44,361	12,675	-	6,337
Zone 2	1,707	8,535	-	3,414	17,070	-	3,414
Zone 3	5,247	26,235	31,482	-	36,729	-	5,247
Zone 4	-	9,603	24,006	14,404	-	-	-
Zone 5	74	297	890	148	-	-	74
Zone 6	-	-	-	-	-	-	-

Number of Peak Monthly Trips by Zone Check - 2050 Residents/Employees

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	9,506	-	66,542	38,024	66,542	-	9,506
Zone 2	6,269	31,346	-	12,538	62,692	-	12,538
Zone 3	8,569	42,847	51,417	-	59,986	-	8,569
Zone 4	-	99,036	247,590	148,554	-	-	-
Zone 5	111	445	1,336	223	-	-	111
Zone 6	-	-	-	-	-	-	-

Proposed O/D (by Zone) - Cityside Visitation 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	30%	50%	20%	0%	0%	0%
Zone 1	10%	0%	50%	30%	0%	0%	10%
Zone 2	10%	40%	0%	40%	0%	0%	10%
Zone 3	10%	30%	50%	0%	0%	0%	10%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	0%	0%	0%	0%	0%	0%	0%
Zone 6	5%	30%	35%	30%	0%	0%	0%

Notes (2023):

- Zone 5 (Toronto Islands) not included as visitation is analyzed seperatly

Proposed O/D (by Zone) - Cityside Visitation 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	18%	47%	20%	15%	0%	0%
Zone 1	8%	0%	40%	29%	15%	0%	8%
Zone 2	10%	40%	0%	40%	0%	0%	10%
Zone 3	10%	30%	50%	0%	0%	0%	10%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	0%	0%	0%	0%	0%	0%	0%
Zone 6	5%	30%	35%	30%	0%	0%	0%

Notes (2035):

- Zone 5 (Toronto Islands) not included as visitation is analyzed seperatly

Proposed O/D (by Zone) - Cityside Visitation 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	18%	47%	20%	15%	0%	0%
Zone 1	8%	0%	40%	29%	15%	0%	8%
Zone 2	10%	40%	0%	40%	0%	0%	10%
Zone 3	10%	30%	50%	0%	0%	0%	10%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	0%	0%	0%	0%	0%	0%	0%
Zone 6	5%	30%	35%	30%	0%	0%	0%

Notes (2050):

- Zone 5 (Toronto Islands) not included as visitation is analyzed seperatly

Number of Peak Monthly Trips by Zone Check - Cityside Visitation 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	6,525	10,875	4,350	-	-	-
Zone 1	5,956	-	29,781	17,869	-	-	5,956
Zone 2	11,913	47,650	-	47,650	-	-	11,913
Zone 3	1,985	5,956	9,927	-	-	-	1,985
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	178	1,065	1,243	1,065	-	-	-

Number of Peak Monthly Trips by Zone Check - Cityside Visitation 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	4,050	10,575	4,500	3,375	-	-
Zone 1	4,064	-	20,321	14,733	7,620	-	4,064
Zone 2	12,701	50,802	-	50,802	-	-	12,701
Zone 3	5,395	16,186	26,976	-	-	-	5,395
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	227	1,363	1,590	1,363	-	-	-

Number of Peak Monthly Trips by Zone Check - Cityside Visitation 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	4,050	10,575	4,500	3,375	-	-
Zone 1	4,189	-	20,945	15,185	7,855	-	4,189
Zone 2	15,401	61,604	-	61,604	-	-	15,401
Zone 3	5,551	16,654	27,757	-	-	-	5,551
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	275	1,652	1,928	1,652	-	-	-

Proposed O/D (by Zone) - Toronto Islands 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	0%	0%	0%	0%	0%	0%
Zone 1	0%	0%	0%	0%	0%	0%	0%
Zone 2	0%	0%	0%	0%	0%	0%	0%
Zone 3	0%	0%	0%	0%	0%	0%	0%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	2%	18%	72%	8%	0%	0%	0%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Proposed O/D (by Zone) - Toronto Islands 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	0%	0%	0%	0%	0%	0%
Zone 1	0%	0%	0%	0%	0%	0%	0%
Zone 2	0%	0%	0%	0%	0%	0%	0%
Zone 3	0%	0%	0%	0%	0%	0%	0%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	2%	16%	72%	9%	1%	0%	0%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Proposed O/D (by Zone) - Toronto Islands 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	0%	0%	0%	0%	0%	0%
Zone 1	0%	0%	0%	0%	0%	0%	0%
Zone 2	0%	0%	0%	0%	0%	0%	0%
Zone 3	0%	0%	0%	0%	0%	0%	0%
Zone 4	0%	0%	0%	0%	0%	0%	0%
Zone 5	2%	15%	72%	8%	2%	0%	0%
Zone 6	0%	0%	0%	0%	0%	0%	0%

Number of Peak Monthly Trips by Zone Check - Toronto Islands 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	5,712	50,405	206,205	23,925	282	-	-
Zone 6	-	-	-	-	-	-	-

Number of Peak Monthly Trips by Zone Check - Toronto Islands 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	7,781	59,582	263,326	33,262	2,628	-	-
Zone 6	-	-	-	-	-	-	-

Number of Peak Monthly Trips by Zone Check - Toronto Islands 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	8,917	67,586	319,440	37,704	10,880	-	-
Zone 6	-	-	-	-	-	-	-

Total Trips 2023 - unidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	
Zone 0	-	6,798	11,330	4,532	-	-	-	22,659
Zone 1	8,844	-	61,548	38,084	-	-	8,844	117,320
Zone 2	12,530	53,206	-	53,206	-	-	12,530	131,472
Zone 3	2,642	11,207	16,491	-	-	-	2,642	32,981
Zone 4	-	-	-	-	-	-	-	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37	287,271
Zone 6	178	1,065	1,243	1,065	-	-	-	3,550
	29,943	122,829	297,261	120,886	282	-	24,053	595,254

Total Trips 2035 - unidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	
Zone 0	-	4,050	10,575	4,500	3,375	-	-	22,500
Zone 1	10,401	-	77,357	59,094	20,295	-	10,401	177,548
Zone 2	14,407	59,337	-	54,216	17,070	-	16,114	161,145
Zone 3	10,642	42,421	58,458	-	36,729	-	10,642	158,892
Zone 4	-	9,603	24,006	14,404	-	-	-	48,013
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74	368,063
Zone 6	227	1,363	1,590	1,363	-	-	-	4,542
	43,534	176,652	436,202	166,987	80,097	-	37,232	940,702

Total Trips 2050 - unidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	
Zone 0	-	4,050	10,575	4,500	3,375	-	-	22,500
Zone 1	13,695	-	87,487	53,209	74,396	-	13,695	242,483
Zone 2	21,670	92,950	-	74,143	62,692	-	27,939	279,394
Zone 3	14,121	59,501	79,174	-	59,986	-	14,121	226,903
Zone 4	-	99,036	247,590	148,554	-	-	-	495,180
Zone 5	9,029	68,031	320,775	37,927	10,880	-	111	446,753
Zone 6	275	1,652	1,928	1,652	-	-	-	5,508
	58,790	325,221	747,529	319,985	211,329	-	55,867	1,718,721

Total Trips 2023 - bidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	15,642	23,860	7,174	-	5,749	178
Zone 1	15,642	-	114,754	49,291	-	50,553	9,909
Zone 2	23,860	114,754	-	69,697	-	206,651	13,772
Zone 3	7,174	49,291	69,697	-	-	23,999	3,707
Zone 4	-	-	-	-	-	282	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37
Zone 6	178	9,909	13,772	3,707	-	37	-

Total Trips 2035 - bidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	14,451	24,982	15,142	3,375	7,855	227
Zone 1	14,451	-	136,693	101,514	29,897	59,879	11,764
Zone 2	24,982	136,693	-	112,674	41,076	264,216	17,704
Zone 3	15,142	101,514	112,674	-	51,133	33,411	12,005
Zone 4	3,375	29,897	41,076	51,133	-	2,628	-
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74
Zone 6	227	11,764	17,704	12,005	-	74	-

Total Trips 2050 - bidirectional

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	17,745	32,245	18,621	3,375	9,029	275
Zone 1	17,745	-	180,437	112,711	173,432	68,031	15,347
Zone 2	32,245	180,437	-	153,316	310,282	320,775	29,867
Zone 3	18,621	112,711	153,316	-	208,540	37,927	15,773
Zone 4	3,375	173,432	310,282	208,540	-	10,880	-
Zone 5	9,029	68,031	320,775	37,927	10,880	-	111
Zone 6	275	15,347	29,867	15,773	-	111	-

50% **Capturable Mode Share**

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	5,749	89
Zone 1	7,821	-	57,377	24,645	-	50,553	4,955
Zone 2	11,930	57,377	-	34,848	-	206,651	6,886
Zone 3	3,587	24,645	34,848	-	-	23,999	1,853
Zone 4	-	-	-	-	-	282	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37
Zone 6	89	4,955	6,886	1,853	-	37	-

*100% capture rate to apply to island zone

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	7,855	114
Zone 1	7,226	-	68,347	50,757	14,949	59,879	5,882
Zone 2	12,491	68,347	-	56,337	20,538	264,216	8,852
Zone 3	7,571	50,757	56,337	-	25,566	33,411	6,002
Zone 4	1,688	14,949	20,538	25,566	-	2,628	-
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74
Zone 6	114	5,882	8,852	6,002	-	74	-

*100% capture rate to apply to island zone

Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	9,029	138
Zone 1	8,873	-	90,219	56,355	86,716	68,031	7,674
Zone 2	16,123	90,219	-	76,658	155,141	320,775	14,934
Zone 3	9,310	56,355	76,658	-	104,270	37,927	7,887
Zone 4	1,688	86,716	155,141	104,270	-	10,880	-
Zone 5	4,514	68,031	320,775	37,927	10,880	-	111
Zone 6	138	7,674	14,934	7,887	-	111	-

*100% capture rate to apply to island zone

Toronto Islands OD

cityside origin is totally independent of where people want to go to on the island
1 split for Toronto Islands 15/70/15 (Hanlan's, Centre Island, Ward's)

2023 - Assigning trips from along waterfront and transiting through waterfront

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Notes
Along Waterfront	2%	67%	14%	15%	2%		0%	based on % of residents + employees in each zone, changes on study horizons as more development occurs on the waterfront
Transiting	2%	15%	75%	8%	0%		0%	assumption based on major regional transportation connections
Along Waterfront	268	9,574	2,053	2,149	282	-	-	
Transiting	5,444	40,830	204,152	21,776	-	-	-	
Total Trips	5,712	50,405	206,205	23,925	282	-	-	286,529
Weighted %	2%	18%	72%	8%	0%	0%	0%	

2035 - Assigning trips from along waterfront and transiting through waterfront

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Notes
Along Waterfront	4%	40%	12%	29%	14%		0%	based on % of residents + employees in each zone, changes on study horizons as more development occurs on the waterfront
Transiting	2%	15%	75%	8%	0%		0%	assumption based on major regional transportation connections
Along Waterfront	816	7,345	2,138	5,402	2,628	-	-	
Transiting	6,965	52,238	261,188	27,860	-	-	-	
Total Trips	7,781	59,582	263,326	33,262	2,628	-	-	366,579
Weighted %	2%	16%	72%	9%	1%	0%	0%	

2050 - Assigning trips from along waterfront and transiting through waterfront

	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6	Notes
Along Waterfront	2%	19%	12%	18%	49%		0%	based on % of residents + employees in each zone, changes on study horizons as more development occurs on the waterfront
Transiting	2%	15%	75%	8%	0%		0%	assumption based on major regional transportation connections
Along Waterfront	471	4,241	2,714	3,920	10,880	-	-	
Transiting	8,446	63,345	316,726	33,784	-	-	-	
Total Trips	8,917	67,586	319,440	37,704	10,880	-	-	444,527
Weighted %	2%	15%	72%	8%	2%	0%	0%	

Appendix E – Datasets Sources and Notes

Datasets Used for Water Taxi and Sea Bus Feasibility Study

Dataset	Data Source	Notes/Limitations
Landside Development (2023, 2035, and 2050)	Waterfront Toronto (Provided November 2, 2023) + City of Toronto + CreateTO	This dataset included assumptions for residents, jobs, and visitation data along the waterfront for final build-out.
Daily Passenger Counts (2016-2022)	City of Toronto	This dataset includes passenger counts (via ticket sales at JLFT) for City of Toronto ferry services. Data is provided as daily counts and is not separate by vessel, destination, or time of day.
Water Taxi Operations	Various water taxi operations (collected in one-on-one interviews)	One-on-one interviews were conducted with the operators of the water taxi services to understand the demand for these services.
Waterfront Visitor Summary 2022	Waterfront BIA (January 2023)	This study uses Environics MobileScapes Mobile Movement Data to understand visitation to the Waterfront between boundaries of Eireann Quay to Cherry Street and from Lake Shore Boulevard to the waterfront. This data was collected from January to October 2022 and excluded people who work or live in the area boundaries.
Commercial Tour, Charter, and Water Taxi Survey – 2019 and 2022	Waterfront BIA (June 2023 draft)	This study is based on data provided by five water taxi operators and estimates provided by one water taxi

Dataset	Data Source	Notes/Limitations
		operator. Data is aggregated to total passengers and was used to confirm information verbally provided in water taxi operator interviews conducted as part of this study.
Transportation Tomorrow Survey (TTS) 2016	University of Toronto Data Management Group	The Ministry of Transportation of Ontario (MTO), Metrolinx, TTC, and GTHA municipalities are jointly undertaking the TTS 2023 update; this updated dataset is not available at the time of this study. The TTS dataset only collected information on weekday trips, therefore only considering typical daily activities and not accounting for tourism activity. This dataset was used for resident and employee trips.

Appendix F – Detailed Loading Tables

ROUTE A

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	5,749	89
Zone 1	7,821	-	57,377	24,645	-	50,553	4,955
Zone 2	11,930	57,377	-	34,848	-	206,651	6,886
Zone 3	3,587	24,645	34,848	-	-	23,999	1,853
Zone 4	-	-	-	-	-	282	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37
Zone 6	89	4,955	6,886	1,853	-	37	-

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	7,855	114
Zone 1	7,226	-	68,347	50,757	14,949	59,879	5,882
Zone 2	12,491	68,347	-	56,337	20,538	264,216	8,852
Zone 3	7,571	50,757	56,337	-	25,566	33,411	6,002
Zone 4	1,688	14,949	20,538	25,566	-	2,628	-
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74
Zone 6	114	5,882	8,852	6,002	-	74	-

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Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	9,029	138
Zone 1	8,873	-	90,219	56,355	86,716	68,031	7,674
Zone 2	16,123	90,219	-	76,658	155,141	320,775	14,934
Zone 3	9,310	56,355	76,658	-	104,270	37,927	7,887
Zone 4	1,688	86,716	155,141	104,270	-	10,880	-
Zone 5	4,514	68,031	320,775	37,927	10,880	-	111
Zone 6	138	7,674	14,934	7,887	-	111	-

Route A - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	-	-
Zone 1	1	-	1	1	1	-	-
Zone 2	1	1	-	1	1	-	-
Zone 3	1	1	1	-	1	-	-
Zone 4	1	1	1	1	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	-	-
Zone 1	1	-	1	1	1	-	-
Zone 2	1	1	-	1	1	-	-
Zone 3	1	1	1	-	1	-	-
Zone 4	1	1	1	1	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	-	-
Zone 1	1	-	1	1	1	-	-
Zone 2	1	1	-	1	1	-	-
Zone 3	1	1	1	-	1	-	-
Zone 4	1	1	1	1	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route A - 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	782	1,193	359	-	-	-
Zone 1	782	-	5,738	2,465	-	-	-
Zone 2	1,193	5,738	-	3,485	-	-	-
Zone 3	359	2,465	3,485	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	723	1,249	757	169	-	-
Zone 1	723	-	6,835	5,076	1,495	-	-
Zone 2	1,249	6,835	-	5,634	2,054	-	-
Zone 3	757	5,076	5,634	-	2,557	-	-
Zone 4	169	1,495	2,054	2,557	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	887	1,612	931	169	-	-
Zone 1	887	-	9,022	5,636	8,672	-	-
Zone 2	1,612	9,022	-	7,666	15,514	-	-
Zone 3	931	5,636	7,666	-	10,427	-	-
Zone 4	169	8,672	15,514	10,427	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route A - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island
Eastbound	Boarding	2,334	8,202	3,485		
	Alighting		782	6,931	6,308	
	Loading (by leg)	2,334	9,754	6,308	-	
		Villiers Island	Parliament Slip	Yonge Slip	Portland Slip	Ontario Place
Westbound	Boarding		6,308	6,931	782	
	Alighting			3,485	8,202	2,334
	Loading (by leg)		6,308	9,754	2,334	-

Route A - 2035 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island
Eastbound	Boarding	2,898	13,405	7,688	2,557	
	Alighting		723	8,084	11,467	6,274
	Loading (by leg)	2,898	15,580	15,184	6,274	-
		Villiers Island	Parliament Slip	Yonge Slip	Portland Slip	Ontario Place
Westbound	Boarding	6,274	11,467	8,084	723	
	Alighting		2,557	7,688	13,405	2,898
	Loading (by leg)	6,274	15,184	15,580	2,898	-

Route A - 2050 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island
Eastbound	Boarding	3,599	23,329	23,180	10,427	
	Alighting		887	10,634	14,232	34,781
	Loading (by leg)	3,599	26,041	38,587	34,781	-
		Villiers Island	Parliament Slip	Yonge Slip	Portland Slip	Ontario Place
Westbound	Boarding	34,781	14,232	10,634	887	
	Alighting		10,427	23,180	23,329	3,599
	Loading (by leg)	34,781	38,587	26,041	3,599	0

ROUTE B **Island Visitation** 0.15 represents island visitation for Wards (15%)

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	862	89
Zone 1	7,821	-	57,377	24,645	-	7,583	4,955
Zone 2	11,930	57,377	-	34,848	-	30,998	6,886
Zone 3	3,587	24,645	34,848	-	-	3,600	1,853
Zone 4	-	-	-	-	-	42	-
Zone 5	862	7,583	30,998	3,600	42	#VALUE!	6
Zone 6	89	4,955	6,886	1,853	-	6	-

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	1,178	114
Zone 1	7,226	-	68,347	50,757	14,949	8,982	5,882
Zone 2	12,491	68,347	-	56,337	20,538	39,632	8,852
Zone 3	7,571	50,757	56,337	-	25,566	5,012	6,002
Zone 4	1,688	14,949	20,538	25,566	-	394	-
Zone 5	1,178	8,982	39,632	5,012	394	#VALUE!	11
Zone 6	114	5,882	8,852	6,002	-	11	-

Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	1,354	138
Zone 1	8,873	-	90,219	56,355	86,716	10,205	7,674
Zone 2	16,123	90,219	-	76,658	155,141	48,116	14,934
Zone 3	9,310	56,355	76,658	-	104,270	5,689	7,887
Zone 4	1,688	86,716	155,141	104,270	-	1,632	-
Zone 5	677	10,205	48,116	5,689	1,632	#VALUE!	17
Zone 6	138	7,674	14,934	7,887	-	17	-

Route B - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	-	1	-	1	1
Zone 1	1	-	-	1	-	1	1
Zone 2	-	-	-	-	-	-	-
Zone 3	1	1	-	-	-	1	1
Zone 4	-	-	-	-	-	-	-
Zone 5	1	1	-	1	-	-	1
Zone 6	1	1	-	1	-	1	-

Route B - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	-	1	-	1	1
Zone 1	1	-	-	1	-	1	1
Zone 2	-	-	-	-	-	-	-
Zone 3	1	1	-	-	-	1	1
Zone 4	-	-	-	-	-	-	-
Zone 5	1	1	-	1	-	-	1
Zone 6	1	1	-	1	-	1	-

Route B - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	-	1	-	1	1
Zone 1	1	-	-	1	-	1	1
Zone 2	-	-	-	-	-	-	-
Zone 3	1	1	-	-	-	1	1
Zone 4	-	-	-	-	-	-	-
Zone 5	1	1	-	1	-	-	1
Zone 6	1	1	-	1	-	1	-

Route B - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route B - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route B - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route B - 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	782	-	359	-	86	9
Zone 1	782	-	-	2,465	-	758	495
Zone 2	-	-	-	-	-	-	-
Zone 3	359	2,465	-	-	-	360	185
Zone 4	-	-	-	-	-	-	-
Zone 5	86	758	-	360	-	-	1
Zone 6	9	495	-	185	-	1	-

Route B - 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	723	-	757	-	118	11
Zone 1	723	-	-	5,076	-	898	588
Zone 2	-	-	-	-	-	-	-
Zone 3	757	5,076	-	-	-	501	600
Zone 4	-	-	-	-	-	-	-
Zone 5	118	898	-	501	-	-	1
Zone 6	11	588	-	600	-	1	-

Route B - 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	887	-	931	-	135	14
Zone 1	887	-	-	5,636	-	1,020	767
Zone 2	-	-	-	-	-	-	-
Zone 3	931	5,636	-	-	-	569	789
Zone 4	-	-	-	-	-	-	-
Zone 5	68	1,020	-	569	-	-	2
Zone 6	14	767	-	789	-	2	-

Route B - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Parliament Slip**	**Ward's Island**	**Outer Harbour**
Eastbound	**Boarding**	1,236	3,718	545	1	
	Alighting		782	2,823	1,205	690
	Loading (by leg)	1,236	4,172	1,894	690	-
		Outer Harbour	**Ward's Island**	**Parliament Slip**	**Portland Slip**	**Ontario Place**
Westbound	**Boarding**	690	1,205	2,823	782	
	Alighting		1	545	3,718	1,236
	Loading (by leg)	690	1,894	4,172	1,236	-

Route B - 2035 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Parliament Slip**	**Ward's Island**	**Outer Harbour**
Eastbound	**Boarding**	1,609	6,562	1,101	1	
	Alighting		723	5,833	1,517	1,201
	Loading (by leg)	1,609	7,448	2,717	1,201	-
		Outer Harbour	**Ward's Island**	**Parliament Slip**	**Portland Slip**	**Ontario Place**
Westbound	**Boarding**	1,201	1,517	5,833	723	
	Alighting		1	1,101	6,562	1,609
	Loading (by leg)	1,201	2,717	7,448	1,609	0

Route B - 2050 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Parliament Slip**	**Ward's Island**	**Outer Harbour**
Eastbound	**Boarding**	1,967	7,423	1,358	2	
	Alighting		887	6,567	1,725	1,571
	Loading (by leg)	1,967	8,504	3,295	1,571	-
		Outer Harbour	**Ward's Island**	**Parliament Slip**	**Portland Slip**	**Ontario Place**
Westbound	**Boarding**	1,571	1,657	6,567	887	
	Alighting		2	1,358	7,423	1,900
	Loading (by leg)	1,571	3,227	8,436	1,900	-

ROUTE C

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	5,749	89
Zone 1	7,821	-	57,377	24,645	-	50,553	4,955
Zone 2	11,930	57,377	-	34,848	-	206,651	6,886
Zone 3	3,587	24,645	34,848	-	-	23,999	1,853
Zone 4	-	-	-	-	-	282	-
Zone 5	5,749	50,553	206,651	23,999	282	-	37
Zone 6	89	4,955	6,886	1,853	-	37	-

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	7,855	114
Zone 1	7,226	-	68,347	50,757	14,949	59,879	5,882
Zone 2	12,491	68,347	-	56,337	20,538	264,216	8,852
Zone 3	7,571	50,757	56,337	-	25,566	33,411	6,002
Zone 4	1,688	14,949	20,538	25,566	-	2,628	-
Zone 5	7,855	59,879	264,216	33,411	2,628	-	74
Zone 6	114	5,882	8,852	6,002	-	74	-

Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	9,029	138
Zone 1	8,873	-	90,219	56,355	86,716	68,031	7,674
Zone 2	16,123	90,219	-	76,658	155,141	320,775	14,934
Zone 3	9,310	56,355	76,658	-	104,270	37,927	7,887
Zone 4	1,688	86,716	155,141	104,270	-	10,880	-
Zone 5	4,514	68,031	320,775	37,927	10,880	-	111
Zone 6	138	7,674	14,934	7,887	-	111	-

Route C - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	-	-	-	-
Zone 1	1	-	1	-	-	-	-
Zone 2	1	1	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	-	-	-	-
Zone 1	1	-	1	-	-	-	-
Zone 2	1	1	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	-	-	-	-
Zone 1	1	-	1	-	-	-	-
Zone 2	1	1	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route C - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route C - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route C - 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	782	1,193	-	-	-	-
Zone 1	782	-	5,738	-	-	-	-
Zone 2	1,193	5,738	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	723	1,249	-	-	-	-
Zone 1	723	-	6,835	-	-	-	-
Zone 2	1,249	6,835	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	887	1,612	-	-	-	-
Zone 1	887	-	9,022	-	-	-	-
Zone 2	1,612	9,022	-	-	-	-	-
Zone 3	-	-	-	-	-	-	-
Zone 4	-	-	-	-	-	-	-
Zone 5	-	-	-	-	-	-	-
Zone 6	-	-	-	-	-	-	-

Route C - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Yonge Slip**		
Eastbound	**Boarding**	1,975	5,738	-		
	Alighting		782	6,931		
	Loading (by leg)	1,975	6,931	-		
		Yonge Slip	**Portland Slip**	**Ontario Place**		
Westbound	**Boarding**	6,931	782	-		
	Alighting		5,738	1,975		
	Loading (by leg)	6,931	1,975	-		

Route C - 2035 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Yonge Slip**		
Eastbound	**Boarding**	1,972	6,835	-		
	Alighting		723	8,084		
	Loading (by leg)	1,972	8,084	-		
		Yonge Slip	**Portland Slip**	**Ontario Place**		
Westbound	**Boarding**	8,084	723	-		
	Alighting		6,835	1,972		
	Loading (by leg)	8,084	1,972	-		

Route C - 2050 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5
		Ontario Place	**Portland Slip**	**Yonge Slip**		
Eastbound	**Boarding**	2,500	9,022	-		
	Alighting		887	10,634		
	Loading (by leg)	2,500	10,634	-		
		Yonge Slip	**Portland Slip**	**Ontario Place**		
Westbound	**Boarding**	10,634	887	-		
	Alighting		9,022	2,500		
	Loading (by leg)	10,634	2,500	-		

ROUTE D

Island Visitation 0.3 represents island visitation for Hanlan's and Wards (30% total, 15% each)

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	1,725	89
Zone 1	7,821	-	57,377	24,645	-	15,166	4,955
Zone 2	11,930	57,377	-	34,848	-	61,995	6,886
Zone 3	3,587	24,645	34,848	-	-	7,200	1,853
Zone 4	-	-	-	-	-	85	-
Zone 5	1,725	15,166	61,995	7,200	85	-	11
Zone 6	89	4,955	6,886	1,853	-	11	-

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	2,357	114
Zone 1	7,226	-	68,347	50,757	14,949	17,964	5,882
Zone 2	12,491	68,347	-	56,337	20,538	79,265	8,852
Zone 3	7,571	50,757	56,337	-	25,566	10,023	6,002
Zone 4	1,688	14,949	20,538	25,566	-	788	-
Zone 5	2,357	17,964	79,265	10,023	788	-	22
Zone 6	114	5,882	8,852	6,002	-	22	-

Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	2,709	138
Zone 1	8,873	-	90,219	56,355	86,716	20,409	7,674
Zone 2	16,123	90,219	-	76,658	155,141	96,233	14,934
Zone 3	9,310	56,355	76,658	-	104,270	11,378	7,887
Zone 4	1,688	86,716	155,141	104,270	-	3,264	-
Zone 5	1,354	20,409	96,233	11,378	3,264	-	33
Zone 6	138	7,674	14,934	7,887	-	33	-

Route D - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	1	1
Zone 1	1	-	1	1	1	1	1
Zone 2	1	1	-	1	1	1	1
Zone 3	1	1	1	-	1	1	1
Zone 4	1	1	1	1	-	1	1
Zone 5	1	1	1	1	1	-	1
Zone 6	1	1	1	1	1	1	-

Route D - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	1	1
Zone 1	1	-	1	1	1	1	1
Zone 2	1	1	-	1	1	1	1
Zone 3	1	1	1	-	1	1	1
Zone 4	1	1	1	1	-	1	1
Zone 5	1	1	1	1	1	-	1
Zone 6	1	1	1	1	1	1	-

Route D - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	1	1	1	1	1	1
Zone 1	1	-	1	1	1	1	1
Zone 2	1	1	-	1	1	1	1
Zone 3	1	1	1	-	1	1	1
Zone 4	1	1	1	1	-	1	1
Zone 5	1	1	1	1	1	-	1
Zone 6	1	1	1	1	1	1	-

Route D - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route D - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route D - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route D - 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	782	1,193	359	-	172	9
Zone 1	782	-	5,738	2,465	-	1,517	495
Zone 2	1,193	5,738	-	3,485	-	6,200	689
Zone 3	359	2,465	3,485	-	-	720	185
Zone 4	-	-	-	-	-	8	-
Zone 5	172	1,517	6,200	720	8	-	1
Zone 6	9	495	689	185	-	1	-

Route D - 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	723	1,249	757	169	236	11
Zone 1	723	-	6,835	5,076	1,495	1,796	588
Zone 2	1,249	6,835	-	5,634	2,054	7,926	885
Zone 3	757	5,076	5,634	-	2,557	1,002	600
Zone 4	169	1,495	2,054	2,557	-	79	-
Zone 5	236	1,796	7,926	1,002	79	-	2
Zone 6	11	588	885	600	-	2	-

Route D - 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	887	1,612	931	169	271	14
Zone 1	887	-	9,022	5,636	8,672	2,041	767
Zone 2	1,612	9,022	-	7,666	15,514	9,623	1,493
Zone 3	931	5,636	7,666	-	10,427	1,138	789
Zone 4	169	8,672	15,514	10,427	-	326	-
Zone 5	135	2,041	9,623	1,138	326	-	3
Zone 6	14	767	1,493	789	-	3	-

Route D - 2023 (Detailed Zones)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 6	Zone 5-W	Zone 5-M
Zone 0	-	782	1,193	359	-	9	86	86
Zone 1	782	-	5,738	2,465	-	495	758	758
Zone 2	1,193	5,738	-	3,485	-	689	3,100	3,100
Zone 3	359	2,465	3,485	-	-	185	360	360
Zone 4	-	-	-	-	-	-	4	4
Zone 6	9	495	689	185	-	-	1	1
Zone 5-W	86	758	3,100	360	4	1	-	-
Zone 5-M	86	758	3,100	360	4	1	-	-

Route D - 2035 (Detailed Zones)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 6	Zone 5-W	Zone 5-M
Zone 0	-	723	1,249	757	169	11	118	118
Zone 1	723	-	6,835	5,076	1,495	588	898	898
Zone 2	1,249	6,835	-	5,634	2,054	885	3,963	3,963
Zone 3	757	5,076	5,634	-	2,557	600	501	501
Zone 4	169	1,495	2,054	2,557	-	-	39	39
Zone 6	11	588	885	600	-	-	1	1
Zone 5-W	118	898	3,963	501	39	1	-	-
Zone 5-M	118	898	3,963	501	39	1	-	-

Route D - 2050 (Detailed Zones)

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 6	Zone 5-W	Zone 5-M
Zone 0	-	887	1,612	931	169	14	135	135
Zone 1	887	-	9,022	5,636	8,672	767	1,020	1,020
Zone 2	1,612	9,022	-	7,666	15,514	1,493	4,812	4,812
Zone 3	931	5,636	7,666	-	10,427	789	569	569
Zone 4	169	8,672	15,514	10,427	-	-	163	163
Zone 6	14	767	1,493	789	-	-	2	2
Zone 5-W	68	1,020	4,812	569	163	2	-	-
Zone 5-M	68	1,020	4,812	569	163	2	-	-

CONCEPTUAL MATRIX

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place		CW	CW	CW	CW	CCW	CCW	CCW
Portland Slip	CCW		CW	CW	CW	CW	CCW	CCW
Yonge Slip	CCW	CCW		CW	CW	CW	CW	CCW
Parliament Slip	CCW	CCW	CCW		CW	CW	CW	CCW
Villiers Island	CCW	CCW	CCW	CCW		CW	CW	CW
Outer Harbour	CW	CCW	CCW	CCW	CCW		CW	CW
Ward's Island	CW	CW	CCW	CCW	CCW	CCW		CW
M8 - Manitou Beach	CW	CW	CW	CW	CCW	CCW	CCW	

LEG: ONTARIO PLACE TO PORTLAND - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place		1	1	1	1			
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour								
Ward's Island		1						
M8 - Manitou Beach		1	1	1				

LEG: ONTARIO PLACE TO M8 Manitou Beach - COUNTERLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place						1	1	1
Portland Slip							1	1
Yonge Slip								1
Parliament Slip								1
Villiers Island								
Outer Harbour								
Ward's Island								
M8 - Manitou Beach								

LEG: PORTLAND TO YONGE - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place			1	1	1			
Portland Slip			1	1	1	1		
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour								
Ward's Island								
M8 - Manitou Beach			1	1				

LEG: MANITOU TO WARDS - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place						1	1	
Portland Slip							1	
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour								
Ward's Island								
M8 - Manitou Beach					1	1	1	

LEG: YONGE TO PARLIAMENT - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place				1	1			
Portland Slip				1	1	1		
Yonge Slip				1	1	1	1	
Parliament Slip								
Villiers Island								
Outer Harbour								
Ward's Island								
M8 - Manitou Beach				1				

LEG: M8 WARDS TO OUTER HARBOUR - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place						1		
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour								
Ward's Island			1	1	1	1		
M8 - Manitou Beach					1	1		

LEG: PARLIAMENT TO VILLIERS - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place					1			
Portland Slip					1	1		
Yonge Slip					1	1	1	
Parliament Slip					1	1	1	
Villiers Island								
Outer Harbour								
Ward's Island								
M8 - Manitou Beach								

LEG: OUTER HARBOUR TO VILLIERS - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour		1	1	1	1			
Ward's Island			1	1	1			
M8 - Manitou Beach					1			

LEG: VILLIERS TO OUTER HARBOUR - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip						1		
Yonge Slip						1	1	
Parliament Slip						1	1	
Villiers Island						1	1	1
Outer Harbour								
Ward's Island								
M8 - Manitou Beach								

LEG: VILLIERS TO PARLIAMENT - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island	1	1	1	1				
Outer Harbour		1	1	1				
Ward's Island			1	1				
M8 - Manitou Beach								

LEG: OUTER HARBOUR TO WARDS - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip							1	
Parliament Slip							1	
Villiers Island							1	1
Outer Harbour	1						1	1
Ward's Island								
M8 - Manitou Beach								

LEG: PARLIAMENT TO YONGE - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip								
Parliament Slip	1	1	1					1
Villiers Island	1	1	1					
Outer Harbour		1	1					
Ward's Island			1					
M8 - Manitou Beach								

LEG: WARDS TO MANITOU - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island								1
Outer Harbour	1							1
Ward's Island	1	1						1
M8 - Manitou Beach								

LEG: YONGE TO PORTLAND - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip	1	1						1
Parliament Slip	1	1						1
Villiers Island	1	1						
Outer Harbour		1						
Ward's Island								
M8 - Manitou Beach								

LEG: MANITOU TO ONTARIO PLACE - CLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip								
Yonge Slip								
Parliament Slip								
Villiers Island								
Outer Harbour	1							
Ward's Island	1	1						
M8 - Manitou Beach	1	1	1	1				

LEG: PORTLAND TO ONTARIO PLACE - COUNTERCLOCKWISE

From ↓ To →	Ontario Place	Portland Slip	Yonge Slip	Parliament Slip	Villiers Island	Outer Harbour	Ward's Island	M8 - Manitou Beach
Ontario Place								
Portland Slip	1						1	1
Yonge Slip	1							1
Parliament Slip	1							1
Villiers Island	1							
Outer Harbour								
Ward's Island								
M8 - Manitou Beach								

2023

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5	Stop 6	Stop 7	Stop 8	Stop 9
		Ontario Place	**Portland Slip**	**Yonge Slip**	**Parliament Slip**	**Villiers Island**	**Outer Harbour**	**Ward's Island**	**M8 - Manitou Beach**	**Ontario Place**
Eastbound (Clockwise)	**Boarding**	2,334	8,698	7,273	545	8	10	845	4,304	-
	Alighting	181	2,299	10,030	6,668	-	1,369	3,465	5	
	Loading (by leg)	7,310	13,709	10,952	4,829	4,838	3,478	858	5,158	
	Notes	Board - Zone 1,2,3,4 Alight - Zone 5,6	Board - Zone 2,3,4,6 Alight - Zone 0,5	Board - 3,4,6, Wards Alight - Hanlan's,	Board - 4,6, Wards Alight - Hanlan's, 0,1,2	Board -6, 5 Alight - 0,1,2,3	Board-5, 0 Alight - 1,2,3,4	Board-Hanlans, OP Alight - 1,2,3,4,6	Board-OP, Zone 1,2,3 Alight - 1,2,3,4,6	
		Ontario Place	**M8 - Manitou Beach**	**Ward's Island**	**Outer Harbour**	**Villiers Island**	**Parliament Slip**	**Yonge Slip**	**Portland Slip**	**Ontario Place**
Westbound (Counterclockwise)	**Boarding**	181	5	3,465	1,369	-	6,668	10,030	2,299	
	Alighting	2,334	4,304	845	10	8	545	7,273	8,698	
	Loading (by leg)	5,158	858	3,478	4,838	4,829	10,952	13,709	7,310	
	Notes	Board - Zone 5,6 Alight - Zone 1,2,3,4	Board - Zone 6,4 (50% only from Hanlan's) Alight - Zone 3,2,1,0 (50% only to Hanlan's)	Board - 2,3,4,6 (50% only from Wards) Alight - 0,1 (50% only to Wards)	Board - 1,2,3,4 Alight - 0,5	Board -0,1,2,3 Alight - 6,5	Board - Hanlan's, 0,1,2 Alight - 4,6, Wards	Board - Hanlan's, 0,1 Alight - 3,4,6, Wards	Board - Zone 0,5 Alight - Zone 2,3,4,6	

2035

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5	Stop 6	Stop 7	Stop 8	Stop 9
		Ontario Place	**Portland Slip**	**Yonge Slip**	**Parliament Slip**	**Villiers Island**	**Outer Harbour**	**Ward's Island**	**M8 - Manitou Beach**	**Ontario Place**
Eastbound (Clockwise)	**Boarding**	2,898	13,993	12,536	3,658	79	14	1,016	5,480	-
	Alighting	247	2,519	12,047	11,968	6,274	2,074	4,505	41	
	Loading (by leg)	9,158	20,633	21,122	12,812	6,617	4,557	1,068	6,508	
	Notes	1,2,3,4 Alight - Zone 5,6	2,3,4,6 Alight - Zone 0,5	Wards Alight - Hanlan's,	Alight - Hanlan's, 0,1,2	Board -6, 5 Alight - 0,1,2,3	Board-5, 0 Alight - 1,2,3,4	Board-Hanlans, OP Alight - 1,2,3,4,6	1,2,3 Alight - 1,2,3,4,6	
		Ontario Place	**M8 - Manitou Beach**	**Ward's Island**	**Outer Harbour**	**Villiers Island**	**Parliament Slip**	**Yonge Slip**	**Portland Slip**	**Ontario Place**
Westbound (Counterclockwise)	**Boarding**	247	41	4,505	2,074	6,274	11,968	12,047	2,519	
	Alighting	2,898	5,480	1,016	14	79	3,658	12,536	13,993	
	Loading (by leg)	6,508	1,068	4,557	6,617	12,812	21,122	20,633	9,158	
	Notes	Board - Zone 5,6 Alight - Zone 1,2,3,4	Board - Zone 6,4 (50% only from Hanlan's) Alight - Zone 3,2,1,0 (50% only to Hanlan's)	Board - 2,3,4,6 (50% only from Wards) Alight - 0,1 (50% only to Wards)	Board - 1,2,3,4 Alight - 0,5	Board -0,1,2,3 Alight - 6,5	Board - Hanlan's, 0,1,2 Alight - 4,6, Wards	Board - Hanlan's, 0,1 Alight - 3,4,6, Wards	Board - Zone 0,5 Alight - Zone 2,3,4,6	

2050

		Stop 1	Stop 2	Stop 3	Stop 4	Stop 5	Stop 6	Stop 7	Stop 8	Stop 9
		Ontario Place	**Portland Slip**	**Yonge Slip**	**Parliament Slip**	**Villiers Island**	**Outer Harbour**	**Ward's Island**	**M8 - Manitou Beach**	**Ontario Place**
Eastbound (Clockwise)	**Boarding**	3,599	24,096	29,485	11,785	326	17	1,088	6,469	-
	Alighting	149	2,928	15,446	14,801	34,781	3,049	5,545	165	
	Loading (by leg)	11,021	32,189	46,228	43,211	8,756	5,724	1,267	7,571	
	Notes	Board - Zone 1,2,3,4 Alight - Zone 5,6	Board - Zone 2,3,4,6 Alight - Zone 0,5	Wards Alight - Hanlan's, 0,1	Board - 4,6, Wards Alight - Hanlan's, 0,1,2	Board -6, 5 Alight - 0,1,2,3	Board-5, 0 Alight - 1,2,3,4	Board-Hanlans, OP Alight - 1,2,3,4,6	Board-OP, Zone 1,2,3 Alight - 1,2,3,4,6	
		Ontario Place	**M8 - Manitou Beach**	**Ward's Island**	**Outer Harbour**	**Villiers Island**	**Parliament Slip**	**Yonge Slip**	**Portland Slip**	**Ontario Place**
Westbound (Counterclockwise)	**Boarding**	285	165	5,545	3,049	34,781	14,801	15,446	2,928	
	Alighting	3,599	6,536	1,156	17	326	11,785	29,485	24,096	
	Loading (by leg)	7,706	1,335	5,724	8,756	43,211	46,228	32,189	11,021	
	Notes	Board - Zone 5,6 Alight - Zone 1,2,3,4	Board - Zone 6,4 (50% only from Hanlan's) Alight - Zone 3,2,1,0 (50% only to Hanlan's)	Board - 2,3,4,6 (50% only from Wards) Alight - 0,1 (50% only to Wards)	Board - 1,2,3,4 Alight - 0,5	Board -0,1,2,3 Alight - 6,5	Board - Hanlan's, 0,1,2 Alight - 4,6, Wards	Board - Hanlan's, 0,1 Alight - 3,4,6, Wards	Board - Zone 0,5 Alight - Zone 2,3,4,6	

ROUTE E **Island Visitation** 0.15 represents island visitation for Wards (15%)

Total Trips 2023 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,821	11,930	3,587	-	862	89
Zone 1	7,821	-	57,377	24,645	-	7,583	4,955
Zone 2	11,930	57,377	-	34,848	-	30,998	6,886
Zone 3	3,587	24,645	34,848	-	-	3,600	1,853
Zone 4	-	-	-	-	-	42	-
Zone 5	862	7,583	30,998	3,600	42	-	6
Zone 6	89	4,955	6,886	1,853	-	6	-

Total Trips 2035 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	7,226	12,491	7,571	1,688	1,178	114
Zone 1	7,226	-	68,347	50,757	14,949	8,982	5,882
Zone 2	12,491	68,347	-	56,337	20,538	39,632	8,852
Zone 3	7,571	50,757	56,337	-	25,566	5,012	6,002
Zone 4	1,688	14,949	20,538	25,566	-	394	-
Zone 5	1,178	8,982	39,632	5,012	394	-	11
Zone 6	114	5,882	8,852	6,002	-	11	-

Total Trips 2050 - Total Capturable Market

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	8,873	16,123	9,310	1,688	1,354	138
Zone 1	8,873	-	90,219	56,355	86,716	10,205	7,674
Zone 2	16,123	90,219	-	76,658	155,141	48,116	14,934
Zone 3	9,310	56,355	76,658	-	104,270	5,689	7,887
Zone 4	1,688	86,716	155,141	104,270	-	1,632	-
Zone 5	677	10,205	48,116	5,689	1,632	-	17
Zone 6	138	7,674	14,934	7,887	-	17	-

Route E - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	1	1	1	-
Zone 3	-	-	1	-	1	1	-
Zone 4	-	-	1	1	-	1	-
Zone 5	-	-	1	1	1	-	-
Zone 6	-	-	-	-	-	-	-

Route E - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	1	1	1	-
Zone 3	-	-	1	-	1	1	-
Zone 4	-	-	1	1	-	1	-
Zone 5	-	-	1	1	1	-	-
Zone 6	-	-	-	-	-	-	-

Route E - coding

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	1	1	1	-
Zone 3	-	-	1	-	1	1	-
Zone 4	-	-	1	1	-	1	-
Zone 5	-	-	1	1	1	-	-
Zone 6	-	-	-	-	-	-	-

Route E - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route E - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route E - Zone Capture Matrix

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	0%	10%	10%	10%	10%	10%	10%
Zone 1	10%	0%	10%	10%	10%	10%	10%
Zone 2	10%	10%	0%	10%	10%	10%	10%
Zone 3	10%	10%	10%	0%	10%	10%	10%
Zone 4	10%	10%	10%	10%	0%	10%	10%
Zone 5	10%	10%	10%	10%	10%	0%	10%
Zone 6	10%	10%	10%	10%	10%	10%	0%

Route E - 2023

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	3,485	-	3,100	-
Zone 3	-	-	3,485	-	-	360	-
Zone 4	-	-	-	-	-	4	-
Zone 5	-	-	3,100	360	4	-	-
Zone 6	-	-	-	-	-	-	-

Route E - 2035

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	5,634	2,054	3,963	-
Zone 3	-	-	5,634	-	2,557	501	-
Zone 4	-	-	2,054	2,557	-	39	-
Zone 5	-	-	3,963	501	39	-	-
Zone 6	-	-	-	-	-	-	-

Route E - 2050

Origin / Destination	Zone 0	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
Zone 0	-	-	-	-	-	-	-
Zone 1	-	-	-	-	-	-	-
Zone 2	-	-	-	7,666	15,514	4,812	-
Zone 3	-	-	7,666	-	10,427	569	-
Zone 4	-	-	15,514	10,427	-	163	-
Zone 5	-	-	4,812	569	163	-	-
Zone 6	-	-	-	-	-	-	-

Route E - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	
		Yonge Slip	**Parliament Slip**	**Villiers Island**	**Wards Island**	
	Boarding	6,585	360	4	-	
Eastbound	**Alighting**		3,485	-	3,464	
	Loading (by leg)	6,585	3,460	3,464	-	
		Wards Island	**Villiers Island**	**Parliament Slip**	**Yonge Slip**	
	Boarding	3,464	-	3,485	-	
Westbound	**Alighting**		4	360	6,585	
	Loading (by leg)	3,464	3,460	6,585	-	

Route E - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	
		Yonge Slip	**Parliament Slip**	**Villiers Island**	**Wards Island**	
	Boarding	11,651	3,058	39	-	
Eastbound	**Alighting**		5,634	4,610	4,504	
	Loading (by leg)	11,651	9,075	4,504	-	
		Yonge Slip	**Portland Slip**	**Ontario Place**		
	Boarding	4,504	4,610	5,634	-	
Westbound	**Alighting**		39	3,058	11,651	
	Loading (by leg)	4,504	9,075	11,651	-	

Route E - 2023 Loadings

		Stop 1	Stop 2	Stop 3	Stop 4	
		Yonge Slip	**Parliament Slip**	**Villiers Island**	**Wards Island**	
	Boarding	27,992	10,996	163	-	
Eastbound	**Alighting**		7,666	25,941	5,544	
	Loading (by leg)	27,992	31,322	5,544	-	
		Yonge Slip	**Portland Slip**	**Ontario Place**		
	Boarding	5,544	25,941	7,666	-	
Westbound	**Alighting**		163	10,996	27,992	
	Loading (by leg)	5,544	31,322	27,992	-	

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