



Irondequoit Bay Outlet Bridge Alternatives Analysis Study

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
1.0 PURPOSE + APPROACH	1
1.1 Purpose	1
1.2 Project History and Evolution	1
1.3 Study Area	1
1.4 Study Tasks	1
2.0 PUBLIC ENGAGEMENT + PARTICIPATION	3
2.1 Project Steering Committee	3
2.2 Public Outreach	4
2.3 Stakeholder Meetings	5
2.4 Public Survey	5
2.5 Project Objectives	5
2.6 Evaluation Criteria	6
3.0 EXISTING CONDITIONS	8
3.1 Land Uses	8
3.2 Existing Bridge	9
3.3 Existing Traffic Volumes and Patterns	10
3.4 Vessel Survey	12
3.5 Navigability	13
3.6 Irondequoit Bay Navigation Clearances	13
3.7 Environmental Resources	14
3.7.1 Endangered Species and Critical Environmental Areas	14
3.7.2 Ground Water	15
3.7.3 Surface Water	16
3.7.4 Federal and State Jurisdictional Wetlands	16
3.7.5 Floodplains	18
3.7.6 Historic / Cultural Resources	19
3.7.7 Hazardous Waste Sites	21
3.8 Economic Impact	22
4.0 DEVELOPMENT OF ALTERNATIVES	23
4.1 Unfeasible Alternatives	23
4.2 Feasible Alternatives	26
5.0 EVALUATION OF ALTERNATIVES	31
5.1 Scoring Method	
5.1.1 Evaluation Criteria 1: Improved Year Round Access	31
5.1.2 Evaluation Criteria 2: Emergency Access	41
5.1.3 Evaluation Criteria 3: Environmental Impacts	41
5.1.4 Evaluation Criteria 4: Impacts to Properties	47

5.1.5 Evaluation Criteria 5: Economic Impacts	52
5.1.6 Evaluation Criteria 6: Project Costs	53
5.1.7 Evaluation Criteria 7: Aesthetic Impacts	53
5.1.8 Evaluation Criteria 8: Operation and Maintenance Costs	54
5.1.9 Evaluation Criteria 9: Improved Access for Non-Motorized Users	55
5.1.10 Evaluation Criteria 10: Improved on Highway User Costs	55
5.1.11 Evaluation Criteria 11: Construction Elements	57
5.2 Alternative Scoring Summary	58

6.0 NEXT STEPS	61
6.1 Project Steering Committee	61
6.2 Ownership and Maintenance	61
6.3 Formally Adopt the Feasibility Study	61
6.4 Identify Funding Sources	62
6.5 Coordination with Impacted Property Owners	62

7.0 SUMMARY	63
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TABLES (Example numbering Chapter-sequential numbering: i.e. Table 3-1)

2. Public Engagement + Participation	3
2-1 Ranking of Alternatives Analysis Criteria.....	7
3. Existing Conditions	8
3-1 Average Daily Traffic Volumes	11
3-2 Origins and Designations of IBOB Traffic.....	12
3-3 Irondequoit Bay Vessel Sizes.....	12
4. Development of Alternatives	23
4-1 Overall Lengths of Fixed Bridge Options.....	24
5. Evaluation of Alternatives	31
5-1 Project Costs	53
5-2 Operation and Maintenance Cost Summary	54
5-3 Alternative Scoring Summary	58

FIGURES (Example numbering Chapter-sequential numbering: i.e. Figure 4-1)

1. Purpose + Approach	1
1-1 Project Study Area.....	2
2. Public Engagement + Participation	3
3. Existing Conditions	8
3-1 Zoning Maps of Potential Project Locations	8
3-2 Existing Swing Bridge.....	10
3-3 Irondequoit Bay Navigation Chart	13
3-4 Primary Aquifers within the Project Area	16
3-5 Wetland Areas at Irondequoit Bay.....	17
3-6 Wetland Areas at Route 104 Connection.....	18
3-7 Flood Zones within the Project Area.....	19
3-8 Park Lands within the Project Area	20
3-9 Hazardous Waste Sites within the Project Area	21
3-10 Census Tracts	22
4. Development of Alternatives	23
4-1 Conceptual Layout of a Fixed Bridge with a 50-foot Under Clearance.....	25
4-2 Conceptual Layout of a Tunnel.....	26
4-3 Conceptual Layout of Retrofitting the Existing Bridge or a New Movable Bridge.....	27
4-4 Conceptual Layout of New Ramps at Irondequoit Bay Bridge.....	29
4-5 Conceptual Layout of Route 104 to Ridge Road Connection.....	30
5. Evaluation of Alternatives.....	31
5-1 East Side of Bridge – Weekday Queue Lengths.....	32
5-2 East Side of Bridge – Weekend Queue Lengths.....	33
5-3 West Side of Bridge – Weekday Queue Lengths	33
5-4 West Side of Bridge – Weekend Queue Lengths	34
5-5 Peak Hour – Weekend Queue Lengths	35
5-6 Peak Hour – Weekday Queue Lengths.....	35
5-7 Off Peak Hour – Weekend Queue Lengths	36

5-8 Off Peak Hour – Weekday Queue Lengths.....	36
5-9 Route 104 Ramp Connections to Sea Breeze Drive	37
5-10 Route 104 Ramp Connections to Sea Breeze Drive	38
5-11 Route 104 to Ridge Road Connection.....	39
5-12 Route 104 Westbound to Sea Breeze Drive Northbound.....	39
5-13 Sea Breeze Drive Southbound to Route 104 Eastbound	40
5-14 Alternative B and D Partial Acquisitions	47
5-15 Alternative C Total Property Acquisitions	50
5-16 Alternative C Partial Property Acquisitions.....	51
5-17 Approximate Travel Times – Northern Route.....	56
5-18 Approximate Travel Times – Southern Route.....	57

APPENDICES

- A. Public Meetings & Outreach Material
- B. Alternative Scoring Sheets



Executive Summary

The purpose of this study is to explore options to provide year-round access across the Bay Outlet, creating a better regional transportation system for all modes of travel. This feasibility study assesses whether any reasonable design solutions are available to provide year round access to all travelers, including vehicles, boats, bicycles and pedestrians while preserving the Irondequoit Bay's ability to serve as a safe harbor. Potential design alternatives were evaluated within the study area surrounding Irondequoit Bay.



Although the Town of Irondequoit was the lead municipality, a Project Steering Committee (PSC) was established and coordination with the PSC, as well as the public, occurred throughout the duration of the study. The PSC, served as the primary decision-making body providing guidance on key components of this study that were used to progress each task. The PSC provided input on project alternatives, community needs, and evaluation criteria used to rank each alternative. Project information was also presented to the public to obtain their input, feedback, and prioritization of the evaluation criteria. The evaluation criteria consisted of 11 key criteria that were numbered from 1-11 in order of descending priority based on input from the PSC and the public. The criteria was established and prioritized prior to the identification and evaluation of any alternatives. The evaluation criteria were as follows:

1. Project Costs
2. Impacts to Properties
3. Economic Impacts
4. Environmental Impacts
5. Emergency Access
6. Improved Year Round Access
7. Aesthetic Impacts
8. Operation and Maintenance Costs
9. Improved Access for Non-Motorized Users (Bicyclists and Pedestrians)
10. Impacts on Highway User Costs
11. Construction Impacts

Prior to developing conceptual design alternatives, an existing conditions assessment was conducted to identify existing opportunities and challenges related to project development within the study area, as well as key destinations and points of connectivity.

Subsequently, the following eight preliminary alternatives were identified within the study area:



- Fixed Bridge with 75 foot under clearance
- Tunnel
- Ferry Service
- Retrofit existing bridge for year round operation with a 10-foot under clearance
- New movable bridge with 10-foot under clearance
- New ramps at Irondequoit Bay Bridge
- Route 104 to Ridge Road connection
- Null or Do Nothing (i.e., retain existing seasonal swing bridge)

Three of the alternatives were deemed unfeasible in consultation with the PSC. They were the Fixed Bridge, Tunnel, and Ferry Service. The remaining five alternatives were assessed in accordance with the evaluation criteria, which used a three tier weighted ranking system within each criteria. A weighted sum was subsequently calculated to determine the order in which the alternatives best satisfy the evaluation criteria, which is as follows.

1. Retrofit existing bridge for year round operation with a 10-foot under clearance
1. New movable bridge with 10-foot under clearance
3. Null or Do Nothing (i.e., retain existing seasonal swing bridge)
4. Route 104 to Ridge Road connection
5. New ramps at Irondequoit Bay Bridge

A key follow on recommendation is for the PSC to remain in effect to ensure the guiding principles and goals of this study are not lost should there be staff changes within the municipalities. Periodic meetings of the PSC, or at least the PSC representatives from the Towns of Irondequoit and Webster and Monroe County, should be scheduled to share progress being made on moving a project forward. In addition, the municipalities should determine a plan for ownership and maintenance of any future bridge options. Each municipality should also adopt the recommendations of this study and assign a person who will be responsible for continued coordination including: monitoring funding opportunities, continuing conversations with impacted property owners, and ensuring that the owning municipality has monies for maintenance as well as capital improvements.

This study evaluated the feasibility of options to provide year-round access across the Irondequoit Bay Outlet. A systematic procedure was used to evaluate alternatives and extensive coordination with the Project Steering Committee and public occurred throughout the duration of the project. Results of this study show a ranking of alternatives based on the established criteria. This report documents the process used; the feasible alternatives including potential impacts associated with their development; associated design, construction and maintenance costs; and follow on activities. The information included herein is intended to be used as a stepping-stone to progress the Irondequoit Bay Outlet Bridge Project to future design and construction.



1.0 PURPOSE + APPROACH

1.1 Purpose

The purpose of this study is to explore options to provide year-round access across the Irondequoit Bay Outlet, creating a better regional transportation system for all modes of travel. This feasibility study assesses whether any reasonable design solutions are available to provide year round access to all travelers, including vehicles, boats, bicycles and pedestrians while preserving the Irondequoit Bay's ability to serve as a safe harbor for boaters.



The Irondequoit Bay Outlet Bridge Study is an important milestone effort aimed at improving year round connectivity between northern Irondequoit and Webster.

1.2 Project History and Evolution

There have been planned improvements to improve the connection across the channel between Lake Ontario and Irondequoit Bay on and off since 1946. A brief history is summarized below.

- Prior to 1900 – Narrow truss highway bridge existed
- 1929 – Truss bridge was replaced with a 2-lane timber bridge
- 1946 – Study authorized by Congress to improve recreational purposes
- 1958 – Congress authorized improvement project to construct a replacement bridge consisting of a fixed highway bridge at a revised location along the Irondequoit Bay Outlet
- 1960 – New York State revised project to route traffic to a new bridge over Route 104
- 1970 – Route 104 bridge opened to traffic
- 1975 – 1980 – various efforts to improve access at the Irondequoit Bay Outlet
- 1985 – Existing low level bridge across the Irondequoit Bay Outlet was removed in 1985 and the Irondequoit Bay Outlet Study approved
- 1986 - Irondequoit Bay Outlet Study issued
- 1989 – New York state approved Project Proposal
- 1994 – Federal funds previously allocated for a year round bridge project were rescinded and reallocated to earthquake relief in California
- 1998 – Existing Seasonal Swing Bridge opened

1.3 Study Area

This study addresses options for improving the connection between northern Irondequoit and Webster at the opening between Lake Ontario and the Irondequoit Bay. Irondequoit Bay is located on the south shore of Lake Ontario approximately four miles east of the Rochester Harbor and 28 miles west of Sodus Point. A narrow split separates the bay from Lake Ontario.



The bay is located in Monroe County, New York with the Town of Irondequoit to the west and the Town of Webster to the east. The City of Rochester is to the south.

The study area encompasses the area surrounding Irondequoit Bay. Most of the assessment of the physical impact will focus on determining a connection between the east and west sides of the bay at two different sites. These sites are as follows and shown in Figure 1-1:

- Outlet Bridge Connection – The immediate outlet area
- Route 104 Connector – The area from Titus Avenue to East Ridge Road, including Sea Breeze Drive, Interstate 590 and Route 104

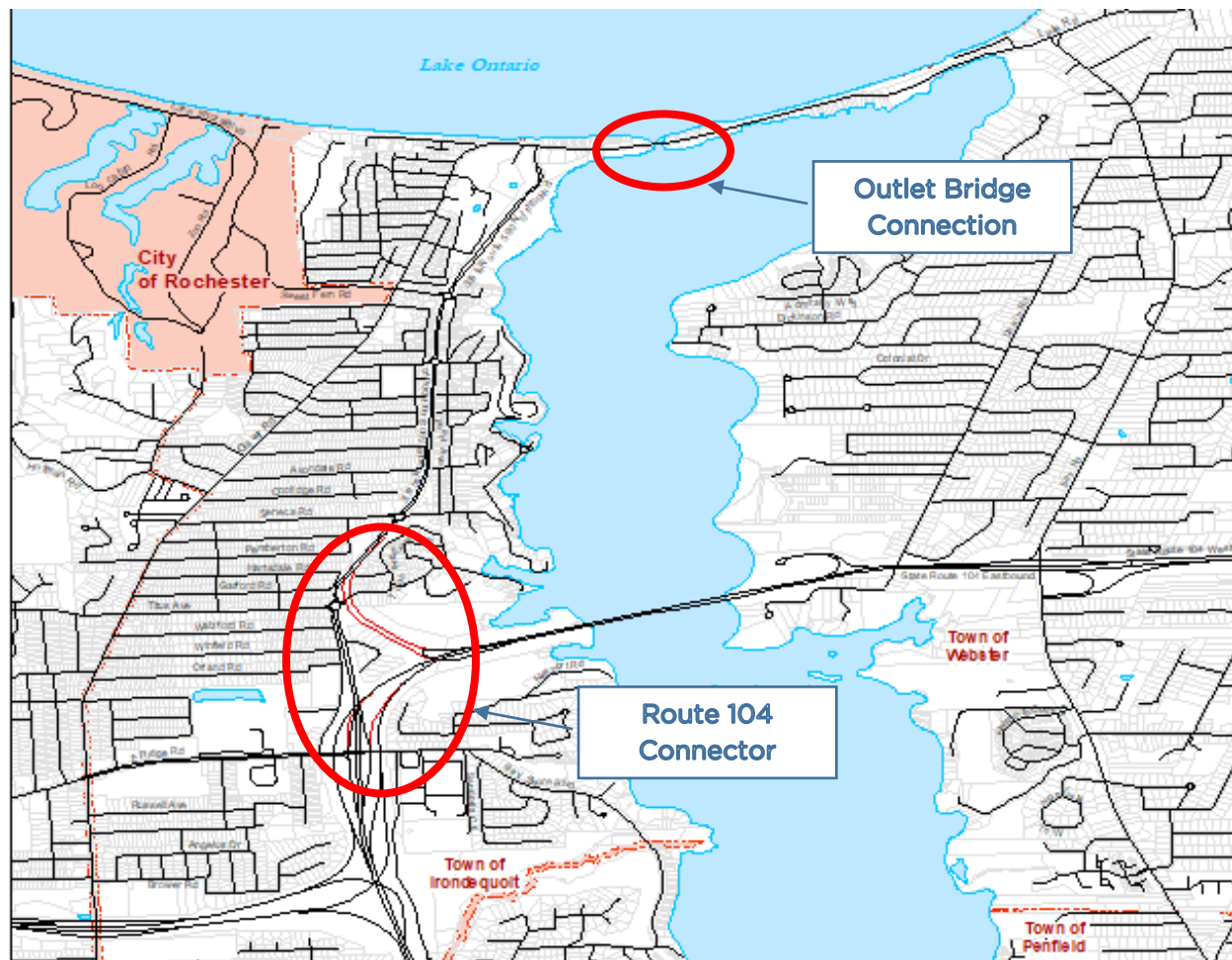


Figure 1-1 – Project Study Area

To assess the impacts to the area as a whole requires looking at a larger network of transportation facilities that includes many of the surrounding surface roads, regional traffic patterns and local residential and business needs. The larger network of facilities includes Lake Road and Culver Road to the north, Empire Boulevard to the south, Bay Road to the east, and Sea Breeze Drive to the west. The various transportation routes evaluated are owned and maintained by multiple municipal agencies and serve different demographic constituents.



1.4 Study Tasks

A number of study tasks were developed to help assess whether any reasonable design solutions are available to provide year round access to all travelers. These tasks are as follows:

- Public Participation – Community outreach throughout the study process to encourage participation, submission of comments and ideas bearing on the feasibility study and education of the study goals and objectives.
- Existing Conditions Analysis – Research and characterize existing physical, environmental, engineering, and economic conditions within the study area.
- Development of Design Alternatives – Establish concepts of potential design solutions and how they meet the project goals.
- Assessment of Alternatives – Review benefits and limitations associated with each alternative and how they rank in respect to the evaluation criteria.



2.0 Public Engagement + Participation

This study encompassed two different municipalities, the Towns of Irondequoit and Webster. The Town of Irondequoit is the project sponsor, and served as the primary point of contact throughout the duration of the study. The Town of Webster was an actively involved participant providing input and guidance throughout the project. Representatives of the Town of Webster also served on the Project Steering Committee. In addition to the two municipalities, other interested study participants included: Monroe County, Genesee Transportation Council, NYS Department of Transportation, NYS Office of Parks, NYS Department of Environmental Conservation, United States Coast Guard, Assemblyman Joe Morelle, Senator Rich Funke, Senator Chuck Schumer, as well as interested business owners, landowners, and residents.

2.1 Project Steering Committee

A Project Steering Committee was established at the onset of the Study in January 2017 to represent a range of interests and provide guidance to the consultant team. The steering committee was comprised of the following individuals:

Geoff Benway – Town of Webster
George Winter – Town of Webster
Kerry Ivers – Town of Irondequoit
John Perticone – Town of Irondequoit
Lauren Kelly – Town of Irondequoit
Robert Kiley – Town of Irondequoit
Chris Zeltmann – Senator Schumer
Jesse Sleezer – Senator Funke
Jim Nasso – Assemblyman Morelle
Fran Beth – Marges Lakeside Inn
Bob Cudzilo – Southpaw Designs
Shane Di'Mora – Castaways Restaurant
Maeve MacAutuile – Sea Breeze Homeowner
Richard Parker – NYSOPRHP
Roland Beck – NYSOPRHP
James Willer – NYSDOT
Tom Haley – NYSDEC
George Hebert – Monroe County
Tom Goodwin – Monroe County Planning
Scott Leathersich – MCDOT
Terrence Rice – MCDOT
Jody Binnix – GTC
James Stack – GTC
Roseann Schmid – Fisher Associates
Tim Faulkner – Fisher Associates
Rick Bennett – Fisher Associates
Pete Davis – HDR



The Steering Committee's primary task was to oversee the project and act as an advisory body to guide the study and ensure that it was being progressed in accordance with the project objectives. In addition, the Steering Committee provided valuable local knowledge and input to further advance the study through each stage. The Steering Committee contributed to the development of the evaluation criteria used to rank the project alternatives. A total of four Steering Committee meetings were held at key points within the study process to keep the committee up to date on the study progress and receive input and feedback prior to proceeding to the next step in the process. Dates of the Steering Committee meetings were as follows:

- January 26, 2017 - This meeting introduced the project to the committee, established the process for how the study would be conducted, provided a brief overview of initial environmental investigations, and discussed the preliminary list of possible alternatives.
- March 30, 2017 - This meeting included discussion of existing conditions research into jurisdictional ownership, structural conditions, environmental screenings, traffic data and land use. The Steering Committee also conducted a workshop session to establish the evaluation criteria.
- June 1, 2017 - This meeting included a discussion of the rankings of the evaluation criteria based on Steering Committee and public input. Concepts for potential year round access alternatives were also presented.
- January 4, 2018 - Findings were presented of the various alternatives as they related to the individual evaluation criteria and how the alternatives scored relative to each other.

2.2 Public Outreach

A public outreach program was developed and implemented to inform the public of the project objectives and goals and to solicit input and comments on the evaluation criteria to be used to assess the feasibility of the alternatives as well as on the alternatives and their impacts. Components of the program included formal public information meetings, one-on-one meetings with businesses/residents, internet outreach through the town website, online surveys to solicit public opinion on study components, written comments and verbal comments.

Formal public information meetings were held on:

- April 12, 2017 - This meeting introduced the study scope and goals to the public, established the process for how the study would be conducted, provided a brief overview of initial environmental investigations, and discussed the development of possible alternatives. The public was invited to visit breakout stations to provide input on origin and destinations within the study area, provide comments on study components, and rank the evaluation criteria in descending order of priority.
- October 3, 2017 - This meeting was held to present the findings of the existing conditions analysis, summarize the list of concept alternatives that were developed, and discuss the alternatives that would be considered for further detailed analysis and scoring under the evaluation criteria.
- January 11, 2018 - This meeting was held to discuss the findings of the study process,



present the alternatives and their impacts as well as their scoring under the evaluation criteria.

During each meeting the feasibility study development, process and findings to date were discussed. In addition, various formats were utilized to obtain public input and convey information. The first two meetings began with a formal presentation and were followed by interactive breakout stations to obtain public comment on various aspects of the alternatives under consideration, and the evaluation criteria utilized in scoring the alternatives. The third meeting began with a formal presentation and was followed by a moderated question and answer session. Appendix A provides a summary of the comments received through public participation.

2.3 Stakeholder Meetings

The study team also conducted one on one meetings with participatory business owners as interested stakeholders to discuss the project elements. Meetings were conducted with Seabreeze Amusement Park, Bill Gray's Restaurant, Marge's Lakeside, Mayer's Marina, and Town of Webster Parks. Additionally, these meetings were used to understand the general operations of the businesses, and the economic changes in their business, if any, associated with the seasonal presence of the existing swing bridge and how the alternatives may affect the existing economics.

2.4 Public Survey

Various online surveys were conducted to provide an opportunity for the public to participate in the development of the study. The first online survey was conducted in April and May of 2017 to establish demographics of the public and develop an understanding of the origins and destinations of travelers within the study area, and the reasons why people travel to the outlet area. A total of 800 respondents participated. A second online survey was conducted in June of 2017 where the public was invited to rank the priority of the evaluation criteria to be utilized in the study. A total of 645 people participated in the survey and their feedback was utilized in establishing the order of priority.

In addition to the online survey, the Town of Irondequoit published all information related to the project study on their website. Throughout the study duration, the public was provided the opportunity to submit comments by e-mail to the Town and Steering Committee for consideration in the study process.

2.5 Project Objectives

A number of project objectives were established in the Town's application to request funding for the study through the Genesee Transportation Council's Unified Planning Work Program (UPWP). The objectives were further discussed during meetings with the Steering Committee and the community to ensure a consistent understanding of the objectives of the project prior to beginning the study.



These objectives were used as a barometer in evaluating the different alternatives and were used as a basis for developing the evaluation criteria utilized in the study process. They are as follows:

- Improve access between the Towns of Webster and Irondequoit by providing year round access across the Bay Outlet, creating a better regional transportation system for all modes of travel
- Minimize physical and financial impact to surrounding properties
- Minimize environmental impacts
- Minimize capital, operation, and maintenance costs to provide the highest benefits for public monies used

2.6 Evaluation Criteria

In order to ensure a methodical, logical, and unbiased process was used to determine whether a feasible alternative exists, it was critical to establish evaluation criteria to assess and rank all possible alternatives.

Three different sets of rankings were developed to prioritize the criteria that was utilized to evaluate the various Irondequoit Bay Outlet Bridge (IBOB) alternatives. The initial set of evaluation criteria were developed by the Steering Committee at their first meeting. The evaluation criteria was as follows:

- Project Costs
- Impacts to Properties
- Economic Impacts
- Environmental Impacts
- Emergency Access
- Improved Year Round Access
- Aesthetic Impacts
- Operation and Maintenance Costs
- Improved Access for Non-Motorized Users (Bicyclists and Pedestrians)
- Impacts on Highway User Costs
- Construction Impacts

Each of the Steering Committee members was asked to rank the criteria in order of importance from one to eleven with one being the most important and 11 being the least important. At the public informational meeting held on April 12, 2017, meeting attendees were asked to undertake the same exercise. Finally, an on-line survey was published that asked survey takers to rank the same evaluation criteria. All these rankings were averaged together to establish the study order of the evaluation criteria. The results of each of these rankings, as well as the final overall ranking, are illustrated below in Table 2-1.



Table 2-1
Ranking of Alternatives Analysis Criteria

Alternatives Analysis Criteria	Steering Committee	Public Meeting	On-Line Survey	Average	Overall Rank
Aesthetic Impacts	7	5	8	6.67	7
Construction Impacts	11	7	11	9.67	11
Economic Impacts	3	9	3	5.00	5
Emergency Access	5	3	2	3.33	2
Environmental Impacts	4	4	4	4.00	3
Impacts on Highway User Costs	10	11	5	8.67	10
Improved Access for Non-Motorized Users	9	10	6	8.33	9
Improved Year Round Access	6	1	1	2.67	1
Operation & Maintenance Costs	8	8	7	7.67	8
Project Costs	1	6	9	5.33	6
Impacts to Properties	2	2	10	4.67	4

What is interesting to note is that the rankings that were completed by the public clearly showed the primary consideration when evaluating the alternatives should be providing year round access between Irondequoit and Webster for residents, commuters, business patrons and emergency services providers. However, the priority criteria for those that would be responsible for funding any future improvement are the costs of the alternatives.

The on-line survey also solicited other comments related to the overall project and the potential alternatives. These are summarized below.

- 44% commented that they wanted a year round bridge
- 10% commented that the Route 104 ramps should be completed
- 8% commented that the closure schedule should be modified to allow a longer season for vehicular access across the bay
- 8% commented that impact on economic development should be considered
- 6% commented that the impact of increased traffic on Lake Road during the summer months should be considered
- 6% commented that accommodation of boat traffic is more important than the accommodation of vehicular traffic
- 6% said leave everything the way it is and do nothing
- 3% commented that accommodation of vehicular traffic is more important than the accommodation of boat traffic
- 3% stated that whatever is done should not increase taxes
- 2% stated that a tunnel should be considered
- 2% stated that bicycle/pedestrian accommodations across the bay should be provided year round
- 2% stated that there improved enforcement of speeding and DWI laws was necessary



3.0 Existing Conditions

Existing features and conditions within the project study area impact the feasibility of the alternatives as well as the cost. Therefore, prior to establishing alternatives, an existing conditions inventory was conducted to determine the opportunities and challenges associated with the alternative development in the project area. Existing conditions were assessed by conducting numerous site visits to the project area, as well as reviewing data available from GIS and municipalities.

3.1 Land Uses

Land uses within the project area include retail, residential, and recreational. See Figures 3-1A and 3-1B for a current zoning maps of the area. On the Irondequoit side, the predominant land use is single family residential. However, convenience retail and community facilities are also located along Culver Road. “Hot-Dog Row”, consisting of a few food establishments, is located at the junction of Lake Road and Sea Breeze Drive. A row of houses lines the lakeshore immediately adjacent to the outlet on the west side.

On the Webster side, the land use is mostly single family residential with a few interspersed commercial businesses. There are only a small number of commercial businesses. There is also a commercial marina and a few small boat launches along the bayshore for recreational boating.



Figure 3-1A – Zoning Maps of Potential Project Locations



Figure 3-1B – Zoning Maps of Potential Project Locations

3.2 Existing Bridge

The existing outlet bridge was constructed in 1998 and provides two travel lanes and two sidewalks crossing the outlet channel to Irondequoit Bay. The inside width between trusses is 24 feet and there is a 5 foot wide sidewalk on each side of the bridge (outside the trusses) see Figure 3-2. The navigation clearance with the bridge in the closed position (i.e., spanning the channel) is 4 ft. The bridge is seasonally operated. It is positioned across the outlet to accommodate vehicular, pedestrian and bicycle traffic November 1 through April 1. The bridge is swung open and positioned along the bank of the channel for the remainder of the year to accommodate boat traffic. The sidewalk on the bridge serves as a fishing pier during the navigation season.

It should be noted that over the years since the seasonal swing bridge was constructed in 1998, requests have been made to the Coast Guard to extend the period that the bridge is positioned across the outlet to accommodate vehicular traffic. Such requests have been denied. During a Steering Committee meeting that the Coast Guard participated in, this topic was again raised, the Coast Guard reiterated that the November 1 – April 1 period would not be extended.



Figure 3-2 – Existing Swing Bridge

3.3 Existing Traffic Volumes and Patterns

Existing traffic data was collected at three locations in the area of the Ironbequoit Bay Outlet Bridge. This data was collected from March 25-29th, 2017 when the bridge was positioned across the outlet to accommodate vehicles, and August 2nd-August 6th, 2017 when the bridge was closed to vehicular traffic and positioned along the bank of the channel. The March counts were taken at the following three locations:

- Sea Breeze Drive, South of Culver Road
- Culver Road, west of Sea Breeze Drive
- Lake Road, immediately east of the Irondequoit Bay Outlet Bridge

The August traffic counts were taken in the same locations as the March traffic counts with the exception of the Lake Road traffic count, which was moved to west of Bay Road. The results of the traffic counts are shown in the following table:



Table 3-1
Average Daily Traffic Volumes

Location	March Count	August Count
Sea Breeze Drive	1929	2097
Culver Road	5613	4082
Lake Road	5854	2085

In general, Sea Breeze Drive traffic shows more of a commuter traffic type pattern when the bridge is servicing motorists with a peak in the morning and a more significant peak in the afternoon. During the summer, traffic increases until the peak at 11:00 am and then continues to drop off after that which is more indicative of traffic going to and from the amusement park rather than Sea Breeze Drive being used as a commuter route. Culver Road traffic shows similar characteristics, with two distinct peaks during the traditional commuter peak hours in the March counts and three peaks in the August counts which occur at 11 am, 4 pm, and 8 pm. Lake Road traffic in March shows two distinct peaks during the commuter hours while August traffic increases all day long until 8 pm and then drops off significantly after that.

The Genesee Transportation Council (GTC), the regional transportation planning agency for Monroe County and the surrounding area has developed a Regional Travel Demand Model (RTDM) that estimates traffic volumes using a multitude of information. The RTDM is based on an average September day, which means the Irondequoit Bay Outlet Bridge is not in place to service motorists. The GTC was asked to model the transportation network with the outlet bridge in place so that a comparison of traffic volumes could be made between when the outlet bridge is in place and when it is not in place. The RTDM was also used to estimate where traffic is coming from and going to when the outlet bridge is in place servicing motorists. The results of these analyses are discussed below.

The comparison of traffic volumes when the bridge is in place servicing motorists versus when it is not in place showed the following:

- 36% increase in traffic on Lake Road east of Bay Road
- 31% increase in traffic on Lake Shore Boulevard
- 35% increase in traffic on Bay Road north of Klem Road. South of Klem Road there is a slight decrease
- 5% increase in traffic on Route 104
- 3% decrease in traffic on Sea Breeze Drive south of Pt. Pleasant Road
- Slight decrease in traffic on Culver Road south of Pt. Pleasant Road

The origins and destinations of traffic using the outlet bridge during the AM and PM peak hours shows the following:



Table 3-2
Origin and Destinations of IBOB Traffic

AM Peak Hour		PM Peak Hour	
Westbound Traffic	Eastbound Traffic	Westbound Traffic	Eastbound Traffic
35% from Lake Rd.	1% from Titus Ave.	18% from Lake Rd.	4% from Titus Ave.
31% from Klem Rd.	1% from Culver Rd.	44% from Klem Rd.	8% from Culver Rd.
20% from Bay Rd.	68% from Lake Shore Blvd.	28% from Bay Rd.	47% from Lake Shore Blvd.
60% to Lake Shore Blvd.	7% from Sea Breeze Dr.	64% to Lake Shore Blvd.	23% from Sea Breeze Dr.
8% to Culver Rd.	20% to Lake Rd.	2% to Culver Rd.	44% to Lake Rd.
2% to Sea Breeze Dr.	48% to Klem Rd.	3% to Sea Breeze Dr.	32% to Klem Rd.
6% to Titus Ave.	24% to Bay Rd.	1% to Titus Ave.	13% to Bay Rd.

Note: Totals do not add up to 100% due to some traffic being local to the area

3.4 Vessel Survey

A review of the local mariners was performed including discussions with marina owners as well as a count of the slips within the Bay. While a precise survey of each vessel was not performed, discussion with marina owners indicated that approximately 90 percent of the vessels berthed within the bay are recreational craft from 10 to 30 feet in length while there are some larger craft up to 50 feet in length. The bay is also home to sailing vessels in the 15 to 30 feet range. Based upon a count of slips, the bay can accommodate approximately 1800 small craft. The dimensional characteristics of various vessel classes are indicated in Table 3-3.

Table 3-3
Irondequoit Bay Vessel Sizes

Vessel Type	Estimated Number	Beam (feet)	Draft (feet)	Height from waterline (feet)
Motor boat 10 to 30 feet in length	1400	8	3	10
Motor Boat over 35 feet in length	25		6	25
Sail Boat under 30 feet	340		6	33
Sail Boat over 30 feet	25	15	10 - 12	45
Work Barges		40	3 to 12	0 to 15
Emergency Service vessels		12	5	10

As indicated in the table, the majority of the vessels traversing the outlet channel are small craft. There are some larger vessels which are berthed in the bay. In addition to the local vessels, the bay is considered a safe harbor. As a safe harbor, any vessel with a draft less than the channel limitations may enter during inclement weather events. In addition, emergency service vessels enter the bay. Emergency service vessels include Coast Guard and NY State police



boats. These vessels are motor boats under 30 feet in length. The largest vessel in the US Coast Guard inventory is an ice breaker which rarely enters the bay.

3.5 Navigability

Outlet Bridge Connection:

Irondequoit Bay is considered a navigable Safe Harbor as an Inland Lake/Harbor by the U.S. Coast Guard (USCG). The currently serviceable structure has been granted a Coast Guard Bridge Permit, and is subject to USCG regulation.

Irondequoit Bay is considered Navigable by the U.S. Army Corps of Engineers (USACE).

Route 104 Connector

The proposed Route 104 Connection is located approximately 1500 feet from Irondequoit Bay. Any connection would be made entirely over land, thus not impacting navigability.

3.6 Irondequoit Bay Navigation Clearances

Access to Irondequoit Bay from Lake Ontario is through a channel which has 100 feet of horizontal clearance and 16 feet of authorized water depth (see figure 3-3). The water depth has been reported anecdotally as 12 feet by local mariners.

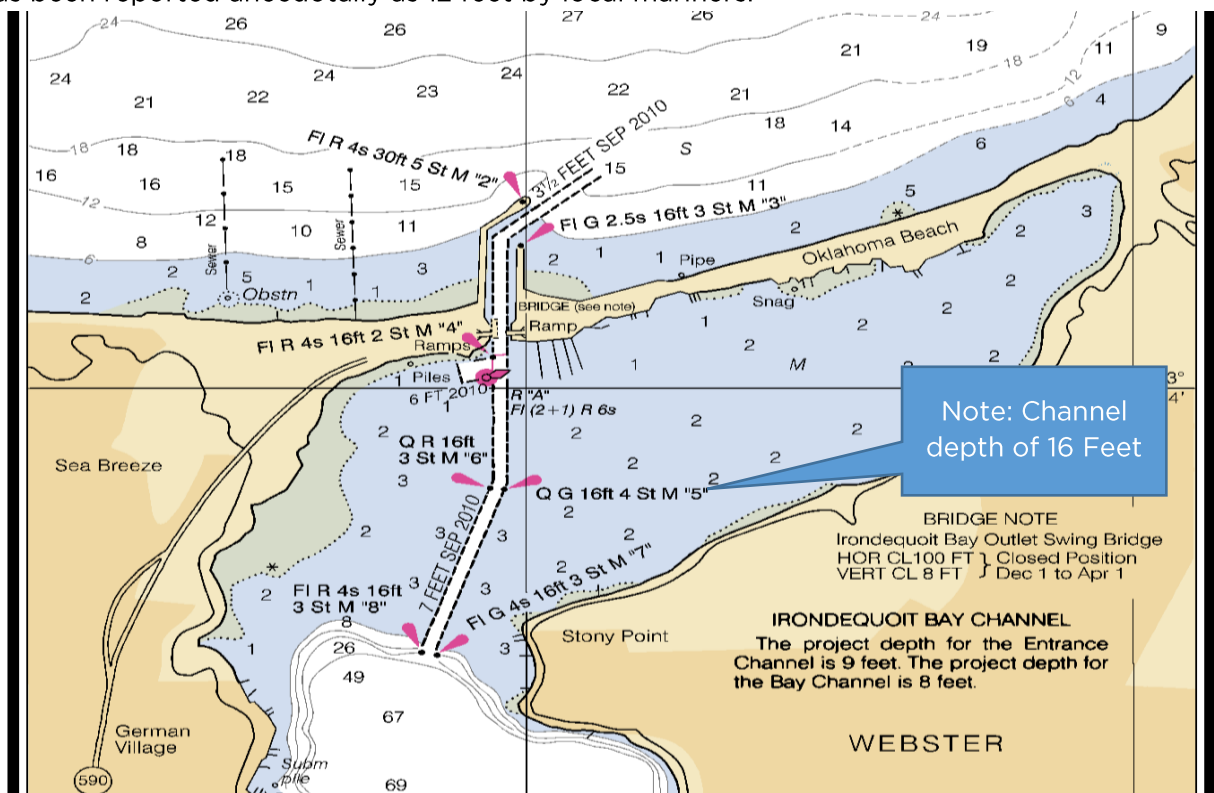


Figure 3-3 - Irondequoit Bay Navigation Chart



Currently, there is unrestricted vertical clearance during the navigation season (April 1 through November 1) as the seasonal swing bridge is swung open and positioned along the bank of the outlet.

3.7 Environmental Resources

Evaluating the existing environmental resources within the study area identifies resources for which impacts should be avoided or minimized to the greatest extent possible. A preliminary environmental screening was conducted in addition to reviewing past environmental documentation. This analysis established current conditions to determine potential environmental impacts associated with the proposed alternatives. As the study area encompasses two distinct geographic areas as indicated in Figure 1-1, the environmental conditions have been characterized for each of these locations: the Outlet Bridge Connection location and the Route 104 Connector location.

3.7.1 Endangered Species and Critical Environmental Areas

Outlet Bridge Connection:

The United States Fish and Wildlife Service (USFWS) provides a web-based process for “Project Reviews in New York State”. The following species were identified by this review process as possibly being present within the vicinity of the project site (subsequent information regarding preferred habitat was gathered from the USFWS website):

- Northern Long-Eared Bat (*Myotis septentrionalis*): The northern long-eared bat predominantly occupies mature forest stands and woodlots. This bat commonly selects tree species based on the tree’s location, position within the landscape, bark characteristics, and ability to provide cavities or crevices. Suitable habitat, including trees greater than three inches diameter at breast height (DBH) are present adjacent to outlet bridge connection.
- Bald Eagle (*Haliaeetus leucocephalus*): Prior to August 2007, the USFWS had listed the bald eagle as a threatened species with known or likely occurrences within Monroe County; however, this species was delisted on August 8, 2007. As such, there are no Endangered Species Act (ESA) requirements for the bald eagle. However, it is protected under the Bald and Golden Eagle Protection Act (BGEPA) and by New York State as a state listed threatened species. Historically, bald eagle nesting sites have been found in forests along the shorelines of oceans, lakes and rivers. A preliminary habitat assessment revealed that the typical nesting habitat for the bald eagle is present within the study location. Additionally, a bald eagle nest is known to be in the vicinity of the project site, and bald eagles are known to frequent the study area.

No critical environmental areas were identified as being present within or adjacent of the proposed site.



Route 104 Connector:

A similar review of endangered species and critical environments was conducted for the study area for the Route 104 connector alternatives. The Northern Long-Eared Bat and Bald Eagle are identified as possibly being present along with potential habitat. The affects and proximity of these species in the Route 104 connector area is identical to those found for the Outlet Bridge Connection area described above.

3.7.2 Ground Water

A Sole Source Aquifer is an aquifer that has been designated by the Environmental Protection Agency (EPA) as the principal source of drinking water for an area. They supply at least 50% of the drinking water for the overlying area.

Primary and Principal Aquifers are aquifers that are utilized as sources of water supply by major municipal water systems.

Outlet Bridge Connection:

Sole Source Aquifer: A review of the Environmental Protection Agency (EPA)-designated Sole Source Aquifer Areas Federal Register Notices, Maps, and Fact Sheets indicates that the outlet bridge connection site is located within a Sole Source Aquifer Project Review Area.

NYSDEC Primary and Principal Aquifers: NYSDEC Aquifer GIS data files have been reviewed and it has been determined that this site is underlain by a primary aquifer.

See Figure 3-4 for designated aquifers within the study area.

Route 104 Connector:

Sole Source Aquifer: A review of the Environmental Protection Agency (EPA)-designated Sole Source Aquifer Areas Federal Register Notices, Maps, and Fact Sheets indicates that the Route 104 Connector area is located within a Sole Source Aquifer Project Review Area.

NYSDEC Primary and Principal Aquifers: NYSDEC aquifer GIS data files have been reviewed and it has been determined that the Route 104 Connector area are underlain by a primary aquifer.

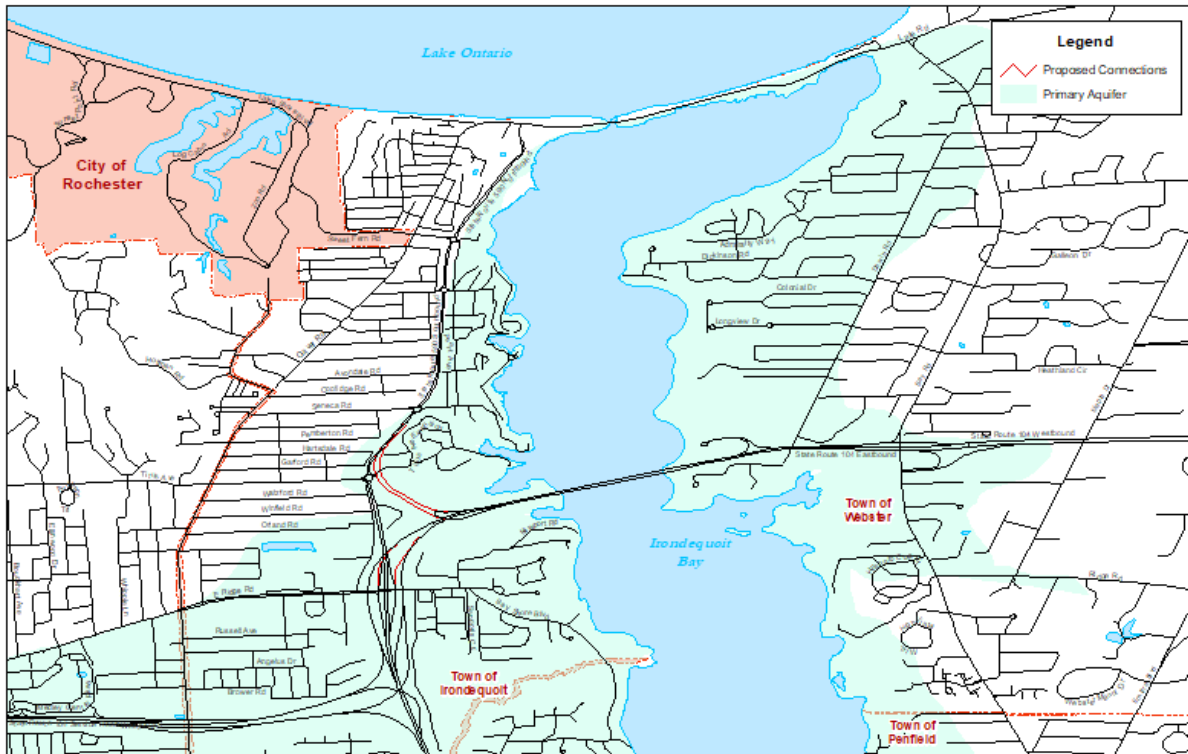


Figure 3-4 – Primary Aquifers within the Project Area

3.7.3 Surface Water

Outlet Bridge Connection:

Waterbody Classification and Standard: The proposed Outlet Bridge Connection area is located adjacent to Irondequoit Bay and Lake Ontario. Irondequoit Bay and Lake Ontario are classified by the NYSDEC as Class A waterbodies. These waterbodies are a source of water supply for drinking, culinary or food processing purposes, primary and secondary contact recreation and fishing. The waters are also suitable for fish and wildlife propagation and survival.

Route 104 Connector:

Waterbody Classification and Standard: The proposed Route 104 Connection area is located approximately 1500 feet from Irondequoit Bay. Irondequoit Bay is classified by the NYSDEC as Class A waterbody.

3.7.4 Federal and State Jurisdictional Wetlands

Wetlands are defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.



Outlet Bridge Connection:

Federal and State Jurisdictional Wetlands: The NYSDEC identifies and regulates freshwater wetlands greater than 12.4 acres, including the 100-ft adjacent area from the delineated wetland edge. In addition, many of the coves along the bay have a 300-foot regulated wetland adjacent area. The proposed Outlet Bridge Connection is located within the mapped 100-foot wetland check zone for NYSDEC Freshwater Wetlands. Also, the US Fish and Wildlife Service(USFWS) maintains a National Wetland Inventory (NWI) database that includes all wetland areas, regardless of size and regulatory status. Additionally, the site location is within close proximity of a federally mapped and regulated wetland. See Figure 3-5 for approximate wetland locations.



Figure 3-5 – Wetland Areas at Irondequoit Bay

Route 104 Connector:

Federal and State Jurisdictional Wetlands: The proposed Route 104 Connector Site is located adjacent to the mapped 100-foot wetland check zone for NYSDEC Freshwater Wetlands. Additionally, the site location is within close proximity of a federally mapped and regulated wetland. See Figure 3-6 for approximate wetland locations.



Figure 3-6 – Wetland Areas at Route 104 Connection

3.7.5 Floodplains

A floodplain is an area of land adjacent to a body of water which stretches from the banks of its channel to the base of the enclosed valley walls or embankments that experience flooding during periods of heavy discharge. The Federal Emergency Management Agency (FEMA) maintains record maps that delineate floodplains for major rain events. See Figure 3-7 for designated flood zones.

Outlet Bridge Connection:

The Outlet Bridge Site is located within the 1% Annual Flood Hazard Area according to the Federal Emergency Management Agency (FEMA).

Route 104 Connector:

The Route 104 Connector Site is not located within the 1% Annual Flood Hazard Area according to the Federal Emergency Management Agency (FEMA).

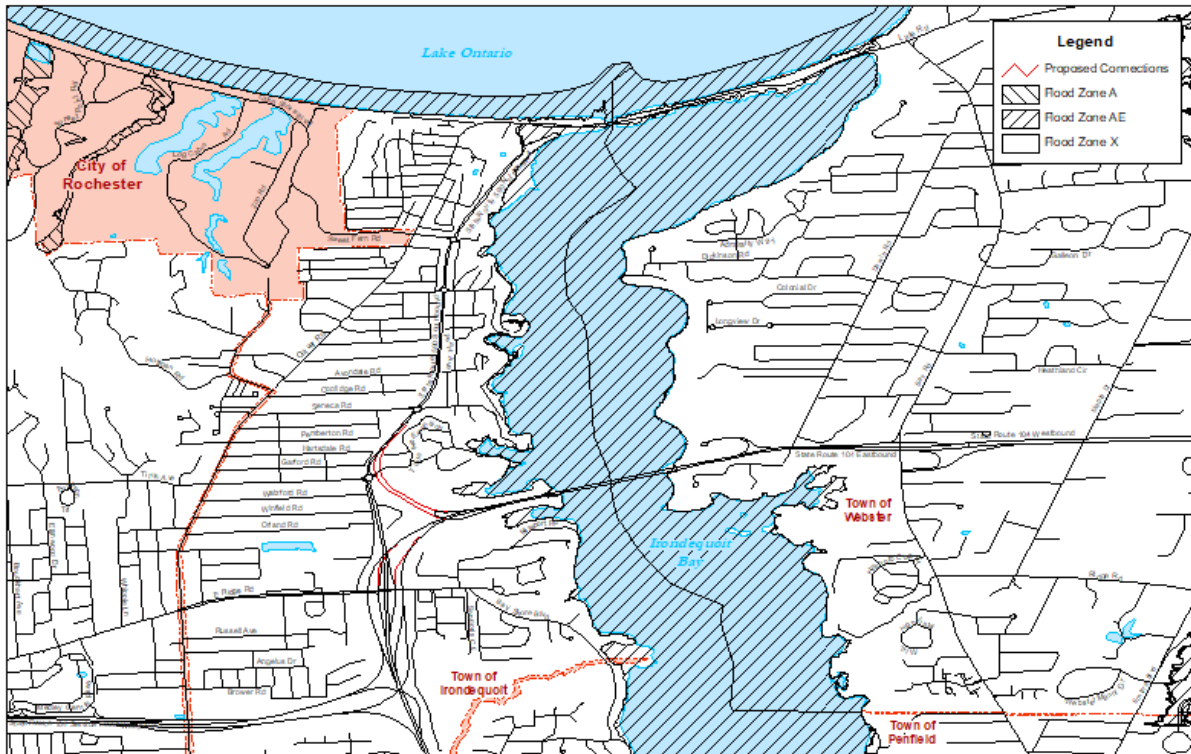


Figure 3-7 – Flood Zones within the Project Area

3.7.6 Historic/Cultural Resources

Outlet Bridge Connection:

This site was reviewed for potential impacts to historic resources, as well as properties protected under Section 4(f) Preservation of Parklands. Records from the New York State Historic Preservation Office (SHPO) and National Register of Historic Places were reviewed for listed historic properties that may be impacted by the proposed project. No eligible properties were identified within or adjacent to the Outlet Bridge Site project limits.

The internet map prepared by the New York State Park, Office of Parks, Recreation and Historic Preservation indicates the proposed site is located within an archeologically sensitive area. This would likely require the preparation of a project review request to be submitted to the NYSDOT Region 4 SHPO Cultural Resources Coordinator for determination as to potential cultural resource impacts. However, based on proposed project components (replacement of a currently serviceable structure) it is not expected that any further historic review requirements would be necessary to progress the Outlet Bridge Site. If construction of an alternative at this site will result in an impact to previously undisturbed soils, then additional historic review requirements may be necessary.



The Outlet Bridge Site is located adjacent to the Irondequoit Bay State Marine Park. Therefore, if an alternative proposes taking any right of way to facilitate construction, coordination under Section 4(f) Preservation of Parklands would likely be required.

Figure 3-8 depicts designated park lands within the project study area.

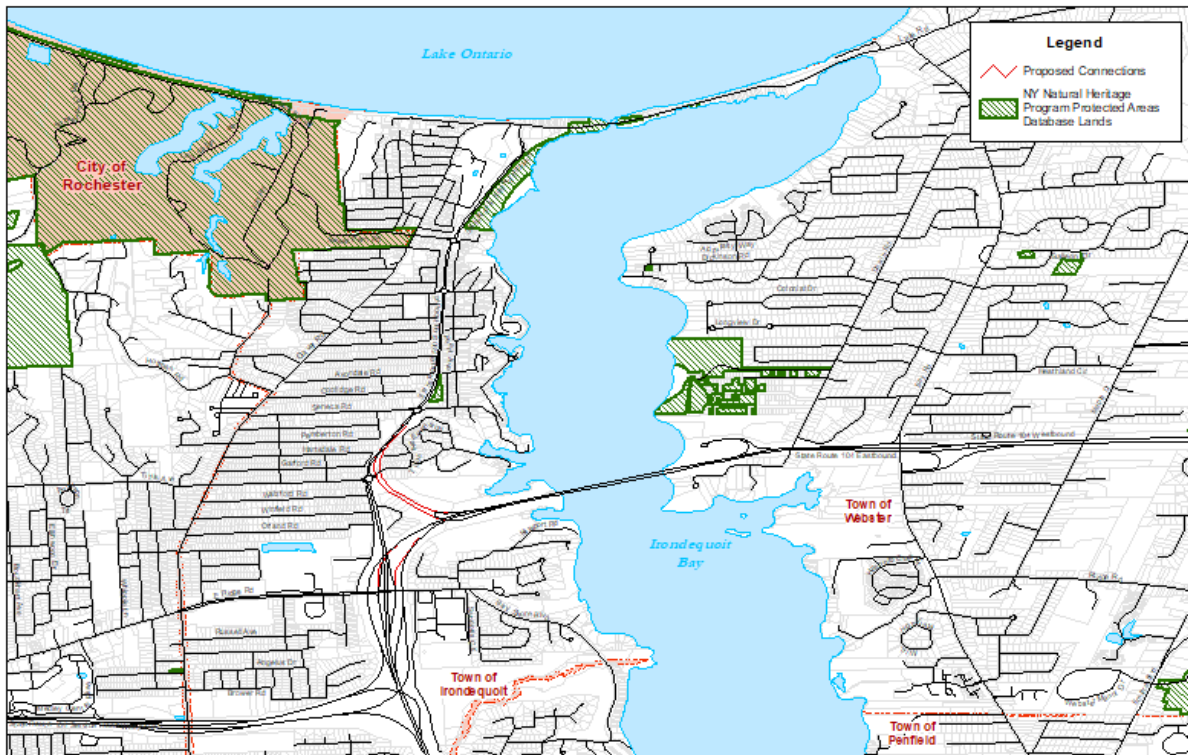


Figure 3-8 – Park Lands within the Project Area

Route 104 Connector:

This site was reviewed for potential impacts to historic resources, as well as properties protected under Section 4(f) Preservation of Parklands. Records from the New York State Historic Preservation Office (SHPO) and National Register of Historic Places were reviewed for listed historic properties that may be impacted by the proposed project. No eligible properties were identified within or adjacent to the Route 104 Connector site project limits.

The internet map prepared by the New York State Park, Office of Parks, Recreation and Historic Preservation indicates the proposed site is located within an archeologically sensitive area. This would likely require the preparation of a project review request to be submitted to the NYSDOT Region 4 SHPO Cultural Resources Coordinator for determination as to potential cultural resource impacts.

No properties adjacent to this site are eligible under Section 4(f) Preservation of Parklands of Historic Properties.



3.7.7 Hazardous Waste Sites

Outlet Bridge Connection:

This site was screened for known hazardous waste sites and NYSDEC Reported Spill Incidences. No known hazardous waste sites were reported as being present in the vicinity of this connection location. However, multiple spill reports at Mayer's Marina, located at 7 Lake Road, Webster are within and directly adjacent to the proposed connection project limits and would need to be evaluated for current status if an alternative is pursued.

Route 104 Connector:

This site was screened for known hazardous waste sites and NYSDEC Reported Spill Incidences. Two known hazardous waste sites were identified that have the potential to be impacted by the construction of an alternative to connect to Route 104. The "Irondequoit Town Dump" is reported as being located approximately 0.1 mile to the south of the proposed connection project limits associated with the Route 104 connector area, and "3000 East Ridge Road" is reported as being located approximately 0.3 mile south of the proposed connection project limits along Route 104. No significant spill reports were identified adjacent to, or within the proposed connection project limits.

Figure 3-9 depicts database locations of reported spill and known hazardous waste sites.

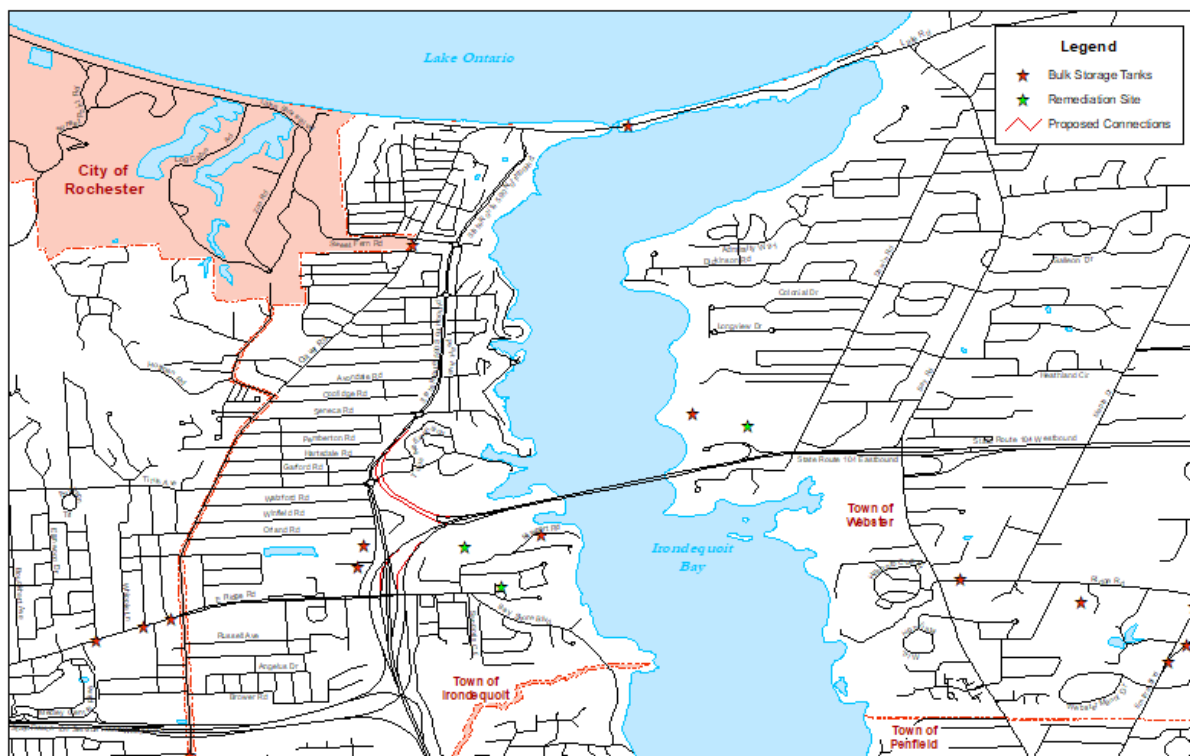


Figure 3-9 – Hazardous Waste Sites within the Project Area



3.8 Economic Impact

This section outlines the planning level economic assessment of the Irondequoit Bay Outlet Bridge's seasonal availability. The assessment examines the existing conditions as well as the anticipated impacts associated with each of the proposed bridge alternatives. The existing condition is that the bridge is fixed in an "open" position from April through October – marine watercraft can utilize the Bay Outlet but vehicular traffic must utilize the Irondequoit Bay Bridge (Route 104) to connect between Irondequoit and Webster. During the winter months, vehicular traffic can utilize the bridge to cross between the Town of Irondequoit and the Town of Webster near Lake Ontario. Quantitative information is utilized where possible and where adequate detail was not available, a qualitative assessment of conditions was completed.

Roadway access has implications across several economic variables, including impacts to businesses and residents, access to employment, tourists and visitors, and general roadway users. While anyone is able to utilize the bridge, the most direct impacts are felt by residents who live in the four Census Tracts (Figure 3-10) directly surrounding the bridge (Monroe County Tracts 107, 108, 112.01 and 112.03). While users in both the Town of Irondequoit and the Town of Webster utilize this roadway, the approximately 11,700 residents that live in these four Tracts and the businesses that are located in this area are the most directly impacted by the change in access when the bridge is and is not available for vehicular traffic. Users outside this area are more likely to utilize Route 104 to avoid out-of-direction travel and access their destinations.

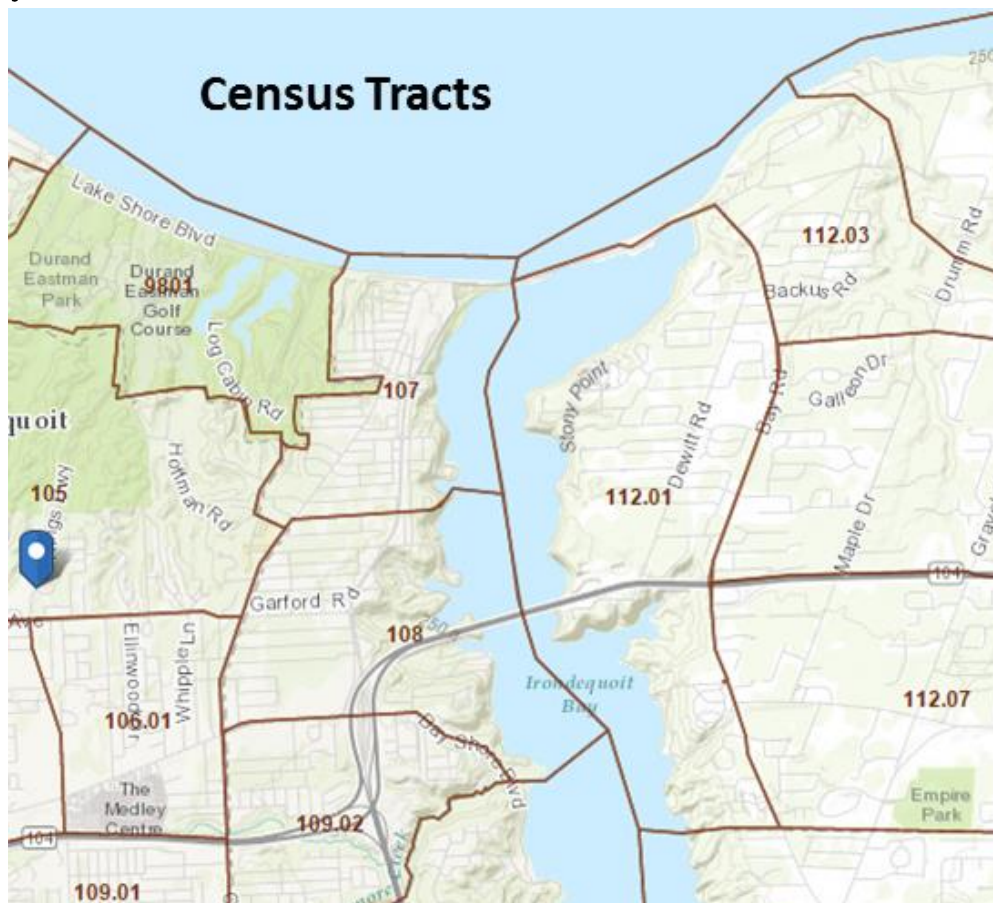


Figure 3-10 – Census Tracts



4.0 Development of Alternatives

The first step in the alternatives evaluation process was to graphically depict all potential concepts within the project area. Potential alternatives were developed based on field visits, the existing conditions analysis, discussions with the Steering Committee, and community feedback. A total of eight preliminary conceptual alternatives were established. These alternatives included options at the existing outlet bridge and other potential connections within the project area. The eight preliminary alternatives were:

- Fixed Bridge with 50-foot under clearance (later revised to 75 foot under clearance)
- Tunnel
- Ferry Service
- Retrofit existing bridge for year round operation and to provide 10-foot under clearance
- New movable bridge with 10-foot under clearance
- New ramps at Irondequoit Bay Bridge
- Route 104 to Ridge Road connection
- Null or Do Nothing (i.e., retain existing seasonal swing bridge)

Three of the above alternatives were deemed to be not feasible due to severe impacts and technical constraints and were not evaluated further. Five alternatives were deemed potentially feasible and were evaluated in more detail as part of this study. The feasible and unfeasible alternatives are discussed in the following sections.

4.1 Unfeasible Alternatives

Fixed Bridge

A survey of the local marine community indicated that a clearance of 50 feet under a fixed structure would likely accommodate anticipated marine traffic. An initial layout and geometric concept that provided a 50-foot under clearance was developed for evaluation and is depicted in Figure 4-1. This concept included a 50-ft. under clearance, a span length of 130 ft. (navigation channel width 100ft.) with two travel lanes and sidewalks (each side), and approach roadways with a 5.0% maximum grade. The United States Coast Guard indicated that a minimum of 75 feet of under clearance would be necessary for a fixed bridge over the channel to be acceptable from a navigation restriction standpoint. During discussions with USCG, they indicated that a permanent movable bridge at this location would be preferable. This study evaluated the impacts to the lower level 50 foot under clearance option, with the understanding that a taller structure would increase potential impacts to the area.

The superstructure could be either a truss or girder design. The truss would minimize the roadway elevation and hence the overall length of the bridge while a girder system would be less intrusive to the visual landscape it would need to be constructed at a slightly higher roadway elevation to provide the same clearance as a truss structure. Assuming a maximum grade across the approach spans of 5.0%, and flat across the bridge navigation span, the overall length would be as shown in Table 4-1:



Table 4-1
Overall Lengths of Fixed Bridge Options

Superstructure type	Navigation Span length	Roadway Elevation	West Approach length	East Approach length	Total bridge Length
Through Truss	130	56	1120	1120	2370
Beam/Girders	130	57	1140	1140	2410

It is expected that approximately 52 properties would be directly impacted. This option would best accommodate emergency access since vehicular traffic would be able to cross the waterway without obstruction at any time. Environmental impacts would include archaeological sensitivity, aesthetic, wetland, park, and quality of life issues. Permitting of this option would require an extensive navigation survey of all vessels on Lake Ontario along with close coordination with the USCG bridge office and the Corps of Engineers to ensure navigation traffic is accommodated.

The cost to construct a new fixed bridge with a 50 foot under clearance is estimated at \$57,300,000 with annual operating/maintenance costs of \$16,000 or \$1,330 per month. The construction cost includes engineering, construction of the new bridge, demolition of the existing bridge and roadway and access improvements for local businesses and residents.

This alternative was deemed unfeasible due to the high project cost and large number of private properties impacted due to the required footprint of the fixed bridge, and the significant aesthetic and character changes that would result under this alternative. It should be noted that subsequent to layout of this alternative to provide a 50 foot under clearance, the US Coast Guard indicated that a 75 foot under clearance would be required at this location. This 25 foot increase in clearance would further adversely impact surrounding properties and the aesthetics of the area.



Figure 4-1 - Conceptual Layout of a Fixed Bridge with a 50-Foot Under Clearance

Tunnel

This option entails construction of a tunnel under the Irondequoit Bay outlet channel. It is assumed that a cut and cover construction methodology would be used for the approaches to the tunnel, with retaining walls. The channel is 16 feet deep with a 5 ft. overburden. The depth of structure would be 8 ft. and the roadway clearance would be 14 ft. Based upon these values, the length of the approaches would be approximately 1022 ft. long on each side. The concept layout of the tunnel option is depicted in Figure 4-2. There would be approximately 100,000 sf of retaining wall and 82,000 cy of excavation. The retaining walls would be supported on piles with tie backs. In addition, pedestrian cross over bridges would be installed over each approach approximately 400 feet from the tunnel and adjacent to the waterway.

It is expected that approximately 43 properties would be directly impacted. The tunnel would require ventilation and pumping systems to meet life safety requirements. This option would be favorable from an emergency access perspective since vehicular traffic can cross the waterway without obstruction at any time. Environmental impacts would include archeologically sensitive areas, aesthetic, wetland, park, and quality of life issues. Permitting of this option would require Corps of Engineers and NYS regulatory agency approvals.

The cost to construct the tunnel is approximately \$67,800,000 with annual maintenance and operating costs of approximately \$4,100 per month.



This alternative was deemed unfeasible due to the high project cost and large number of private properties impacted due to the required footprint of the fixed bridge and potential environmental impacts.



Figure 4-2 – Conceptual Layout of a Tunnel

Ferry Service

The work required to implement ferry service would include construction of mooring systems at each side of the waterway, acquisition of at least two ferries and construction of a maintenance facility. In order for the system to provide competitive mobility, it would need to operate 24 hours per day; 7 days per week. A ferry to service Irondequoit Bay would likely have a one hour service interval with 10-15 minute load/unload times.

Based on the service interval it would be faster for vehicles to use other routes. Also, the physical constraints of the site would not accommodate a ferry of a size needed to adequately meet traffic demand. Lastly, the operation of ferry service across such a short distance would require high operation and maintenance costs. For these reasons this alternative was not deemed to be feasible and was not evaluated further.

4.2 Feasible Alternatives

Null Option

This option assumes that the existing bridge remains and is operated on its current schedule. This alternative has been retained for further evaluation and comparison.



Retrofit Existing Bridge for Year Round Operation

The existing bridge has 4 feet of vertical navigation clearance. This alternative would increase the vertical navigation to 10 feet. To achieve the vertical grade change the approach roadways of Culver Road and Lake Road would need to be modified. Limiting the approach roadway grades to 5.0% maximum, to meet current design standards, would necessitate reconfiguration of the approaches for approximately 200 feet to either side of the bridge, this concept is depicted in Figure 4-3. The estimated cost to modify the bridge for year-round operation and increased under clearance is approximately \$16,000,000, and would require approximately 8 months to build and construction would occur during the non-navigation season. For year round operation, it is assumed that the bridge will open hourly between April and November at a cost of approximately \$146,000 per year plus routine maintenance costs (total \$ 186k/yr.). In addition, this movable bridge will require repairs over its operating life. Coordination with jurisdictional agencies would need to occur to set timeframes for potential repair and or maintenance activities. An example of the coordination would be to establish when operations could affect navigation through the channel, this would be limited to wintertime months (November through March). Permits with oversight agencies would need to be secured for this alternative. A discussion of these permits follows in Chapter 5 of this study. This alternative would impact neighboring properties on both the east and west side of the outlet.



**Figure 4-3 - Conceptual Layout of Retrofitting the Existing Bridge
or a New Movable Bridge**



Movable Bridge

The most efficient movable bridge design for the proposed location is a single leaf rolling bascule. This type of bridge can be constructed within one season during the November to March months. Due to the timing of the construction there would be minimal impact to navigation traffic and potentially larger impacts to roadway traffic as they would be detoured during the period that the existing seasonal swing bridge would typically be in place to service motorists. The profile of the bridge would have a 10-foot under clearance necessitating raising the roadway profile approximately 6 feet. The bridge, when open, would have unlimited vertical clearance for boat passage through the channel. The total length of the movable span would be 120 feet. The approach roadway would be impacted approximately 200 feet on each side to achieve the elevation change. This raising of the approach roadway would have minor impacts to five properties' access at both ends of the bridge. Permits with oversight agencies would need to be secured for this alternative. A discussion of these permits follows in Chapter 5 of this study. Access across the waterway for roadway traffic would be impacted by sailing and large motor craft resulting in bridge openings. During summer months it would be expected that the bridge operating license could be negotiated with the US Coast Guard for hourly openings, with on demand for emergency situations. A fixed opening schedule would allow motorists and boaters to plan their trips accordingly to minimize delays.

The estimated construction cost for on single leaf rolling bascule bridge is approximately \$32,900,000. The operation and maintenance costs would be approximately \$15,500 per month.

New Ramps at Irondequoit Bay Bridge

This option includes extending the ramps on the west end of the Bay Bridge to Sea Breeze Drive just north of the Titus Avenue roundabout. Sea Breeze Drive would be modified to allow the new ramps to tie into the existing roadway approximately 575 feet north of the roundabout. This is necessary to achieve the maximum acceptable grade of 5%. These ramps would be approximately 2500 feet long and would span the valleys from Sea Breeze Drive to Route 104 which are approximately 75 vertical feet. The new ramps would be aligned under Titus Avenue Extension requiring a bridge to carry Titus Avenue Extension over the new ramps. This concept is shown in Figure 4-4. While this option provides unencumbered access across the bay, it requires a longer travel route of approximately 3.5 miles. The permitting issues for this option will require mitigating impacts to endangered species as well as wetlands. There would be extensive property impacts affecting a total of 18 properties (10 total property acquisitions and 8 partial acquisitions).



Figure 4-4 – Conceptual Layout of New Ramps at Irondequoit Bay Bridge

Route 104 to Ridge Road Connector

This option includes constructing new ramps that would connect with Ridge Road. This option would provide three new connections at Ridge Road and is depicted in Figure 4-5.

- I-590 South to Ridge Road
- Route 104 West to Ridge Road
- Ridge Road to Route 104 East

These new connections would be approximately 900 feet long and would be constructed within 6 feet of the existing grade. The existing bridges that carry I-590 over Route 104 would need to be reconstructed to allow for the extra roadway width on Route 104 to develop the new ramps. While this option provides unencumbered access across the bay, it requires a longer travel route of approximately 3.5 miles. The permitting issues for this option would require mitigating impacts to endangered species as well as wetlands. There would be no property impacts since this alternative could be constructed within existing Highway Rights-of-Way.

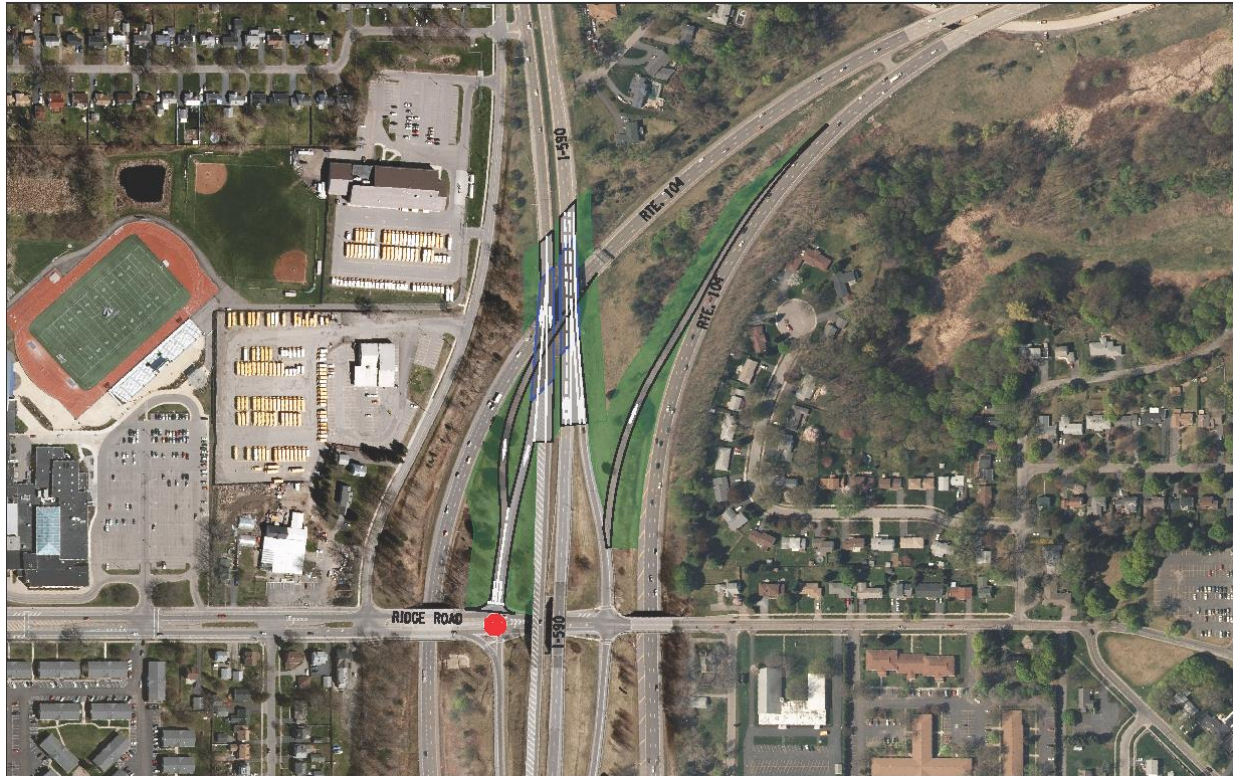


Figure 4-5 – Conceptual Layout of Route 104 to Ridge Road Connection



5.0 Evaluation of Alternatives

The next step was to evaluate and rank the conceptual options against the established set of criteria to determine the feasibility of the alternatives as well as how the alternatives ranked with respect to the evaluation criteria. As previously described in Section 2, the following evaluation criteria (shown in order of decreasing priority) were established.

- A. Improved Year Round Access
- B. Emergency Access
- C. Environmental Impacts
- D. Impacts to Properties
- E. Economic Impacts
- F. Project Costs
- G. Aesthetic Impacts
- H. Operation and Maintenance Costs
- I. Improved Access for Non-Motorized Users
- J. Impacts on Highway User Costs
- K. Construction Impacts

Using these criteria, the alternatives underwent a systematic ranking and evaluation process, which scored each alternative within the established set of criteria. This analysis develops a numerical score, where the lower the score the better the alternative.

5.1 Scoring Method

The method for scoring uses a weighted sum model in a process called decision theory. A weighted sum model is a multi-criteria decision making method for evaluating a number of alternatives in terms of a number of criteria. Each criteria is assigned a weight of importance. The lower the value the more important the criteria.

Each alternative is then assigned a score from 1 to 3 under each criteria with 1 being the best score and 3 being the worst score. Scoring is based on a quantitative or qualitative assessment as supported by the findings established during the alternatives evaluation process. The score for each criteria for each alternative is multiplied by the weight factor of the criteria to obtain a weighted score. The weighted score for each criteria is added together to obtain a final score for each alternative. The alternative with the lowest score is considered the highest ranking alternative. Scoring for each alternative is tabulated in Appendix B.

5.1.1 Evaluation Criteria 1: Improved Year Round Access

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

From a transportation perspective, Alternatives B and D are considered similar in that they provide the same type of year round access, just in a different way. With a moveable bridge, one of the critical issues is the queues that develop when the bridge has to open to allow boats



to pass through the channel and vehicular traffic is required to stop on either side of the outlet. To estimate the queue lengths it was necessary to estimate the amount of traffic that would use a moveable bridge during the summer months. Currently, when the bridge spans the outlet channel (during the winter months), the average daily traffic using the bridge is approximately 5,900 vehicles per day (vpd). Historical traffic counts collected in the early 1980's when the bay was not considered a safe harbor and the previous low level bridge was in place year round, showed that traffic volumes were approximately 50% higher during the summer months. Based on this, the traffic data collected for this study in March 2017 was increased by 50% to estimate the volume of vehicular traffic that would potentially utilize a moveable bridge during the summer months.

The next step was to estimate the queues that would develop when the moveable bridge must open to allow boats to pass. A seven minute cycle time was established for operations from when the gate control arm first goes down to stop traffic to when it goes up again to allow traffic to pass over the bridge. The charts below illustrate the estimated queue lengths during the spring and summer months for the typical weekday and weekend on the east and west sides of the bridge. As these charts show, queue lengths are longest during the weekday peak periods because volumes are higher. They also show different peaking characteristics mainly due to the type of traffic that would be expected to be crossing the bridge. During the weekdays, there is more commuter traffic. Consequently, there are two separate peaks during the weekday, an AM peak and a PM peak. On the weekends, there is more recreational traffic, results in a single peak in the early afternoon. Refer to Figures 5-1 through 5-4 for weekday and weekend queue lengths on the east and west sides of the outlet.

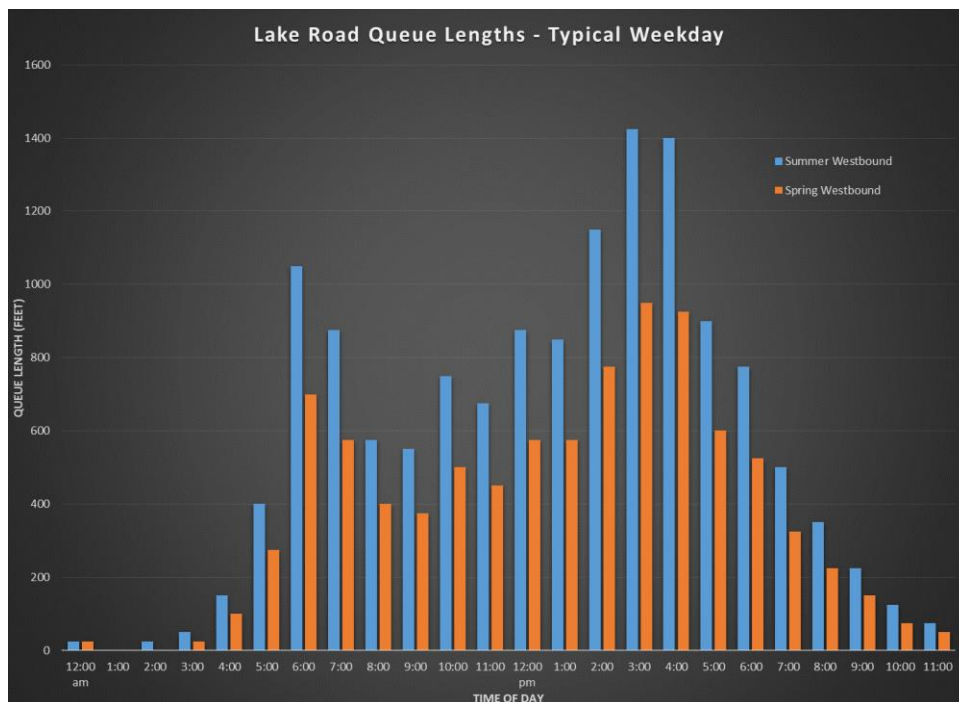


Figure 5-1
East Side of Bridge – Weekday Queue Lengths

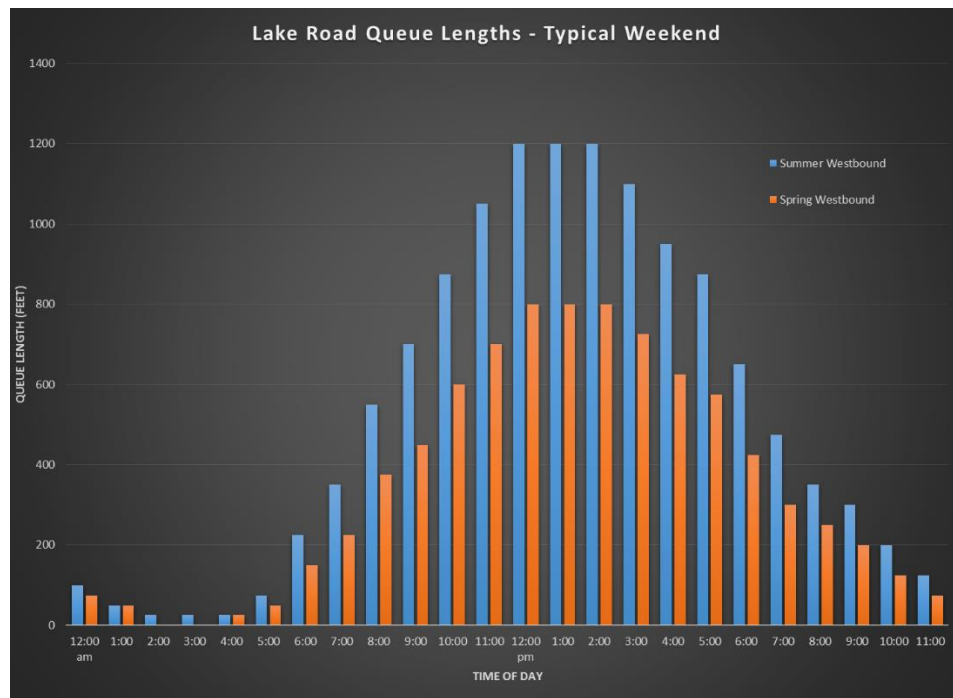


Figure 5-2
East Side of Bridge - Weekend Queue Lengths

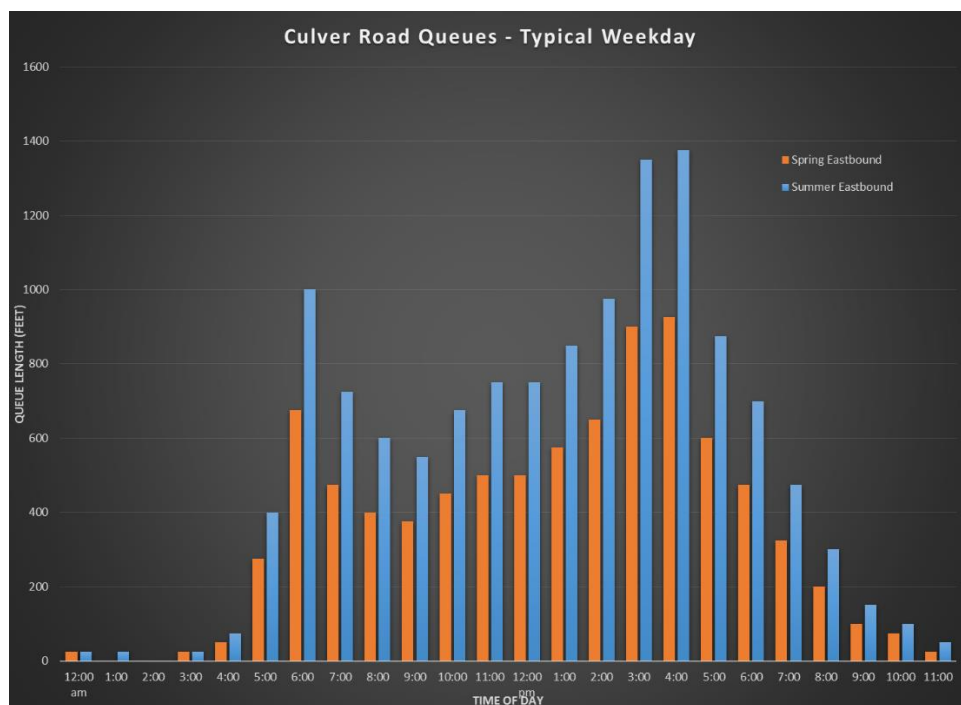


Figure 5-3
West Side of Bridge - Weekday Queue Lengths

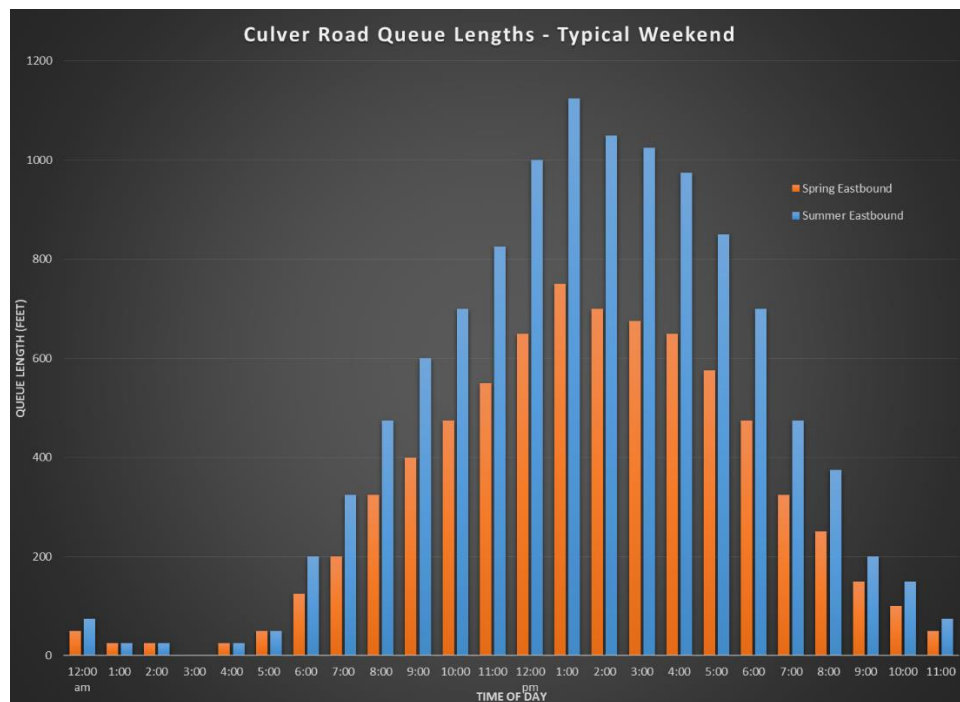


Figure 5-4
West Side of Bridge – Weekend Queue Lengths

For this study, traffic queues were then analyzed for the worst-case peak hour period and then for the average off-peak hours for the remainder of the day to determine operating queue lengths and the estimated time for the queues to clear. For the peak hour, the weekday evening peak was utilized with a queue of 56 vehicles, and for the weekend, the midday peak queues were used with an estimated 48 vehicles. For these weekday and weekend peak hour queues, it is estimated that it would take the last vehicle in line approximately 2 minutes and 1.5 minutes, respectively, to cross the outlet bridge. The queues expected during the remaining off peak hours of the weekday and weekend are 27 vehicles and 24 vehicles, respectively. These queues are estimated to clear in under 1 minute. The estimated length of queues are depicted in Figures 5-5 through 5-8. One way to mitigate these long queues is to restrict opening the bridge during the peak periods except in the event of an emergency. During the weekday, avoiding opening the bridge during the morning and evening peaks would reduce the impact of queuing on the adjacent property owners. During the weekends, the peak hour of traffic flow is during the early afternoon. The Coast Guard would need to approve the proposed schedule for opening and closing the bridge.



Figure 5-5
Peak Hour – Weekend Queue Lengths

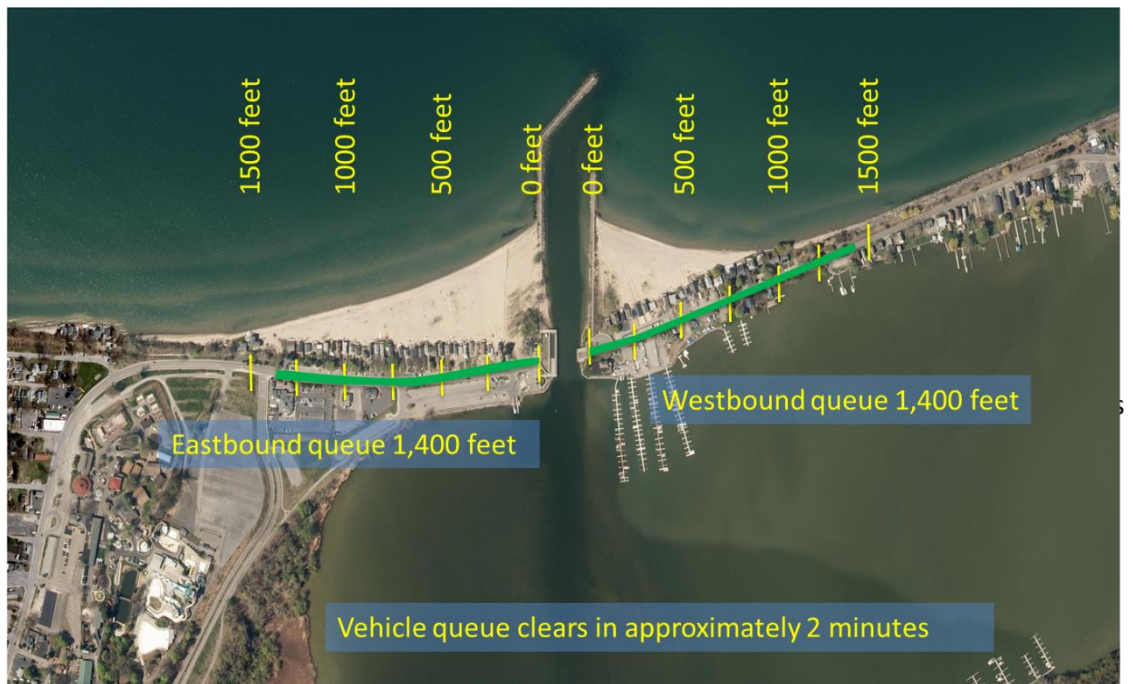


Figure 5-6
Peak Hour – Weekday Queue Lengths



Figure 5-7
Off Peak Hour – Weekend Queue Lengths



Figure 5-8
Off Peak Hour – Weekday Queue Lengths



New Ramps at Irondequoit Bay Bridge

This alternative provides a direct connection to Route 590 to and from the north. The GTC Regional Travel Demand Model was used to estimate the number of vehicles that would use these ramps. Figure 5-9 depicts the layout of this alternative. The results of the model show that the ramp from the Irondequoit Bay Bridge to Route 590 northbound is projected to carry approximately 3,500 vehicles per day and the ramp from Route 590 southbound to the Irondequoit Bay Bridge is projected to carry approximately 3,600 vehicles per day. The main traffic issue with this alternative is the southbound ramp traffic having to cross the Route 590 northbound traffic. This new intersection of ramps and Sea Breeze Drive would need to be designed for acceptable levels of service, most likely through the use of signalized intersection control as depicted in Figure 5-10.



Figure 5-9
Route 104 Ramp Connections to Sea Breeze Drive



Figure 5-10
Route 104 Ramp Connections to Sea Breeze Drive

Route 104 to Ridge Road Connection

This option entails constructing new ramps that would connect Route 104 with Ridge Road and is depicted in Figure 5-11. This option would provide two new connections at Ridge Road; Route 104 westbound to Ridge Road and Ridge Road to Route 104 eastbound. Consequently, if a driver was traveling west on Route 104 and wanted to go north on Route 590, they would be required to take the new ramp, turn left on Ridge Road, then turn left again to get on the ramp that leads from Ridge Road to Route 590 northbound. Conversely, if a driver was on Route 590 southbound and wanted to go east on Route 104, then they would be required to exit at Ridge Road and turn left, then make another left turn to get on the new ramp that will lead from Ridge Road to Route 104 eastbound. The directional movements are depicted in Figures 5-12 and 5-13.

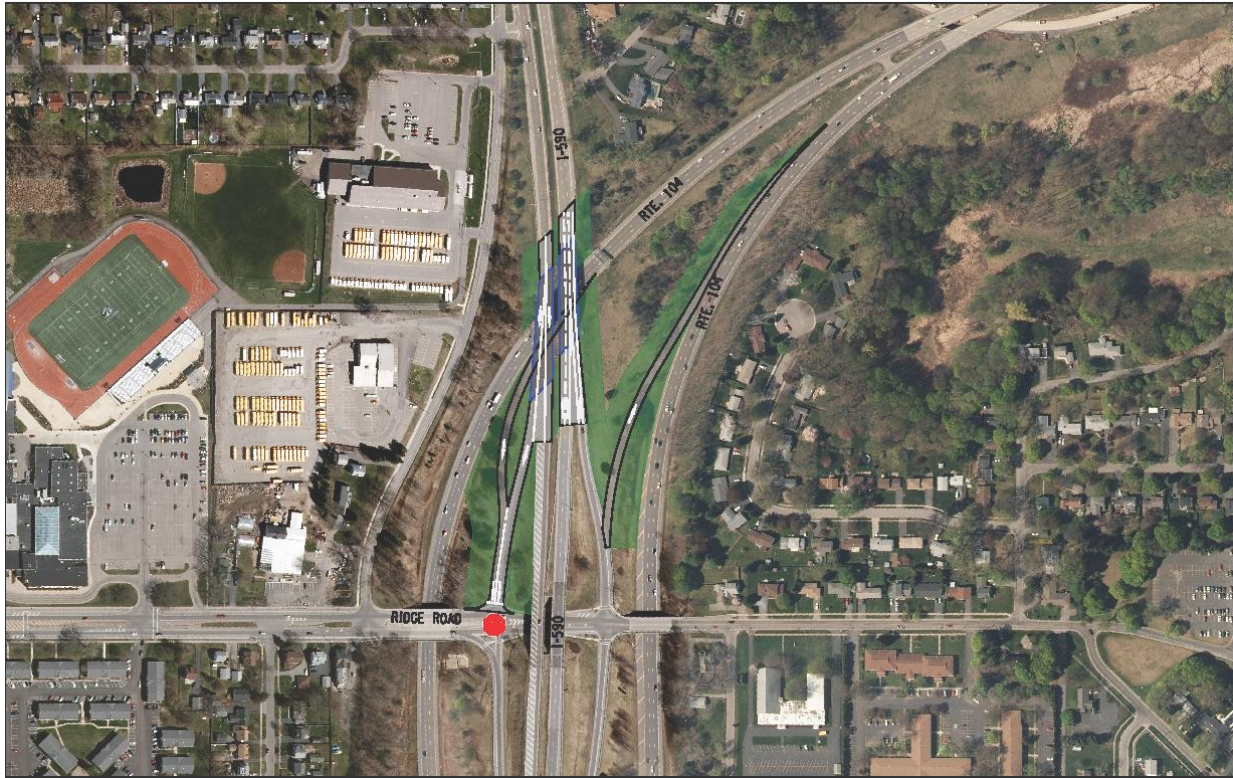


Figure 5-11
Route 104 to Ridge Road Connection

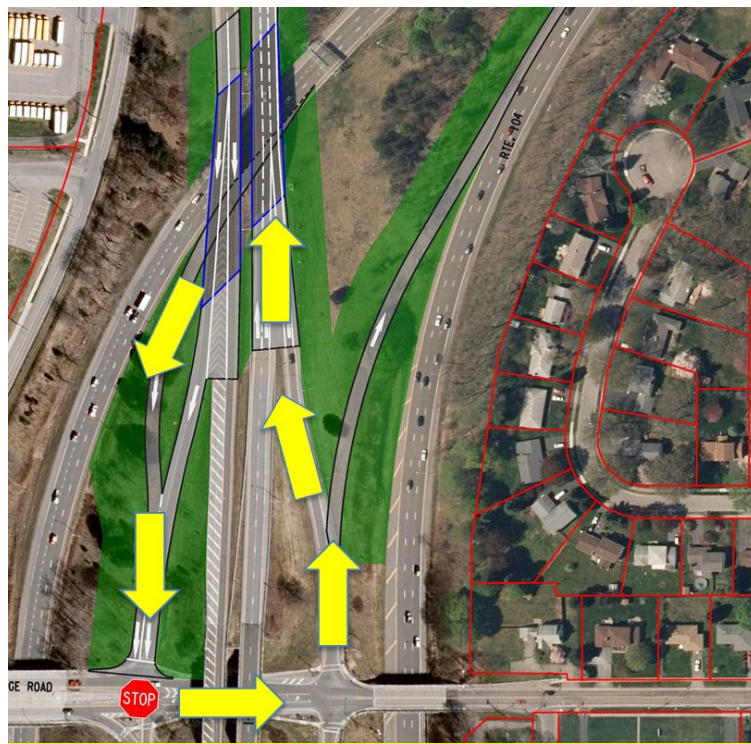


Figure 5-12
Route 104 Westbound to Sea Breeze Drive Northbound



Figure 5-13
Sea Breeze Drive Southbound to Route 104 Eastbound

Again, the GTC's Regional Travel Demand Model was utilized to estimate the volume of traffic that would utilize the new ramps under this alternative. The ramp from Route 104 westbound to Ridge Road is projected to carry approximately 3,200 vehicles per day and the ramp from Ridge Road to Route 104 eastbound is projected to carry approximately 6,800 vehicles per day. However, information gathered from the GTC Regional Travel Demand Model for projected volumes on Route 590 south of Titus Avenue with and without the proposed ramps showed that there is very little increase in traffic on Route 590 with the proposed new ramps (less than 500 vehicles per day). Consequently, it can be concluded that the majority of ramp traffic is traveling between Route 104 and Ridge Road to access points to the east, west, and south and that only a nominal amount of vehicles are using the proposed ramps to travel to and from the north using Route 590.

Scoring Factors

1. Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians)
2. Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians)
3. Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)



5.1.2 Evaluation Criteria 2: Emergency Access

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

The Towns of Irondequoit and Webster Fire Departments provide mutual aid assistance to each other when the existing bridge spans the outlet to service motorists from November 1 – April 1 each year. Under these alternatives, mutual aid assistance would be able to be provided year round.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Due to the location of existing emergency services, these alternatives would have no impact to emergency response.

Scoring Factors

1. Provides improved response time throughout the calendar year allowing mutual support
2. Provides some improved response time throughout the calendar year potentially allowing mutual support
3. Provides no improved response time or intermittent improvements

5.1.3 Evaluation Criteria 3: Environmental Impacts

Endangered Species and Critical Environmental Areas

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

The USFWS web-based process for “Project Reviews in New York State” was conducted for both Alternatives B and D. The following species were identified by this review process as possibly being present within the vicinity of the project alternatives:

- Northern Long-Eared Bat (*Myotis septentrionalis*): A bridge bat survey of the existing structure would be required within one year of the start of construction for construction of either Alternative B or D to ensure that no bats were nesting under the existing bridge.
- Bald Eagle (*Haliaeetus leucocephalus*): It is likely that work restrictive dates would be imposed to prevent the disturbance of nesting or roosting bald eagles for both alternatives, as there is a known bald eagle nest within the vicinity of the proposed alternatives.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

The USFWS web-based process for “Project Reviews in New York State” was conducted for both considered alternatives. The following species were identified by this review process as possibly being present within the vicinity of the project alternatives:

- Northern Long-Eared Bat (*Myotis septentrionalis*): It is likely that both Alternatives C and



E would require a more significant level of review based on the general layout of the alternatives and the significant tree removal that would be necessary for construction of these alternatives.

- Bald Eagle (*Haliaeetus leucocephalus*): It is likely that work restrictive dates would be imposed to prevent the disturbance of nesting or roosting bald eagles for both alternatives, as there is a known bald eagle nest within the vicinity of the proposed alternatives.

The New York State Department of Environmental Conservation (NYSDEC) has not yet been contacted for formal consultation regarding the presence of state listed threatened, endangered or special concern species that may be impacted by the proposed alternatives. This correspondence should be initiated during the preliminary design phase of the alternative to be implemented.

Ground Water

Alternative B: Retrofit Existing Bridge,

Alternative D: Rolling Lift Bridge,

Alternative C: Route 104 to Sea Breeze Drive Connection &

Alternative E: Route 104 to Ridge Road Connector

Sole Source Aquifer: Since all alternatives are located within a Sole Source Aquifer Project Review Area, a federal review and/or approval is required pursuant to Section 1424(e) of the Safe Drinking Water Act. Potential project impacts to the aquifer and any necessary engineering controls and measures to mitigate impacts would need to be documented pursuant to this review.

NYSDEC Primary and Principal Aquifers: It has been determined that all of the considered alternatives are underlain by a primary aquifer. It is anticipated that coordination pursuant to Section 1424(e) of the State Safe Drinking Water Act may be required as the proposed alternatives may have some impact on groundwater, based on the necessary substructure work. A project review and coordination would need to occur to ensure contamination of the aquifer is prevented.

Surface Water

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Waterbody Classification and Standard:

Alternatives B and D are located adjacent to Irondequoit Bay and Lake Ontario, which are classified by the NYSDEC as Class A waterbodies. A NYSDEC Article 15 Protection of Waters Permit is required for disturbing the bed or banks of a stream with a classification of C(t) or higher. Therefore, with regard to stream classification and standards, a NYSDEC Article 15 permit would be required for the construction of Alternatives B or D.

Discharges of fill (i.e., riprap, stone fill) or other materials below the Ordinary High Water elevation of the on-site waterbodies would require authorization under a U.S. Army Corps



of Engineers (USACOE) Section 404 permit. The proposed Outlet Bridge Alternatives include the replacement and rehabilitation of currently existing structures; therefore the project will likely be covered under the USACOE Nationwide Permit #3 for maintenance, specifically paragraph “a”. If sediment and/or previously placed riprap is removed from below the Ordinary High Water elevation, or if fill material is placed below the Ordinary High Water elevation, a preconstruction notification would be required to supplement the Nationwide Permit.

A Section 401 Water Quality Certification would be required for in-water work associated with the Outlet Bridge Alternatives. A Blanket Water Quality Certification has been issued by the New York State Department of Environmental Conservation (NYSDEC) for projects covered under Nationwide Permit #3. A review of the project with respect to the general conditions of the 2012 - 2017 Blanket Water Quality Certification was completed. Based on this review, and the fact that the existing outlet area is located within a Coastal Erosion Hazard Area, it is not expected that Alternatives B or D would be covered under the Blanket Section 401 Water Quality Certification as the location of these alternatives violates general condition 11 which reads, “This certification does not authorize projects in Coastal Erosion Hazard Areas as identified by ECL Article 34”. Therefore, an Individual Water Quality Certification would likely be required for the Outlet Bridge Alternatives.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Waterbody Classification and Standard

Alternatives C and E would not likely impact any NYSDEC Classified Waterbodies. Therefore, with regard to stream classification and standard, a NYSDEC Article 15 permit would not be required for the construction of these two alternatives.

No waterbodies were identified in the vicinity of Alternatives C and E. However, if a wetland delineation determines that this alternative would impact state or federal wetlands, any discharges of fill (i.e., riprap, stone fill) or other materials into the delineated wetland would require authorization under a U.S. Army Corps of Engineers (USACOE) Section 404 permit. Alternatives C and E would include the expansion of an existing linear transportation project; therefore these alternatives would likely be covered under the USACOE Nationwide Permit #14, for Linear Transportation Projects. If it is determined that the Alternatives C and E would impact a wetland, a preconstruction notification would be required to supplement the Nationwide Permit.

A Section 401 Water Quality Certification would be required if it is determined that these alternatives would impact a wetland. A Blanket Water Quality Certification has been issued by the NYSDEC for projects covered under Nationwide Permit #14. A review of the project with respect to the general conditions of the 2012 - 2017 Blanket Water Quality Certification was completed. Based on this review, it is expected that Alternatives C and E would be covered under the Blanket Section 401 Water Quality Certification as at this time the alternatives do not violate any general conditions or special conditions. However, if it is determined that these alternatives would affect a wetland that is within the FEMA designated 100-year floodplain, Special Condition 2 for Nationwide Permit 14 would be



violated, and an Individual Water Quality Certification would likely be required.

Navigability

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Irondequoit Bay is considered a navigable Safe Harbor as an Inland Lake/Harbor by the U.S. Coast Guard (USCG). The currently serviceable structure has been granted a Coast Guard Bridge Permit, and is subject to USCG regulation. Alternatives B and D would require new permit coverage under Section 9 of the Rivers and Harbors Act of 1899 based on these considerations.

Irondequoit Bay is considered navigable by the U.S. Army Corps of Engineers (USACE). Therefore, Alternatives B and D would require a permit under Section 10 of the Rivers and Harbors act of 1899.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Alternatives C and E would not impact any waters considered navigable by the USCG or the USACE. Therefore, coverage under Section 9 and Section 10 of the Rivers and Harbors Act of 1899 would not be required for construction of these alternatives.

Soil Disturbance and Stormwater Runoff

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

It is not anticipated that construction of Alternatives B and D would result in the disturbance of more than 1 acre of soil. Therefore, coverage under the State Pollution Discharge Elimination System (SPDES) General Permit GP-O-15-002 and completion of a Stormwater Pollution Prevention Plan (SWPPP) is not anticipated as a requirement for these alternatives.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

It is anticipated that construction of Alternatives C and E would result in the disturbance of more than 1 acre of soil. Additionally, these alternatives would occupy soils with a Slope Phase of F (per the USDA National Resource Conservation Service Soil Map for Monroe County). Therefore, coverage under the SPDES would be required. However, based on the Soil Slope Phase, coverage under General Permit GP-O-15-002 would likely not be granted, and an Individual SPDES permit would then be required. Additionally, completion of a Stormwater Pollution Prevention Plan (SWPPP) would be required for these alternatives, including Water Quality and Quantity Calculations to evaluate the increase in impervious area as a result of construction of these alternatives.

Federal and State Jurisdictional Wetlands



Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

A wetland delineation would be required for construction of these alternatives. Based on the findings of the wetland delineation, coverage under the NYSDEC Article 24 Freshwater Wetlands Permit and Evaluation under Executive Order 11990 Protection of Wetlands (for federal jurisdictional wetlands) may be required for construction.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Alternatives C and E are located adjacent to the mapped 100-foot wetland check zone for NYSDEC Freshwater Wetlands. Additionally, the alternatives' locations are within close proximity of a federally mapped and regulated wetland. Therefore, a wetland delineation would be required for construction of these alternatives. Based on the findings of the wetland delineation, coverage under the NYSDEC Article 24 Freshwater Wetlands Permit and coverage under Executive Order 11990 Protection of Wetlands (for federal jurisdictional wetlands) may be required for construction of these alternatives.

Floodplains

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Alternatives B and D are located within the 1% Annual Flood Hazard Area according to the Federal Emergency Management Agency (FEMA). Construction of these alternatives would require coordination under Executive Order 11988 for development within a floodplain to ensure that construction of a bridge would not interfere with this floodplain inundation zone.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Alternatives C and E are not located within the 1% Annual Flood Hazard Area according to the Federal Emergency Management Agency (FEMA). Therefore, construction of these alternatives would not require coordination regarding floodplain development.

Hazardous Waste Sites

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

No known hazardous waste sites were reported as being present in the vicinity of these alternatives. However, multiple spill reports at Mayer's Marina, located at 7 Lake Road, Webster are within and directly adjacent to these alternatives. Based on these findings, a subsurface hazardous waste and contaminated materials investigation within the project limits would be recommended prior to design and construction of these alternatives.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Two known hazardous waste sites were identified that have the potential to be impacted by



the construction of these Alternatives C and E. The “Irondequoit Town Dump” is reported as being located approximately 0.1 mile to the south of the proposed ramp connection to Route 104 just west of Irondequoit Bay Bridge , and “3000 East Ridge Road” is reported as being located approximately 0.3 mile south of connection point of the Route 104 ramps just west of the Irondequoit Bay Bridge. These two locations are depicted in Figure 3-9 with the green star symbol. No significant spill reports were identified adjacent to, or within the limits of Alternatives C and E. Based on these findings, a subsurface hazardous waste and contaminated materials investigation within the project limits would be recommended prior to construction of these alternatives to determine if any spills are reported before the project commences..

Cultural Resources

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

No eligible properties were identified within or adjacent to Alternatives B and D.

Records indicate these alternatives are located within an archeologically sensitive area. This would likely require the preparation of a project review request to be submitted to the NYSDOT Region 4 SHPO Cultural Resources Coordinator or SHPO for determination as to potential cultural resource impacts. However, based on proposed project components (retrofit or replacement of existing structure), it is not expected that any further historic review requirements would be necessary to progress these alternatives. If construction of either of them will result in an impact to previously undisturbed soils, then additional historic review requirements may be necessary.

Alternatives B and D are located adjacent to the Irondequoit Bay State Marine Park. Both of these alternatives would require the taking of park right of way to facilitate construction. Therefore, coordination under Section 4(f) Preservation of Parklands would likely be required. However, it is likely that these proposed alternatives would be covered under the Programmatic Section 4(f) agreement, as it involves “bridge replacement on essentially the same alignment” as outlined in the Federal Highway Administration (FHWA) Final Nationwide Section 4(f) Evaluation.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

Records from the New York State Historic Preservation Office (SHPO) and National Register of Historic Places were reviewed for listed historic properties that may be impacted by Alternatives C and E. No eligible properties were identified within or adjacent to these alternatives.

Records indicate these two alternatives are located within an archeologically sensitive area. This would likely require the preparation of a project review request to be submitted to the NYSDOT Region 4 SHPO Cultural Resources Coordinator or SHPO for determination as to potential cultural resource impacts. Additionally, it is likely that further archeological review would be required for construction of these alternatives, as a significant area of undisturbed soil would be impacted within an archeologically sensitive area.



No properties adjacent to these alternatives are eligible under Section 4(f) Preservation of Parklands of Historic Properties.

Scoring Factors

1. Little to no impacts
2. Moderate impacts
3. Major impacts

5.1.4 Evaluation Criteria 4: Impacts to Properties

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Under these two alternatives, 5 parcels would require strip acquisition totaling approximately 2400 sf. The impacted parcels are the Irondequoit Marina Bay Park on the north side and south side of Culver Road, the private parking area on the north side of Culver Road, Mayer's Marina, and a private residence on the north side of Lake Road. The partial acquisitions range from 3 feet wide to 8 feet wide adjacent to the existing right of way. The limits of these strip acquisitions are depicted with a bold yellow line in Figure 5-14.

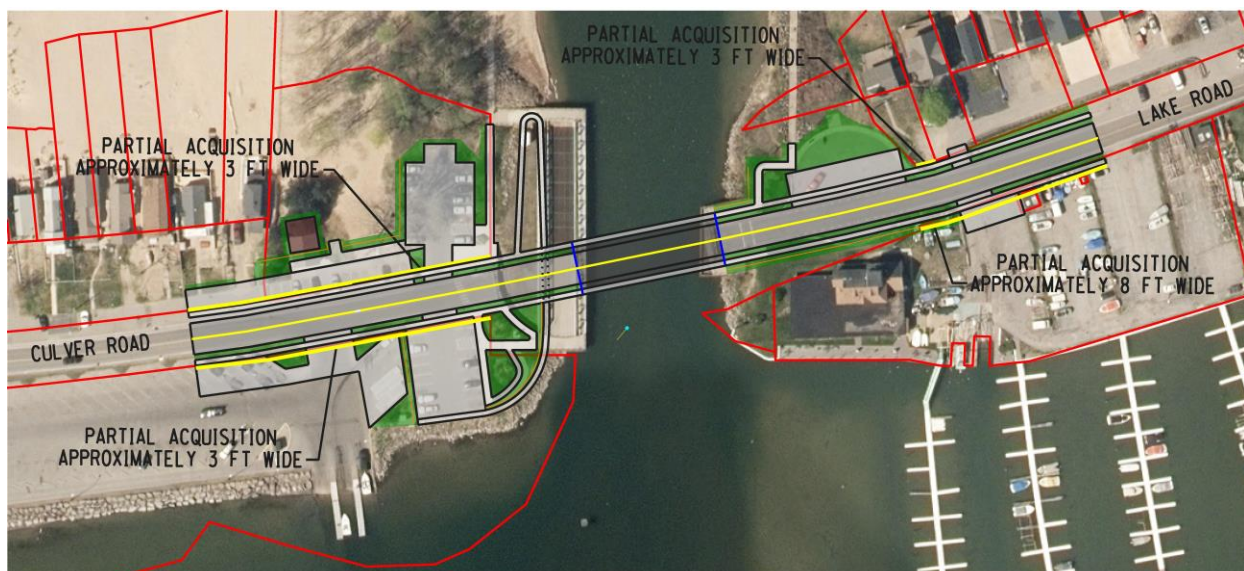


Figure 5-14
Alternative B and D Partial Acquisitions

Irondequoit Marina Bay Park on the north side of Culver Road

At this parcel, the existing street parking would be reconstructed approximately 8 feet to the north to accommodate a new 5-foot sidewalk thus impacting the existing sidewalk and bathroom facilities in the park. Due to the change in grade of the new roadway under these alternatives, a retaining wall would need to be constructed to support the parking area and sidewalks to minimize grading within the park. In addition, the bathroom facility would need to be relocated approximately 14 feet north due to the grade changes and addition of sidewalk.



The vehicular parking lot on this parcel would need to be reconstructed due to the grade change in the roadway.

Irondequoit Marina Bay Park on the south side of Culver Road

At this parcel, the two separate parking lots would be impacted under these two alternatives. The marina lot would have approximately 5 spaces impacted. These spaces would no longer be able to accommodate a vehicle with a trailer, but could be replaced with passenger car spaces. The passenger car lot would require reconstruction due to the grade change in the roadway and would lose approximately 2 parking spaces due to the addition of a sidewalk along the roadway.

Private parking area on the north side of Culver Road

The parking area in front of the private residences on Culver Road would be impacted by the proposed sidewalk. These spaces would be relocated behind the proposed sidewalk. The relocation would require some loss of lawn space to accommodate the new parking area.

Mayer's Marina

In order to support the new roadway and minimize impacts at Mayer's Marina, a retaining wall would need to be constructed along Lake Road under these two alternatives. The majority of the wall could be constructed within the highway boundary, but a short segment would need to be built on the marina's property. The proposed sidewalk would impact a parking lot and would require reconfiguration of approximately 5 spaces that currently store boats.

Private residence on the north side of Lake Road

Some minor grading of approximately 1 foot at the edge of roadway would occur at the first parcel on the north side of Lake Road to facilitate construction of the roadway and sidewalk under these two alternatives.

Public Parking along the north side of Lake Road

The addition of a proposed sidewalk would result in the loss of approximate 13 spaces at this location. These spaces are currently within the highway boundary and could be relocated to the area on the north side of Lake Road where the current cul-de-sac exists.

Sight Distance

Sightlines from the various parking locations along Culver Road and Lake Road adjacent to the existing bridge location were evaluated. The sight distance between vehicles in the parking areas on Culver Road and vehicles traveling over the outlet bridge are limited by the existing and proposed bridge trusses. The sightlines at the 3 main parking areas within the construction limits are limited to approximately 130 feet of sight distance which equates to speeds of under 15 MPH. For alternatives B and D the proposed roadway profile is being raised for additional vertical clearance under the bridge, however adjacent roadway features would also need to be raised in kind to stay in operation. It is anticipated that the vehicles entering the roadway from the parking areas would have the same sight distance under the proposed alternatives B and D as the existing condition of approximately 130 feet.

Both the existing and proposed scenarios meet the design standard for stopping sight distance of 175 feet for 30 MPH for mainline travel on both Culver Road and Lake Road..



Alternative C: Route 104 to Sea Breeze Drive Connector

Property Impacts

This alternative would result in 10 total acquisitions and 8 partial acquisitions of residential properties due to the alignment and corresponding grading needed to construct and support the proposed ramps under this alternative. The properties that would be acquired in total are:

- 2463 Titus Avenue Extension
- 2475 Titus Avenue Extension
- 2470 Titus Avenue Extension
- 2464 Titus Avenue Extension
- 2460 Titus Avenue Extension
- 2444 Titus Avenue Extension
- 3 Rudman Road
- 9 Rudman Road
- 14 Rudman Road
- Empty lot adjacent to Sea Breeze Drive (owned and used by 2600 Titus Avenue Extension)

These properties are highlighted in yellow in Figure 5-15.



Figure 5-15
Alternative C Total Property Acquisitions

The partial acquisitions would be along Sunrise Crescent and Titus Avenue Extension. The properties on Sunrise Crescent would have the new ramps aligned through the back of their existing lots and the corresponding grading would result in approximately 50% of the lots being acquired for the new roadway. These lots would still meet the Town of Irondequoit minimum lots size of 9600 square feet. These properties are as follows:

- 58 Sunrise Crescent
- 69 Sunrise Crescent
- 78 Sunrise Crescent
- 88 Sunrise Crescent
- 94 Sunrise Crescent

The properties requiring partial acquisitions on Titus Avenue Extension would be a result of minor vertical alignment changes on Sea Breeze Drive to match in geometrically with the proposed ramps. These properties are as follows:

- 2600 Titus Avenue Extension



- 2610 Titus Avenue Extension
- 2620 Titus Avenue Extension

2610 Titus Avenue does not have a dwelling on it and is owned and maintained by the owner of 2600 Titus Avenue who also owns and maintains the empty lot along Sea Breeze Drive that would be acquired in total. The parcel at 2600 Titus Avenue Extension would require the removal of a storage shed to construct this alternative.

The partial take areas are depicted in light blue in Figure 5-16.



Figure 5-16
Alternative C Partial Property Acquisitions

Alternative E: Route 104 to Ridge Road Connector

Property Impacts

This alternative can be constructed within the existing highway boundary. No acquisitions are



required.

Scoring Factors

1. No property acquisitions or mitigation measures are necessary
2. Partial property acquisitions or mitigation measures are necessary
3. Major property impacts or total acquisitions or mitigation measures are necessary

5.1.5 Evaluation Criteria 5: Economic Impacts

Two primary categories of economic impacts are discussed in this evaluation: impacts to highway users (see Evaluation Criteria 10) and impacts to businesses.

Business Impacts

In order to study the business impacts within the study area affected by direct access at Lake Road and Culver Road, retail sales data was examined. Data were not available at a level of detail to determine what would be attributable to the change in access and what would be attributable to the change in seasons. In the absence of this data, vehicle traffic was utilized as an alternative means for assessing potential business opportunity.

Many of the businesses directly adjacent to the Bay Outlet Bridge, while open year round, derive most of their economic benefit from the busiest traffic times during the summer months due to the volume of people that frequent the recreational destinations in the Bay Outlet area, when the bridge is not accessible to vehicles. An assessment of retail sales differences could not be conducted at a level granular enough to distinguish any impacts associated with a difference in roadway access to businesses within one mile of the bridge. Average national sales data show general seasonal differences between the winter and summer months for retail operations similar to those located in the Outlet area, but no conclusive evidence is available to indicate a definitive change between the winter and summer months that is attributable to the presence of the vehicular access.

Anecdotal evidence has shown that additional vehicle traffic increases sales opportunities for businesses. Thus, it is possible that the increased vehicle traffic associated with some of the alternatives would present an opportunity to increase retail business sales along the most northern section of Sea Breeze Drive, Culver Road, and Lake Road. Alternatives B - Rehabilitate existing swing bridge and D - New moveable bridge provide the opportunity for year-round access, and thus an increase in retail business opportunity could be reasonably anticipated. Alternative C-Ramps 104 to Sea Breeze Drive is also expected to increase traffic near businesses and an increase in retail business opportunity could also be reasonably anticipated under this alternative. However, Alternatives A - Null Alternative and E - Ramps 104 to Ridge Road Connector are not expected to have any impact on local businesses as neither of them result in significant changes to vehicular traffic volumes in the Bay Outlet area.

Impacts to Property Values

It is widely accepted that roadway and water access impact the value of nearby properties. Research was performed to determine whether values are affected by improved water access due to a movable bridge. No studies were found to address the change in property values driven by movable or fixed bridge types. Thus, there was no precedent to indicate definitive



changes in property values as a direct result of bridge related access.

Scoring Factors

1. Anticipated increase in retail business opportunity
2. No change
3. Anticipated decrease in retail business opportunity

5.1.6 Evaluation Criteria 6: Project Costs

The project costs needed to bring a construction project to completion typically have three separate components. These include engineering costs, rights of way costs, and construction costs. Engineering costs are the dollars associated with designing the project and putting together a set of engineering plans and specifications that provide the details needed for a construction contractor to build the project. Right of way costs are the monies associated with purchasing any private property that would be required to construct the project. Construction costs are the time and materials needed to build the project plus construction inspection to insure that project is being constructed properly.

The project costs for each alternative are reflected in Table 5-1.

**Table 5-1
Project Costs**

Alternative	Engineering	Rights of Way	Construction	Construction Inspection	Total Cost
A (Null)	\$0	\$0	\$0	\$0	\$0
B	\$3,200,000	\$200,000	\$16,000,000	\$3,200,000	\$22,600,000
C	\$5,960,000	\$3,170,000	\$29,800,000	\$5,960,000	\$44,890,000
D	\$6,580,000	\$200,000	\$32,900,000	\$6,580,000	\$46,260,000
E	\$4,200,000	\$0	\$21,000,000	\$4,200,000	\$29,400,000

Scoring Factors

1. Low Project Costs - \$0 to \$15 Million
2. Moderate Project Costs - \$15 to \$30 Million
3. High Project Costs - greater than \$30 Million

5.1.7 Evaluation Criteria 7: Aesthetic Impacts

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Both bridge options have similar aesthetic impacts to the area. Both bridge options would raise the surrounding area by approximately 6 feet and have a footprint similar to the existing bridge. The overall character of the outlet area would be maintained under these two alternatives and therefore a minimal aesthetic impact is expected.

Alternative C: Route 104 to Sea Breeze Drive



A connection from Route 104 to Sea Breeze Drive would have noticeable impacts on the neighborhoods at Sunrise Crescent and Titus Avenue Extension.

The homes at Sunrise Crescent would have expressway ramps relocated approximately 160 feet from the back the house and either steep grading or retaining walls to support the land. This alternative changes the backyards of these homes from a wooded area to a roadway.

The homes at Titus Avenue Extension would have new expressway ramps located close to their homes under this alternative resulting in a reduced buffer space between roadways and their homes.

Alternative E: Route 104 to Ridge Road Connector

This alternative is not anticipated to have any aesthetic impact due to the absence of sensitive receptors to visual changes in the vicinity of this alternative.

Scoring Factors

1. Improves the current character of the area
2. Maintains the current character of the area
3. Decrease the current character of the area

5.1.8 Evaluation Criteria 8: Operation and Maintenance Cost

Each alternative would require a continuing outlay of operation and maintenance costs. The movable bridge alternatives would require electricity to swing or lift the bridge as well as lighting for navigation. The bridge would require other ongoing maintenance such as painting, motor and cable replacement for the swing or lift. In addition, movable bridges have labor costs for operators to swing or lift the bridge. The Route 104 connection alternatives (C and E) also have ongoing maintenance costs, such as repaving, restriping, and cleaning. Table 5-2 shows the estimated present value of the annualized costs over a 75 year service life for operation and maintenance costs for each alternative

Table 5-2
Operation and Maintenance Cost Summary

Null Alternative	Alternative B	Alternative C	Alternative D	Alternative E
\$ 300,000	\$ 3,900,000	\$ 300,000	\$ 3,900,000	\$ 300,000

Scoring Factors

1. Low programmed maintenance costs
2. Moderate programmed maintenance costs
3. High programmed maintenance costs



5.1.9 Evaluation Criteria 9: Improved Access for Non-Motorized Users (Bicyclists and Pedestrians)

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

The movable bridge options would provide year round access for bicycles and pedestrians. This is more beneficial during the summer months when these users are more likely to be out, when the existing bridge does not provide access. Pedestrians would be accommodated with a separate sidewalk facility and bicyclists would be accommodated within the roadway.

During the summer season, when pedestrian traffic is likely to be highest, traffic volumes are also expected to be higher than during winter months. Currently, when the bridge is in place, the average daily traffic using the bridge is approximately 5,900 vehicles per day (vpd). Historical traffic counts that were collected in the early 1980's, when the former low level bridge was in place for the entire year, shows that traffic volumes are approximately 50% higher during the summer months. Consequently, the traffic data that was collected as part of this study in March 2017 was increased by 50% to estimate the volume of traffic across a moveable bridge during the summer months. Review of these adjusted volumes shows that during the hours of the day when traffic is projected to be highest (10am to 5pm), the amount of traffic crossing the bridge would not allow a pedestrian ample time to safely cross. During this timeframe there would be a vehicle crossing the bridge approximately every 10 seconds in each direction. Under these conditions, it would be very difficult for a pedestrian to safely cross the roadway. One solution to mitigate this would be the installation of a signalized mid-block pedestrian crossing that would require vehicles to stop when the pedestrian signal is activated. Another solution would be to provide a crossing for pedestrians under the roadway since the elevation of the new or retrofitted bridge would be raised to provide a 10-foot clearance above ordinary high water.

Alternative C: Route 104 to Sea Breeze Drive Connection & Alternative E: Route 104 to Ridge Road Connector

These alternatives will not improve access for non-motorized users. Route 104 is a limited access highway and bicycles and pedestrians are prohibited.

Scoring Factors

1. Excellent - provides direct connection with the shortest distance
2. Good - provides connection for pedestrians and bicyclists with increased distance
3. Poor - provides no accommodation for pedestrians and bicyclists

5.1.10 Evaluation Criteria 10: Impacts to Highway User Cost

Roadway User Impacts

The existing roadway structure provides a direct connection between the Town of Webster and the Town of Irondequoit for approximately half of the year. During this time, users living and working in the immediately surrounding area have an option to directly cross at the Bay Outlet Bridge, or to drive farther south and use Route 104. Traffic counts indicate a volume of approximately 5,900 vehicles per day when the bridge is available to motorists. These users



must choose an alternate route during the summer months, increasing the length of their journey and thus incurring additional travel time and vehicle maintenance costs.

During the winter months, drivers traveling westbound from Webster are able to cross from Lake Road to Culver Road and then utilize either Culver Road or Sea Breeze Drive to access points within or beyond Irondequoit. For points north of Liberty Avenue, this direct connection is shorter than utilizing Route 104. This is particularly true because there are no northbound ramps connecting Route 104 to Sea Breeze Drive, so users must continue westbound to Culver Road to head north, resulting in additional out-of-direction travel. While only a very short distance, it is inconvenient and results in additional delay and vehicular wear and tear.

As an example, a user wishing to travel from Webster Fire Department Station #2 to Sea Breeze Amusement Park would travel approximately 2.3 miles during the winter and approximately 7.4 miles in the summer (as shown in Figure 5-17 and Figure 5-18). This trip would be shortened under the alternatives that provide year round access at the Bay Outlet, and also under the alternative that provides the northbound connection to Sea Breeze Drive. The impacts of the continuous bridge access would be greater than that of the ramps, which only slightly reduce the trip length.

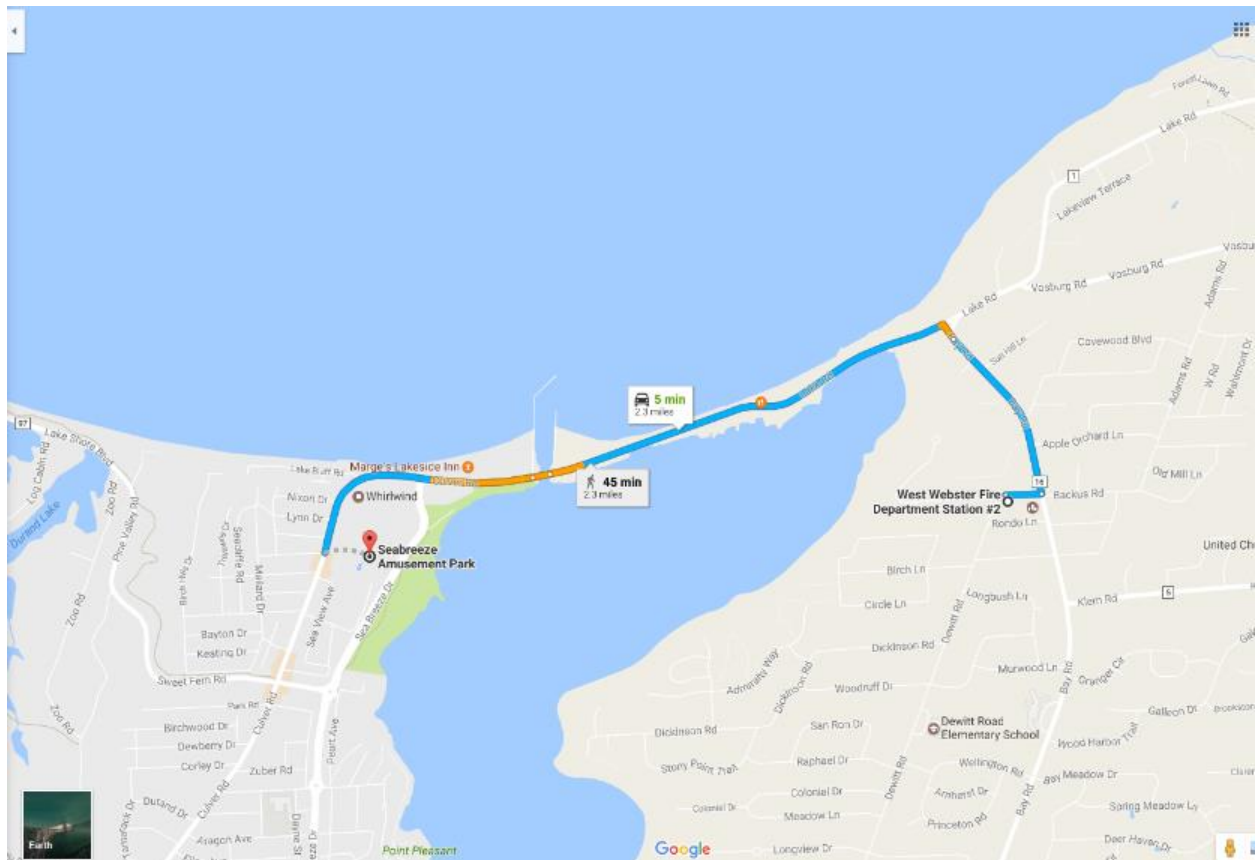


Figure 5-17 Approximate Travel Times – Northern Route

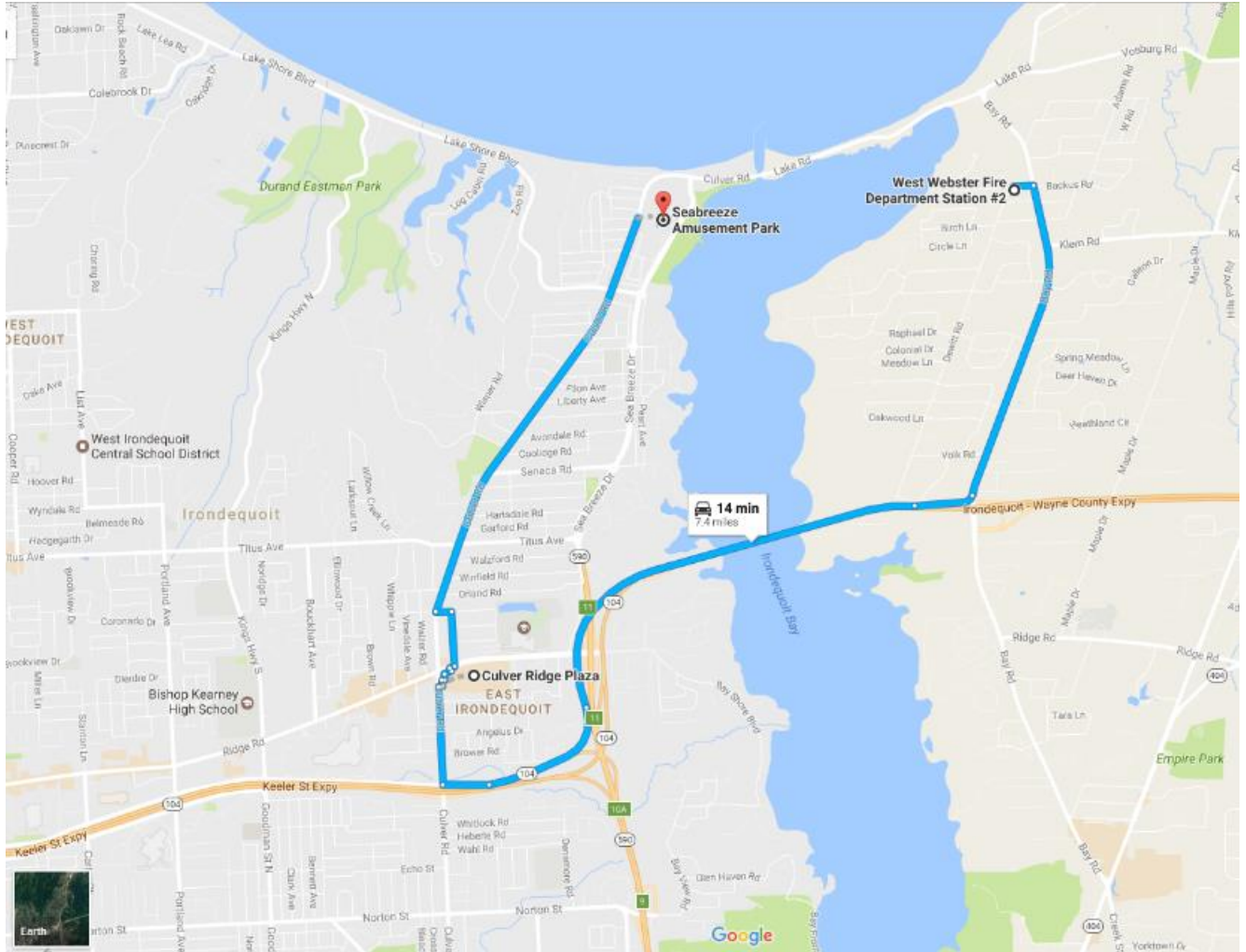


Figure 5-18 – Approximate Travel Times – Southern Route

In summary, the most positive impact (largest reduction in highway user costs) is associated with Alternatives B - Rehabilitate existing swing bridge and D - New moveable bridge. Alternatives C- Ramps 104 to Sea Breeze Drive and E - Ramps 104 to Ridge Road Connector would have a slight impact in the area of the ramps and for specific movements that are not currently present, but would not have a positive impact closer to the Lake. Alternative A - Null alternative would not result in a change of highway user costs.

Scoring Factors

1. Reduction in highway user costs for all users
2. Small change in user costs – benefits to some but not all users
3. No change

5.1.11 Evaluation Criteria 11: Construction Impacts

Alternative B: Retrofit Existing Bridge & Alternative D: Rolling Lift Bridge

Both bridge options would have similar construction impacts. The construction footprint to



build both alternatives is similar as is the corresponding work on Lake and Culver Roads to tie the existing surface streets in the new bridge profile. During construction, the traffic patterns would be affected as the majority of the construction work would need to occur during November to March to minimize impacts to navigation traffic, as such the bridge crossing would not be available for vehicular traffic for approximately one construction season.

Alternative C: Route 104 to Sea Breeze Drive

The majority of construction for this alternative would happen outside any existing roadways as new ramps would be constructed connecting Route 104 and Sea Breeze Drive. While any offline highway work is being constructed, traffic would be maintained using the existing roadway. Constructing the new ties between the ramps and Route 104 would result in temporary traffic pattern shifts and potential detours.

Alternative E: Route 104 to Ridge Road Connector

Most of the construction for the new connections between Route 104 and Ridge Road could be constructed off line. Short-term lane closures may be needed to tie in the new ramps to the existing roadways. The existing bridges carrying Interstate 590 over Route 104 would require reconstruction due to a wider footprint of Route 104 below them. Construction of the new bridges would require long-term lane shifts on Interstate 590 and potentially detours.

Scoring Factors

1. Minor - impacts to roadway users and nearby residents/businesses
2. Moderate - impacts to roadway users and nearby residents/businesses
3. Major - impacts to roadway users and nearby residents/businesses

5.2 Alternative Scoring Summary

As previously indicated in Section 5.1 Scoring Method, based on an assessment of each alternative with respect to the scoring factors under each criteria, the alternatives receive a score from 1 to 3 under each criteria with 1 being the best score and 3 being the worst score. Scoring is based on a quantitative or qualitative assessment as supported by the findings established during the alternatives evaluation process. Table 5-3 provides a summary of the score each alternative received within each of the 11 evaluation criteria based on the scoring factors presented in the previous sections.

Table 5-3
Alternative Scoring Summary

Criteria	Null	Alternative B	Alternative C	Alternative D	Alternative E
1. Improved Year Round Access	3	1	2	1	2
2. Emergency Access	3	1	2	1	2
3. Environmental Impacts	1	2	2	2	2
4. Impacts to Properties	1	2	3	2	1
5. Economic Impacts	2	1	1	1	2



6. Project Costs	1	2	3	3	2
7. Aesthetic Impacts	2	2	3	2	2
8. Operation and Maintenance Costs	1	3	2	3	2
9. Improved Access for Non-Motorized Users	3	1	2	1	2
10. Impacts on Highway User Costs	3	1	2	1	2
11. Construction Impacts	1	1	2	1	3

Once the scores for each alternative under each criteria are tabulated, these scores are multiplied by the weight factor of the criteria to obtain a weighted score. The lower the weight factor of the criteria, the more important the criteria. The weighted score for each criteria is added together to obtain a final score for each alternative. The alternative with the lowest score is considered the highest ranking alternative. Table 5-4 depicts the final weighted scoring of the alternatives. Detailed scoring for each alternative is tabulated in Appendix B.

Table 5-4
Final Weighted Scoring of Alternatives

Alternatives	Criterion											
	Improved Year Round Access	Emergency Access	Environmental Impact	Impacts to Properties	Economic Impacts	Project Costs	Aesthetics Impacts	Operation & Maintenance Costs	Improved Access for Non-Motorized Users	Impacts on Highway User Costs	Construction Impacts	Weighted Sum Score
Criterion Weighting Factor	1	2	3	4	5	6	7	8	9	10	11	
A - Null Alternative	3	3	1	1	2	1	2	1	3	3	1	122
B - Rehabilitate existing swing bridge	1	1	2	2	1	2	2	3	1	1	1	102
C - Ramps 104 to Sea Breeze Drive	2	2	2	3	1	3	3	2	2	2	2	144
D - New moveable -Rolling Lift bridge	1	1	2	2	1	3	2	3	1	1	1	108
E - Ramps 104 to Ridge Road	2	2	2	1	2	2	2	2	2	2	3	139



Based on the final weighted scoring of the alternatives, the ranking of the alternatives is as follows in order of best meets the project evaluation criteria to least meets the project evaluation criteria:

Alternative B. Rehabilitate existing swing bridge	Final Weighted Score = 102
Alternative D: New moveable bridge – rolling lift bridge	Final Weighted Score = 108
Alternative A: Null Alternative (Existing bridge remains)	Final Weighted Score = 122
Alternative E: Ramps 104 to Ridge Road	Final Weighted Score = 139
Alternative C: Ramps 104 to Sea Breeze Drive	Final Weighted Score = 144

With this information, the agencies involved are able to plan for the next steps in the process as discussed in Section 6.0.



6.0 Next Steps

The next steps required to advance the design development and implementation of the IBOB Project will focus on adopting the recommendations and pursuing project funding for future design and construction. There are several follow-on tasks that will help secure future funding by making the project's application more competitive. It is recommended that the Towns of Irondequoit and Webster, along with Monroe County, pursue the following action items in an effort to move a proposed project to construction.

6.1 Project Steering Committee

It is recommended that the Project Steering Committee remain in place and actively advocate for construction and improved year round access. Maintaining the Project Steering Committee continuity ensures that guiding principles and goals are not lost should there be staff changes within the municipalities. Implementation strategies and funding opportunities will remain dynamic as the project progresses and the committee can serve as a strong liaison between the community and public officials. It may be desirable for the Project Steering Committee to meet periodically, or at a minimum, the municipal representatives from the Towns of Irondequoit and Webster and Monroe County who served on the Project Steering Committee. This will ensure the lines of communication remain open, and will allow information sharing among the municipalities regarding progress being made.

6.2 Ownership and Maintenance

The existing swing bridge is owned and operated by Monroe County. Any ownership and maintenance responsibilities for a future bridge should be discussed and agreed upon, so that when a funding application is prepared, these responsibilities can be clearly stated. The maintenance tasks and costs presented herein should be discussed to ensure that the entity assuming ownership and maintenance responsibility has the capability to perform these tasks, and is aware of the costs associated with maintenance and the long-term capital improvement cost.

The Route 104 connector alternatives would be owned and operated by NYSDOT. Both of these alternatives would need to be approved by NYSDOT to be further advanced.

6.3 Formally Adopt the Feasibility Study

Each municipal entity should adopt the recommendations of this Feasibility Study through their standard project approval procedures and incorporate the development of the IBOB into their planned transportation development goals. It is also recommended that each municipality assign a person who is responsible for coordination of further actions needed to move through design and construction including the actions discussed in the next section "Identify Funding Sources".



6.4 Identify Funding Sources

Numerous funding programs exist for project improvements. Funding levels and programs change over time so at the time a municipality elects to pursue a project they will need to evaluate all federal, state and local funding sources that are available to identify the most appropriate financial program to utilize.

6.5 Coordination with Impacted Property Owners

It is recommended that each municipality continue discussions and coordination with the potentially impacted property owners. If possible, a letter of intent should be solicited from the property owners indicating each owner's willingness to grant an easement for the roadway. Letters such as this will strengthen each municipality's funding application. The possibility of donating the required easements should also be discussed with impacted property owners. Going one step further and actually obtaining the easements would significantly strengthen a funding application, as the hurdle for acquiring ROW would be eliminated.



7.0 Summary

This study evaluated the feasibility of providing year round access across the Irondequoit Bay Outlet. A systematic procedure was used to evaluate alternatives and extensive coordination with the Project Steering Committee and public occurred throughout the duration of the project. Results of this study show a ranking of alternatives based on the evaluation criteria established as part of the project development process. This report documents the process used; the feasible alternatives including potential impacts associated with their development; associated design, construction and maintenance costs; and follow on activities. The information included herein is intended to be used as a stepping-stone to progress the Irondequoit Bay Bridge Project to future design and construction.

The process used in this study has established a ranking of alternatives from 1 to 5 where 1 best satisfies the project evaluation criteria. The rankings of the alternatives are as follows:

1. Alternative B - Retrofit of bridge for year round operation and 10 foot under clearance
1. Alternative D - Movable bridge with 10 foot under clearance
3. Alternative A - Null or Do Nothing
4. Alternative C - Route 104 to Ridge Road connection
5. Alternative E - New ramps at Irondequoit Bay Bridge

Appendix A



Town of Irondequoit

Irondequoit Bay Outlet Bridge Alternatives Analysis Study

Public Information Meeting—April 12, 2017—7:00 PM

Irondequoit Town Hall, 1280 Titus Avenue, Irondequoit, New York 14617

Agenda

- Introductions
- Study Purpose
- Results of Existing Conditions Research
- Evaluation Criteria Process
- Next Steps and Schedule
- Public Involvement Breakout Stations

Study Purpose:

The purpose of the study is to explore options to provide year-round access across the Bay Outlet, creating a better regional transportation system for all modes of travel. This feasibility study will provide a mechanism to assess whether any reasonable design solutions are available to provide year-round access to all travelers, including vehicles, boats, bikes and pedestrians while preserving the Irondequoit Bay's ability to serve as a Safe Harbor.

Please Share Your Thoughts

Leave or Mail in a Comment Sheet

Participate in the Public Involvement Breakout
Stations

Take the Online Survey



<https://www.surveymonkey.com/r/PZ38WLC>





Irondequoit Bay Outlet Bridge Alternatives Analysis Study

April 12, 2017





Study Team:

- Town of Irondequoit
- Fisher Associates
 - HDR
 - Ravi Engineering
- Steering Committee





Steering Committee:

- Town of Irondequoit • USCG
- Town of Webster • NYSDOT
- Business Owners • NYSDEC
- Seabreeze District • NYS Parks
- Assemblyman Joe Morelle's office • MCDOT
- Senator Rich Funke's office • GTC
- Senator Chuck Schumer's office • MC Planning
- Monroe County Legislature



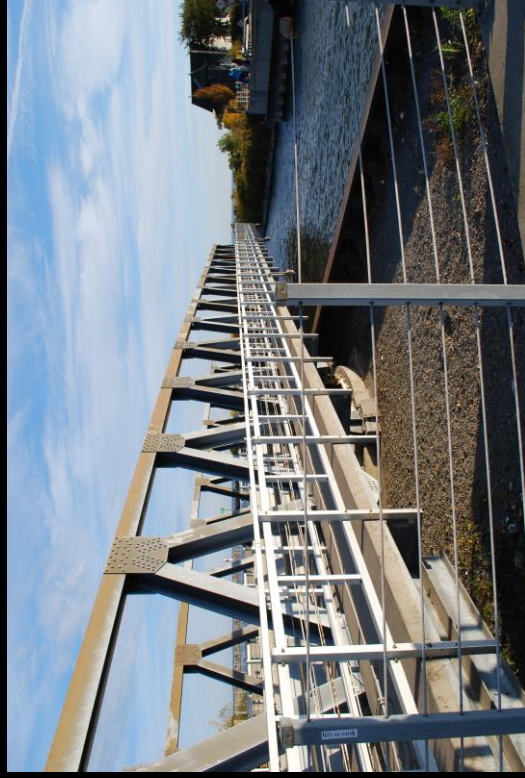
Agenda:

- Introductions
- Study Purpose
- Results of Existing Conditions Research
 - Jurisdictional Ownership
 - Structural Conditions
 - Environmental Screenings
 - Traffic Data
 - Land Use/Business Assessment
- Evaluation Criteria Process
- Next Steps and Schedule
- Public Involvement Breakout Stations



Study Purpose:

The purpose of the study is to explore options to provide year-round access across the Bay Outlet, creating a better regional transportation system for all modes of travel. The feasibility study will provide a mechanism to assess whether any reasonable design solutions are available to provide year-round access to all travelers, including vehicles, boats, bikes and pedestrians while preserving the Irondequoit Bay's ability to serve as a Safe Harbor.





Study Tasks:

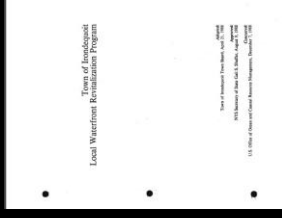
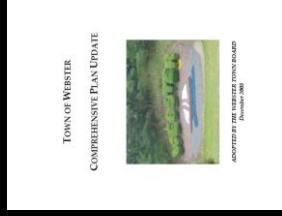
- Project Initiation
- Public Participation
- Existing Conditions Analysis
- Development of Alternatives
- Assessment of Feasibility and Cost Analysis
- Present Draft Recommendations
- Public Information Meeting
- Complete Report



Existing Conditions:

Review of previous plans, designs, reports and documents relating to the Irondequoit Bay Outlet

- NYSDOT Route 104 Ramp Plans – 1967 as-builts
- County and NYSDOT Traffic Records
- Regional Travel Demand Model (TDM)
- Seneca Trail Feasibility Study - 2014
- Comprehensive Plans (Irondequoit, Webster)
- LWRP





Jurisdictional Information





Current Physical and Natural Conditions

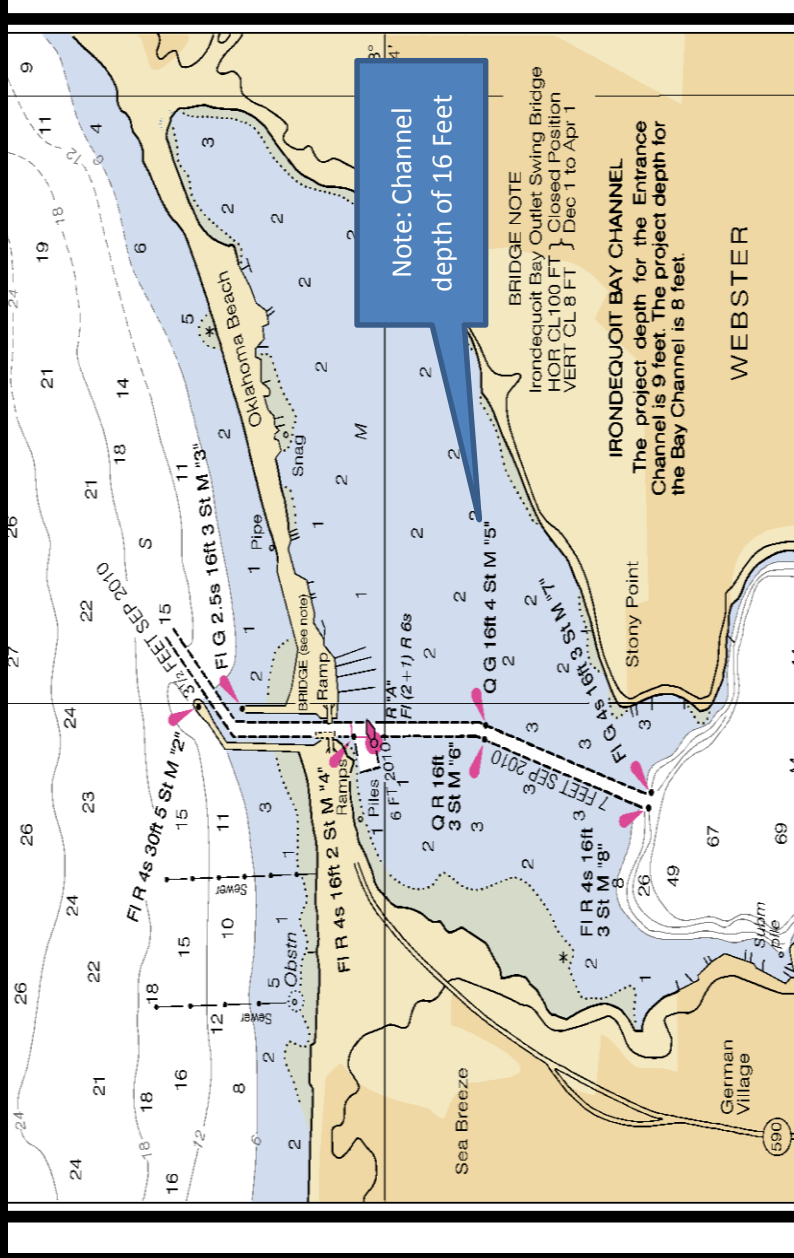
Structural Conditions:

- The existing outlet bridge was constructed in 1998.
- Provides two travel lanes and two sidewalks crossing the outlet channel to Irondequoit Bay.
- The bridge is seasonally operated.
- It is open to roadway traffic from November 1 through April 1. The remainder of the year, it is swung open to allow unrestricted marine traffic and is positioned along the west side of the outlet.
- The inside width between trusses is 24 ft and there is a 5 ft sidewalk on each side of the bridge (outside the trusses).
- The navigation clearance with the bridge in the closed position is 4 ft.



Current Physical Conditions

Navigation Study: Access to Irondequoit Bay from Lake Ontario is through a channel which has 100 feet of horizontal clearance and 16 feet of authorized water depth. The water depth has been reported anecdotally as 12 feet by local mariners.





Current Physical Conditions

Vessel Survey: Review of the local mariners was performed

Vessel Type	Estimated Number	Beam (feet)	Draft (feet)	Height from waterline (feet)
Motor boat 10 to 30 feet in length	1400	8	3	10
Motor Boat over 35 feet in length	25		6	25
Sail Boat under 30 feet	340		6	33
Sail Boat over 30 feet	25	15	10 – 12	45
Work Barges		40	3 to 12	0 to 15
Emergency Service vessels		12	5	10



Current Physical Conditions

Vessel Survey: Review of the local mariners was performed

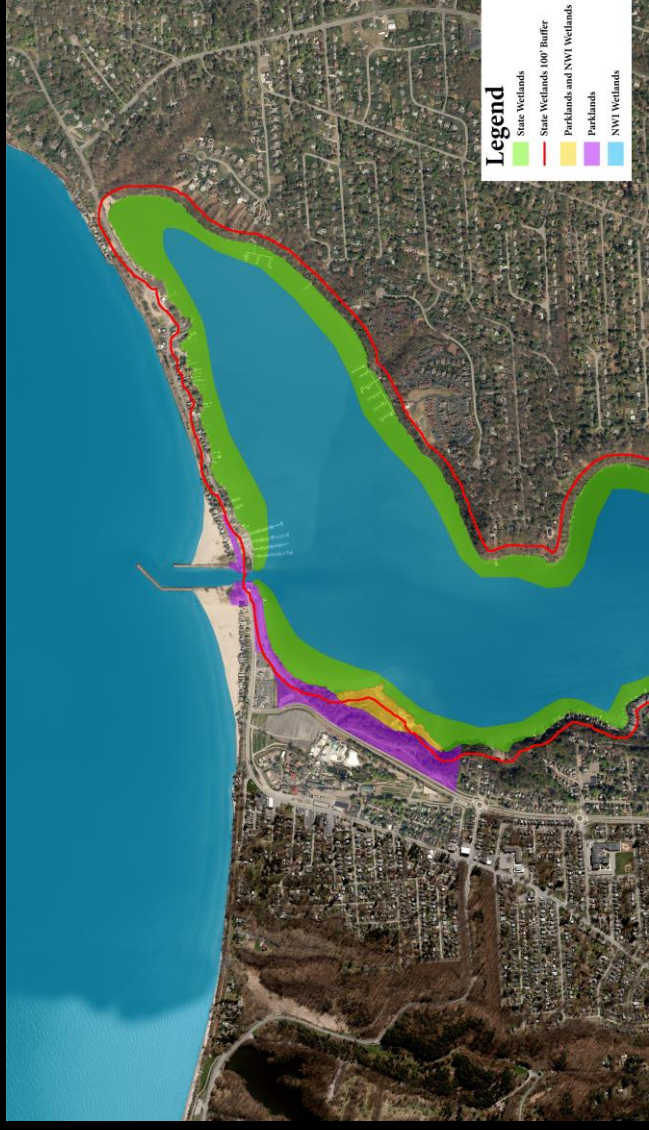
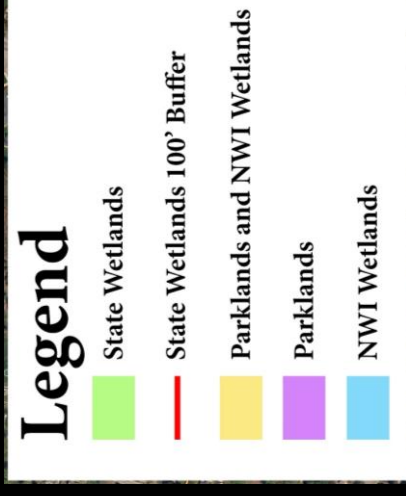
- Discussions with marina owners
- Count of the slips within the Bay
- ~90% of the vessels berthed within the Bay are recreational craft from 10 -30' long; Some larger craft up to 50' long
- The bay is also home to sailing vessels in 15-30' range.
- Based upon a count of slips, the bay can accommodate approximately 1800 small craft.

50' – 100%, 40' – 95%, 20' to 30' – 80%, 10' – 75%



Environmental Screening and Regulatory Compliance

- Endangered Species
- Hazardous Waste Sites
- Ground / Surface Water
- Wetlands
- Cultural Resources
- Parkland





Environmental Screening and Regulatory Compliance

- Endangered Species – Northern Long-Eared Bat, Bald Eagle
 - (Both current location and Route 104 ramp alternatives)
- Hazardous Waste Sites – Spill Sites and Hazardous Waste Sites Within Study Areas Would Require Subsurface Investigations
 - (Both current location and Route 104 ramp alternatives)
- Ground Water – Sole Source Aquifer – No Primary Aquifer – Yes but most likely no impact
 - (Both current location and Route 104 ramp alternatives)



Environmental Screening and Regulatory Compliance

- Surface Water – Lake Ontario and Irondequoit Bay
NYSDEC Class A Water Bodies
(Current location alternative consideration)
- Wetlands – Within 100 Foot Check Zone NYSDEC Wetlands
Near Federal Mapped and Regulated Wetland
 - (Both current location and Route 104 ramp alternatives)
- Cultural Resources – No Historic, Possible Archeological
 - (Both current location and Route 104 ramp alternatives)
- Parkland – Irondequoit Bay State Marine Park – Section 4f
Evaluation



Environmental Screening: Permitting

- US Army Corps:
 - Section 404 Clean Waters Act
 - Pre-Construction Notification Nationwide Permit 14
 - Section 10 of the Rivers and Harbors Act of 1899
- US Coast Guard
 - Section 9 of the Rivers and Harbors Act of 1899
- Executive Orders
 - EO 11990 Protection of Wetlands
 - EO 11988 Floodplains
- NYS Department of State
 - Coastal Zone Consistency Certification Statement





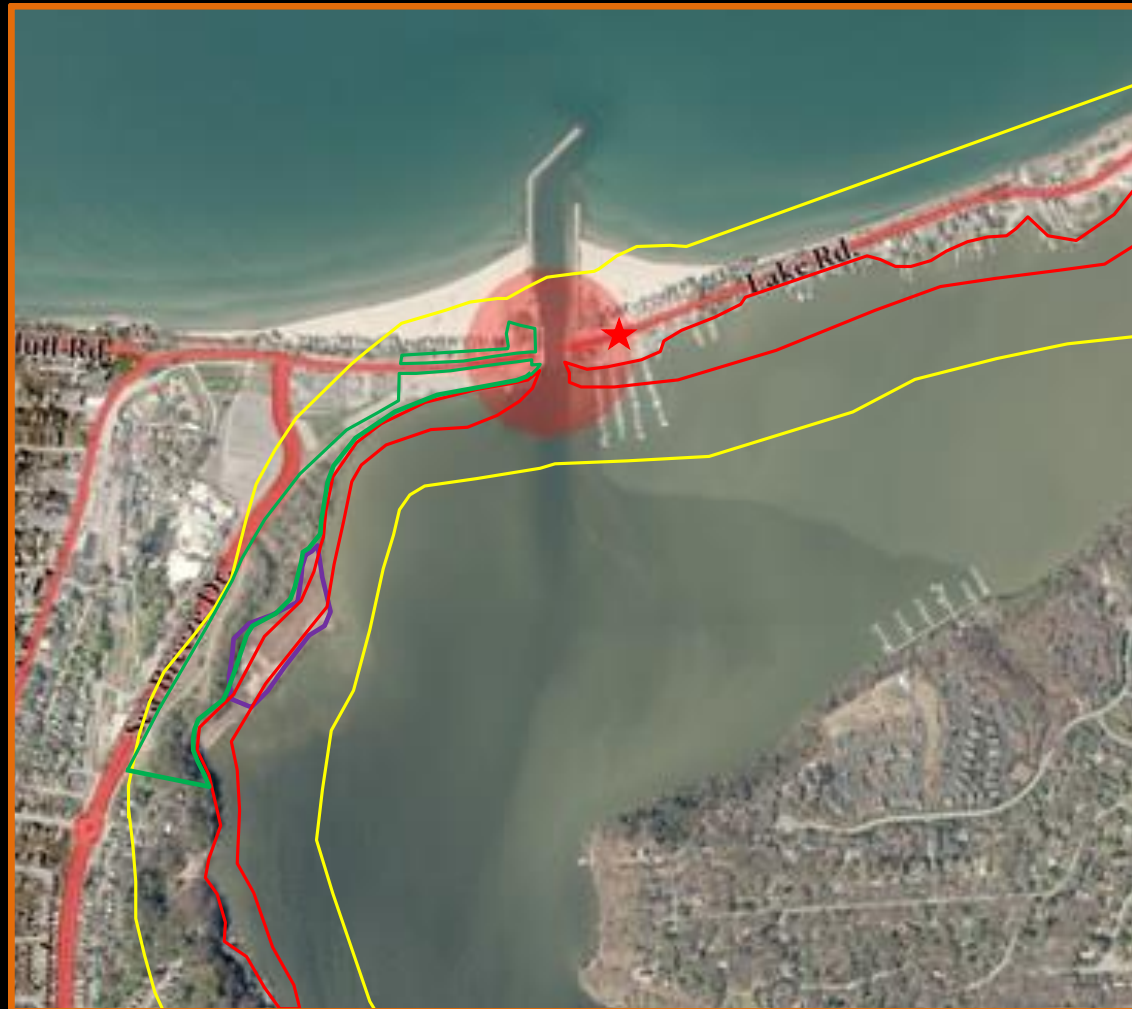
Environmental Screening: Permitting

- NYS Department of Environmental Conservation:
 - Article 34 Coastal Erosion Hazard Area Permit
 - Article 24 Freshwater Wetlands Permit
 - Section 401 Water Quality Certification
 - State Pollution Discharge Elimination System (SPDES) General Permit
- NYS Office of Parks Recreation and Historic Preservation:
 - Section 4(f) evaluation








Environmental Screening:

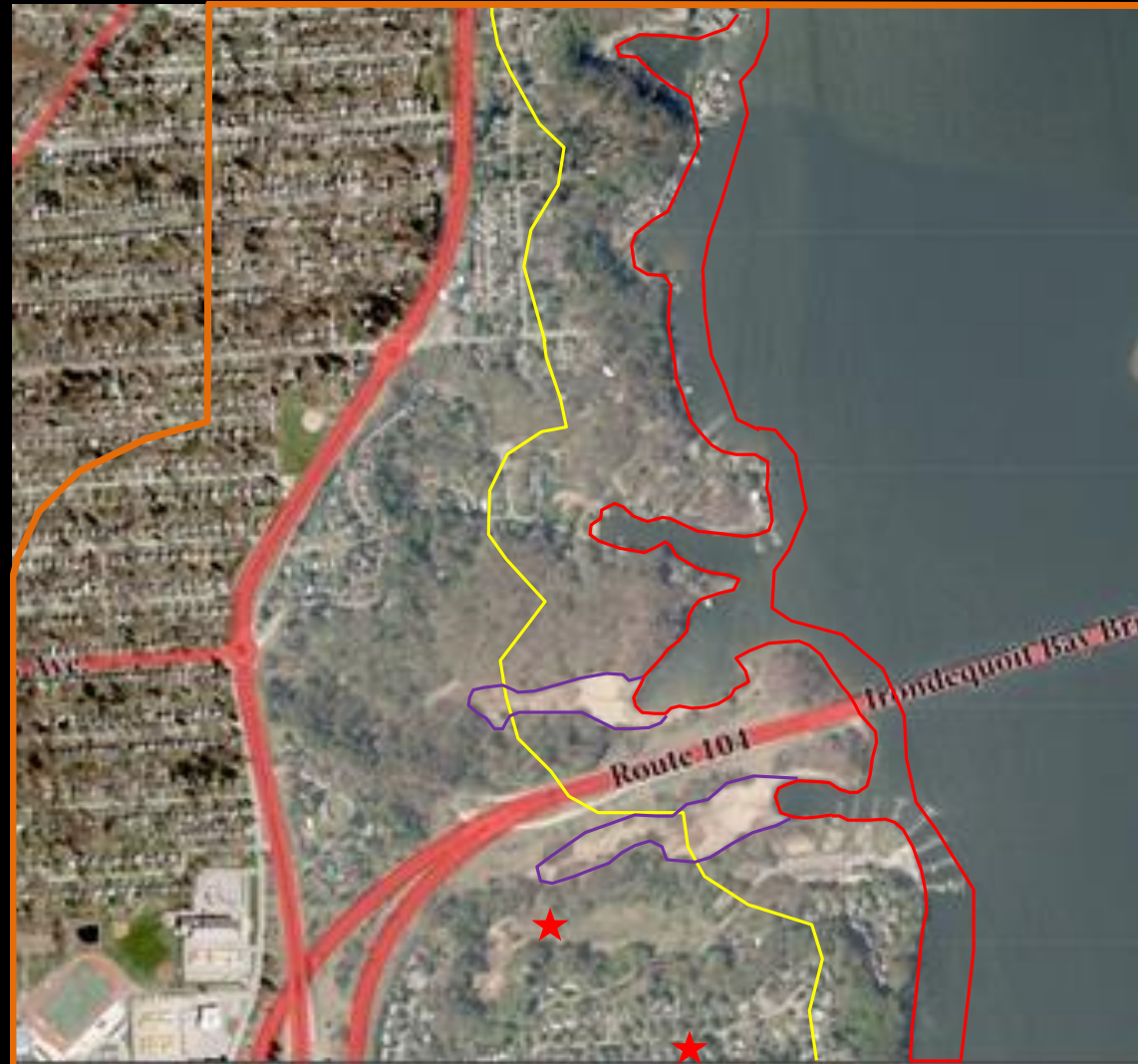
-  **State Wetland Mapped Boundary**
(requires delineation to confirm)
-  **Landward Extent of the State Wetland Check Zone**
-  **Federal Wetland Mapped Boundary**
(requires delineation to confirm)
-  **NYSDEC Primary Aquifer Boundary**
-  **NYS Parklands**
-  **NYSDEC Superfund Sites**
(Hazardous Waste Sites)





Environmental Screening:

-  **State Wetland Mapped Boundary**
(requires delineation to confirm)
-  **Landward Extent of the State Wetland Check Zone**
-  **Federal Wetland Mapped Boundary**
(requires delineation to confirm)
-  **NYSDEC Primary Aquifer Boundary**
-  **NYSDEC Superfund Sites**
(Hazardous Waste Sites)





Current Traffic Conditions: Historical Counts

Bridge Closed to Cars

Bridge Open to Cars

First Year After Swing Bridge

Original Bridge Removed

Source	Date	Location	Volume
NYSDOT	Oct 2013	West of Bay Road	947
MCDOT	Dec 17, 2014	West of IBOB	4558
MCDOT	Dec 6, 2014	West of IBOB	4785
MCDOT	Dec 2, 2014	West of IBOB	5008
MCDOT	Mar 11, 2000	West of IBOB	5489
MCDOT	Mar 7, 2000	West of IBOB	6126
MCDOT	Dec 6, 1999	West of IBOB	5301
MCDOT	Dec 5, 1999	West of IBOB	6371
MCDOT	Dec 4, 1999	West of IBOB	5764
MCDOT	Mar 14, 1999	West of IBOB	5031
MCDOT	Mar 13, 1999	West of IBOB	5673
MCDOT	Mar 11, 1999	West of IBOB	5125
MCDOT	Aug 1, 1985	West of Bay Road	1611
MCDOT	Aug 1, 1984	West of Bay Road	9817
MCDOT	June 1, 1981	West of Bay Road	9561



Current Traffic Conditions: 2010 ADT Open for Cars

Source: GTC Regional Travel Demand
Model Estimates





Current Traffic Conditions: 2010 ADT Closed for Cars

Source: GTC Regional Travel Demand
Model Estimates





Land Use and Business Assessment

- Impact of seasonal closure on area businesses
 - Water-adjacent business uses in Irondequoit are largely summer-focused
 - Loss of access reduces customer base
 - Seasonal nature of businesses creates difficulty comparing winter and summer conditions
 - Businesses along Culver Road may see reduction in sales due to change in traffic pattern between bridge opening and closure
- Economic development potential and expected impacts will vary by bridge alternative



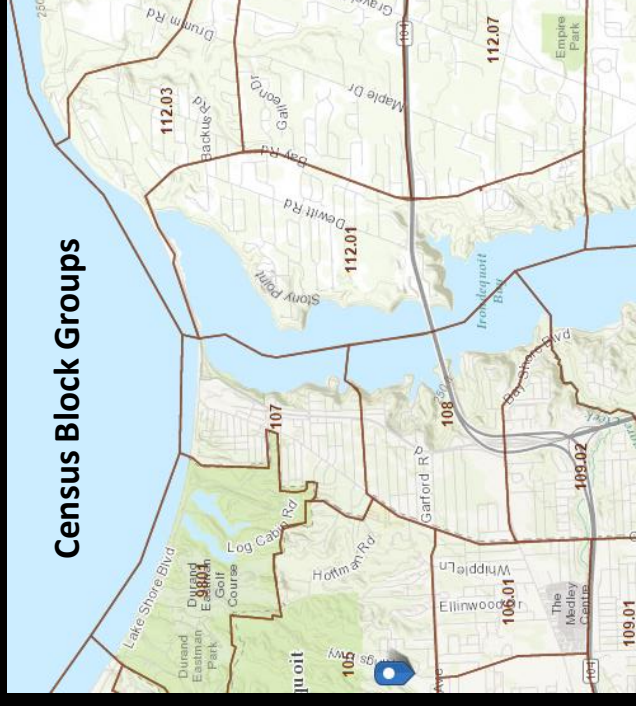
Economic Analysis

- Impact of seasonal closure on residents/tourists
 - Forced change in travel patterns
 - Bicycle/pedestrian access along waterfront
 - General connection between neighboring towns that are close for only part of the year
 - Increased emergency response time
 - Impacts to the boating community



Analytical Approach

- Review study area Census demographic and employment data
 - Population
 - Travel patterns
 - Employment
 - Work commute
 - Spending habits
 - Local sales
- Determine relative size of impacted market area
- Evaluate magnitude of existing impacts of summer bridge closure
 - Differences between summer and winter accounting for seasonal differences





Next Steps Economic Evaluation

- Utilize traffic data in combination with Census data to quantify seasonal variation and business impacts
- Quantify user-related impacts of seasonal bridge closure
 - Travel time costs, including emergency response
 - Loss of bike/ped connectivity
 - Environmental impacts of roadway diversion
 - Safety impacts of changing travel patterns
- Apply methodology to the bridge alternatives to assess differences between alternatives
 - Water-adjacent business uses in area are largely summer-focused; loss of access reduces customer base



Evaluation Criteria: establishes a process that...

- Is systematic
- Objective
- Defendable
- Utilizes a prioritized matrix
- Is developed in collaboration with the Steering Committee and the public



Alternatives Evaluation:

- Environmental considerations
- Existing conditions, traffic evaluation, property impacts, economic impacts
- Steering Committee, Stakeholder & Public Input
- Evaluation Criteria



Development of Alternatives

- Three alternatives with variations
 - Fixed Bridge at existing location
 - Movable Bridge at existing location
 - Extension of the ramps at Irondequoit Bay Bridge





Fixed Bridge at Existing Location

Under Clearance	Bridge Depth 100 ft span	Roadway Elev. Above Existing	Approach Length (5%)	Total Bridge Length
20	10	30	600	1300 (blue)
30	10	40	800	1700 (orange)
40	10	50	1000	2100 (purple)





Movable Bridge at Existing Location

- Installation of traffic gates (150 feet each end)
- Potential vertical clearance increase of 4 to 5 foot – bridge under clearance at 8 to 9 feet
- Type of Bridge
 - Swing (use existing)
 - Twin leaf bascule
 - Towerless vertical lift





Extension of Irondequoit Bay Bridge Ramps





Next Steps

- Finalize existing conditions research and complete economic analysis
- Develop concept alternatives for evaluation
- Apply evaluation criteria to the alternatives
- Prioritize Alternatives
- 2nd Public Meeting






Schedule



Project Initiation
Dec - Jan

Public Participation Plan
Jan - Sept



Existing Conditions Analysis
Jan - April



Committee Meeting



Existing Conditions Inventory



Small Group Meeting



Public Outreach Survey



Committee Meeting



First Public Meeting



Development of Alternatives
April - May



Committee Meeting



Feasible Alternatives & Graphics




Assessment of Feasibility & Cost Analysis
June - July



Preliminary Recommendations



Committee Meeting



Present Draft Recommendations
August



Second Public Meeting
August

Finalize Report
September

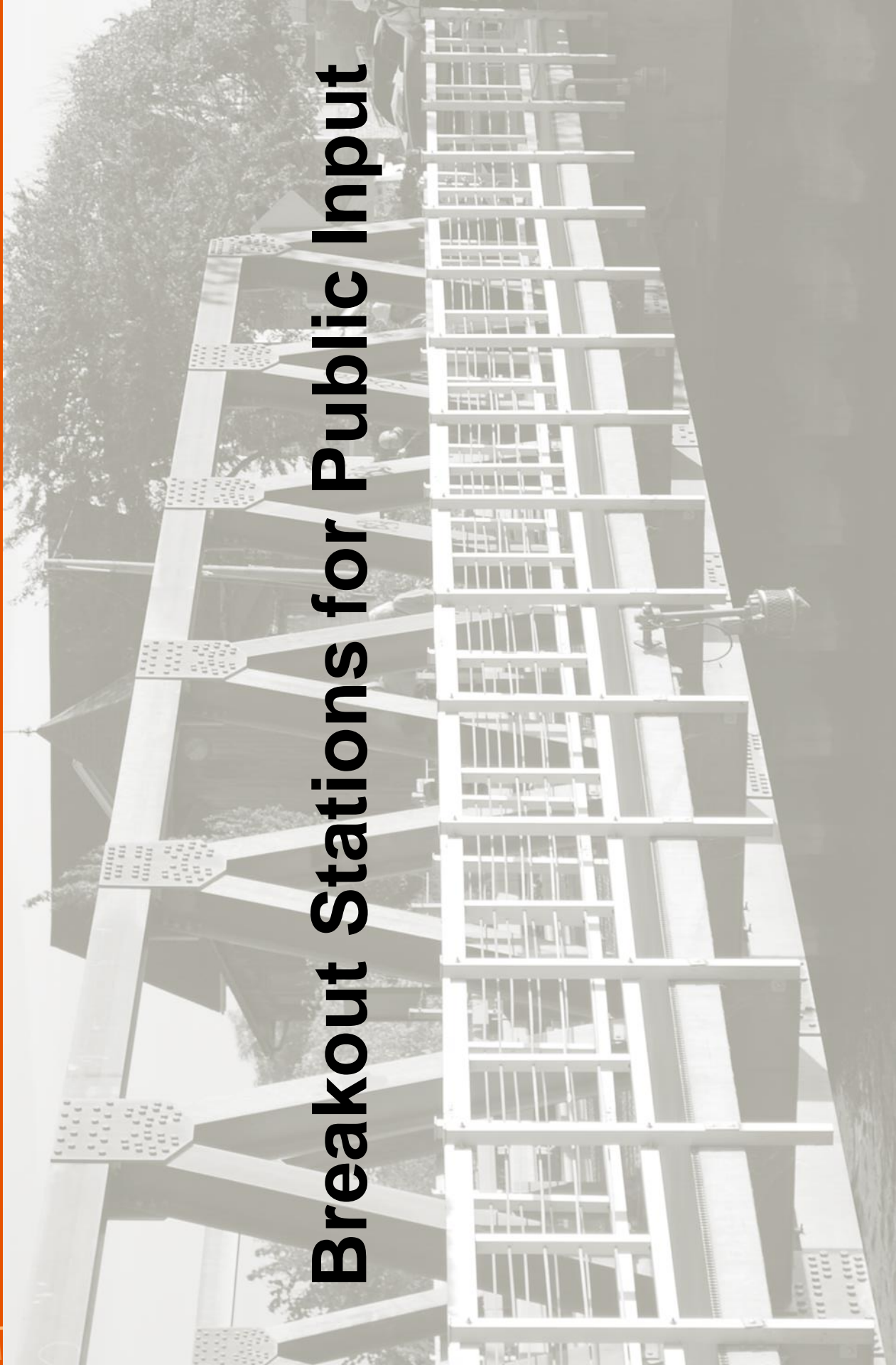


Breakout Stations

- Comment Station
- Trip Location Station
- Evaluation Criteria Station
- Community Participation Location Map



Breakout Stations for Public Input



Date: April 12, 2017

Attendees:
See attached sign in sheet

From: Richard C. Bennett, P.E.

Subject: Irondequoit Bay Outlet Bridge Alternatives Feasibility Study Public Information Meeting

These notes represent the writer's interpretation of the proceedings of the meeting.
Please notify Fisher Associates of any errors or omissions.

Town of Irondequoit Supervisor introduced the Irondequoit Bay Outlet Bridge Alternatives Feasibility Study meeting.

Fisher Associates presented the project overview, results of existing conditions research, next steps and schedule update, and discussed the establishment of evaluation criteria. Attached slides depict the data that was discussed.

Four breakout stations were established for the project:

- 1) Where do you live map where the public was asked to identify the location of their home.
- 2) Trip origin and destination map used to establish general travel patterns of the attendees.
- 3) Comments and thoughts map allowed attendees to geo-locate their comments with respect to the study area.
- 4) Online survey station allowed attendees to take an online questionnaire survey.

Questions and comments from the attendees were to be conveyed at the comments and thoughts break out station. However some general discussion items and questions were raised throughout the meeting:

Comment: Some participants expressed concern over the amount of potential traffic along Lake Road and Bay Road in Webster during the summer months if the IBOB is put into year round use for vehicles.

Comment: Some participants inquired about the number of vessels navigating through the bay outlet.

Comment: Some participants expressed the need to balance both business and resident perspectives.



Action: Attendees from the public were asked to rank the alternatives evaluation criteria that was established by the stakeholder committee members. The public voted on the various items with the lowest number (1-11) indicating their highest priority. After all votes were cast the sum was calculated and the results are as follows with No.1 ranking the highest priority and No 11 ranking the least priority based on the average score per vote:

- 1 - Improved Year Round Access = 3.50
- 2 - Property Impacts = 3.56
- 3 - Emergency Access = 3.86
- 4 - Environmental Impacts = 4.58
- 5 - Aesthetic Impacts = 5.83
- 6 - Project Costs = 5.96
- 7 - Construction Impacts = 6.47
- 8 - Operation and Maintenance Costs = 6.58
- 9 - Economic Impacts = 6.64
- 10 - Improved Non-Motorist Access = 7.37
- 11 - Impacts on Highway User Costs = 7.67

Action: Attendees were asked to participate in an online survey. Both during the public information meeting and subsequent to the meeting 774 surveys were conducted. Results will be condensed, evaluated and incorporated into the final study report.

Action: Attendees provided written comments during the meeting. 35 written comments were provided during the meeting. These comments will be evaluated and incorporated into the study report.



Irondequoit Bay Outlet Bridge Alternatives Analysis Study

October 3, 2017





Study Team:

- Town of Irondequoit
- Fisher Associates
 - HDR
 - Ravi Engineering
- Steering Committee





Agenda

- Project purpose
- Study Tasks
- Development of Alternatives
- Next steps
- Breakout stations



Study Purpose:

The purpose of the study is to explore options to provide year-round access across the Bay Outlet, creating a better regional transportation system for all modes of travel. The feasibility study will provide a mechanism to assess whether any reasonable design solutions are available to provide year-round access to all travelers, including vehicles, boats, bikes and pedestrians while preserving the Irondequoit Bay's ability to serve as a Safe Harbor.





Study Tasks:

- Project Initiation
- Existing Conditions Analysis
 - Public Information Meeting
- Development of Alternatives 
 - Identify impacts & costs
- Alternative Ranking based on Evaluation Criteria
- Present Ranking Results
 - Public Information Meeting
- Complete Report



Project Tasks Completed:

- Steering Committee meetings
- Public information meeting (April 2017)
- Business owner meetings
- Online surveys
- Collected and evaluated traffic data
- Vessel survey interviews with marina operators
- Identified concept alternatives



Concept Alternatives

- Null Alternative
- Rehabilitation of existing bridge for year round operation
- Fixed bridge at existing location (Girder)
- Fixed bridge at existing location (Truss)
- Tunnel at existing location
- Moveable bridge at existing location (Rolling Lift)
- Extension of the ramps at Irondequoit Bay Bridge
- Route 104 to Ridge Road connection
- Ferry



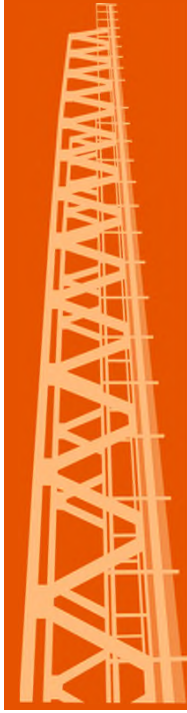
Alternatives Eliminated

- Null Alternative
- Rehabilitation of existing bridge for year round operation
- Fixed bridge at existing location (Girder)
- Fixed bridge at existing location (Truss)
- Tunnel at existing location
- Moveable bridge at existing location
- Route 104 to Sea Breeze Drive Connection
- Route 104 to Ridge Road Connection
- Ferry



Alternatives for Further Consideration

- Null Alternative
- Rehabilitation of existing bridge for year round operation
- Moveable bridge at existing location (Rolling Lift)
- Route 104 to Sea Breeze Drive Connection
- Route 104 to Ridge Road Connection

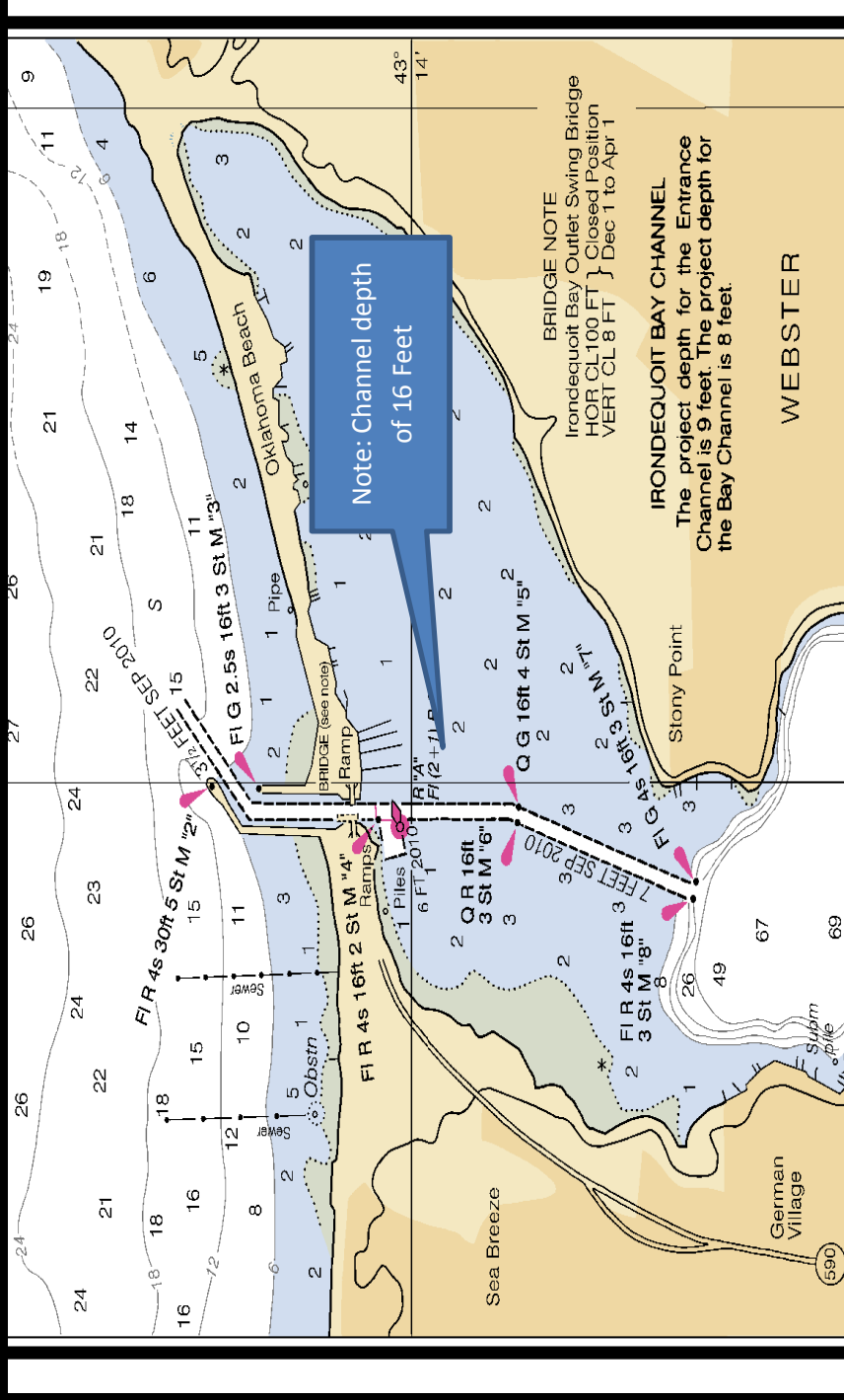


Jurisdictional Information





- Channel has a horizontal clearance of 100 feet and is 12-16 feet deep.





Current Physical Conditions







Vessel Survey: Review of the local mariners was performed

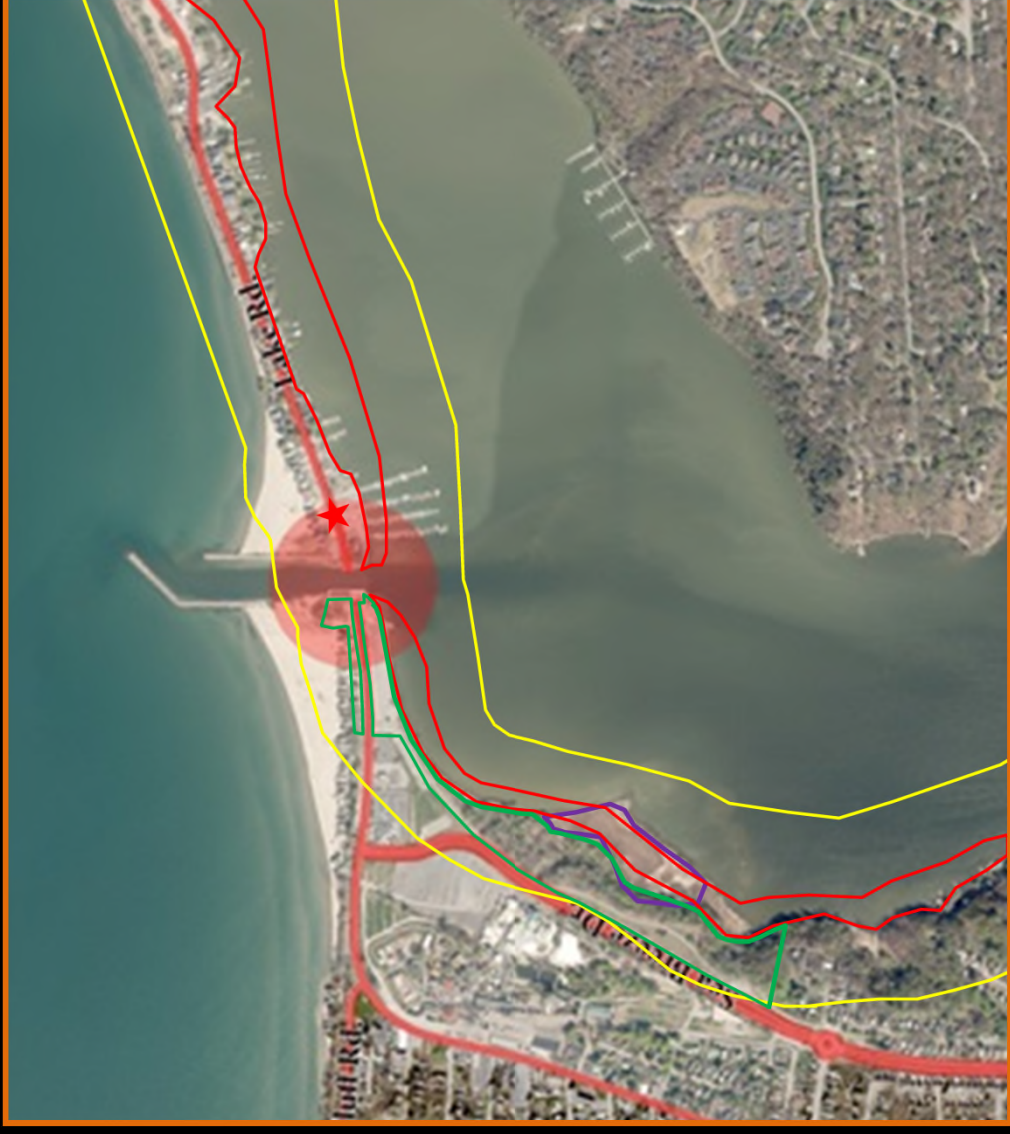
- Discussions with marina owners
- Count of the slips within the Bay
- ~90% of the vessels berthed within the Bay are recreational craft from 10 -30' long; Some larger craft up to 50' long
- The bay is also home to sailing vessels in 15-30' range.
- Based upon a count of slips, the bay can accommodate approximately 1800 small craft.

50' – 100%, 40' – 95%, 20' to 30' – 80%, 10' – 75%








Environmental Screening:

-  State Wetland Mapped Boundary
(requires delineation to confirm)
-  Landward Extent of the State
Wetland Check Zone
-  Federal Wetland Mapped Boundary
(requires delineation to confirm)
-  NYSDEC Primary Aquifer Boundary
-  NYS Parklands
-  NYSDEC Superfund Sites
(Hazardous Waste Sites)

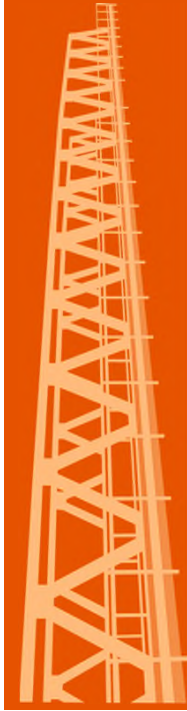




Environmental Screening:

-  **State Wetland Mapped Boundary**
(requires delineation to confirm)
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Wetland Check Zone**
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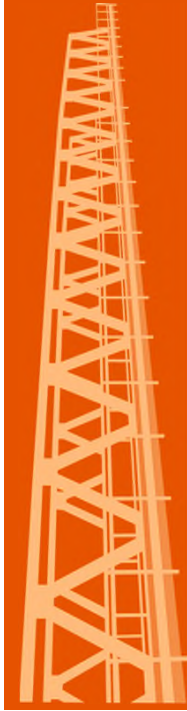




Current Traffic Conditions: 2010 ADT Open for Cars

Source: GTC Regional Travel Demand
Model Estimates





Current Traffic Conditions: 2010 ADT Closed for Cars

Source: GTC Regional Travel Demand
Model Estimates





Development of Alternatives:

- Environmental impacts & considerations
- Traffic and safety evaluation
- Property impacts
- Required mitigation
- Economic impacts
- Steering Committee, Stakeholder & Public Input



Moveable Bridge at Existing Location (Retrofit)

- Installation of traffic gates (150 feet each end)
- Potential vertical clearance increase of 4 to 5 foot – bridge under clearance at 9 to 10 feet
- Type of Bridge
 - Swing (retrofit existing)





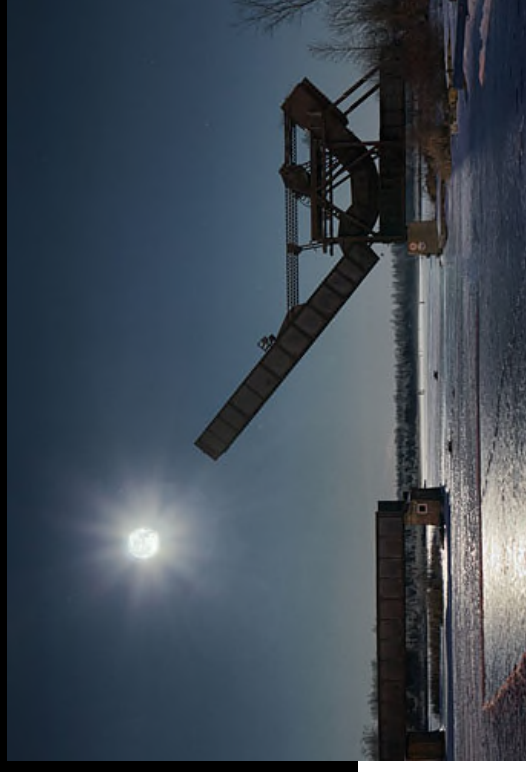
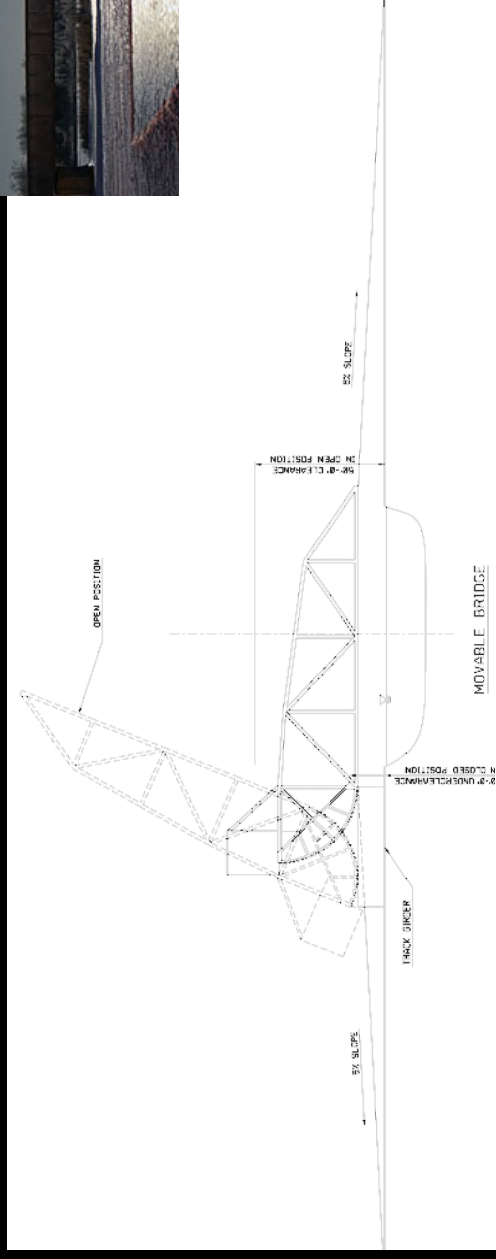
Moveable Bridge at Existing Location (Retrofit)

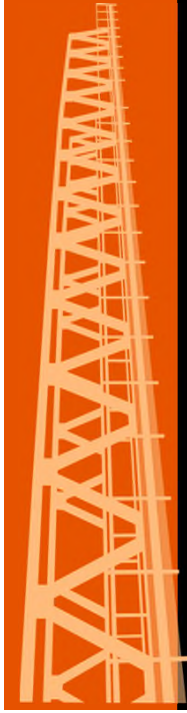




Moveable Bridge at Existing Location (Rolling Lift)

- Installation of traffic gates (150 feet each end)
- Potential vertical clearance increase of 4 to 5 foot – bridge
- under clearance at 9 to 10 feet





Moveable Bridge at Existing Location (Rolling Lift)





Moveable Bridge (bridge operation cycle)

- Lower safety gates and signals change to red – 90 seconds
- Open bridge span – 90 seconds
- Marine traffic passage (5 mph) – 120 seconds
- Close bridge span – 90 seconds
- Open gates and signals to green – 30 seconds
- Total opening time approximately 7 minutes



Moveable Bridge (vehicle queue weekend)





Moveable Bridge (vehicle queue week day)





Route 104 to Sea Breeze Drive Connection

- Limited to 5% grade
 - 75 feet of elevation difference
 - Bridges required for Titus Ave Extension
 - Property acquisitions
 - (17 parcels)
 - Pedestrian and bicyclist accommodations limited
 - Traffic operations
 - 8600 AADT NB
 - 3500 AADT NB and SB
- Ramps





- Limited to 5% grade
- Bridges replacements required for Route 590
- Pedestrian and bicyclist accommodations limited
- No property acquisitions





Life Cycle Cost Summary (75 Year Program)

	Null Alternative	Moveable Rehabilitate Existing Bridge	Moveable New Rolling Lift Bridge	Route 104 to Sea Breeze Drive Connection	Route 104 to Ridge Road Connection
Construction Cost	\$0	\$15,000,000	\$31,900,000	\$29,800,000	\$21,000,000
Annual Operation and Maintenance Costs	\$300,000	\$3,900,000	\$3,900,000	\$300,000	\$300,000
Expected Repair Costs (75 Years)	\$2,700,000	\$3,300,000	\$2,800,000	\$1,300,000	\$1,300,000
Residuals Value	\$100,000	\$300,000	\$250,000	\$100,000	\$100,000
Total Life Cycle Costs	\$2,900,000	\$21,900,000	\$38,350,000	\$31,300,000	\$22,500,000



Alternative Evaluation Criteria:

- Cost
- Property Impacts
- Economic Impacts
- Environmental Impacts
- Emergency Access
- Improved Year Round Access
- Aesthetic Impacts
- Operation and Maintenance Costs
- Improved Non-Motorist Access
- Impacts on Highway User Costs
- Construction Impacts

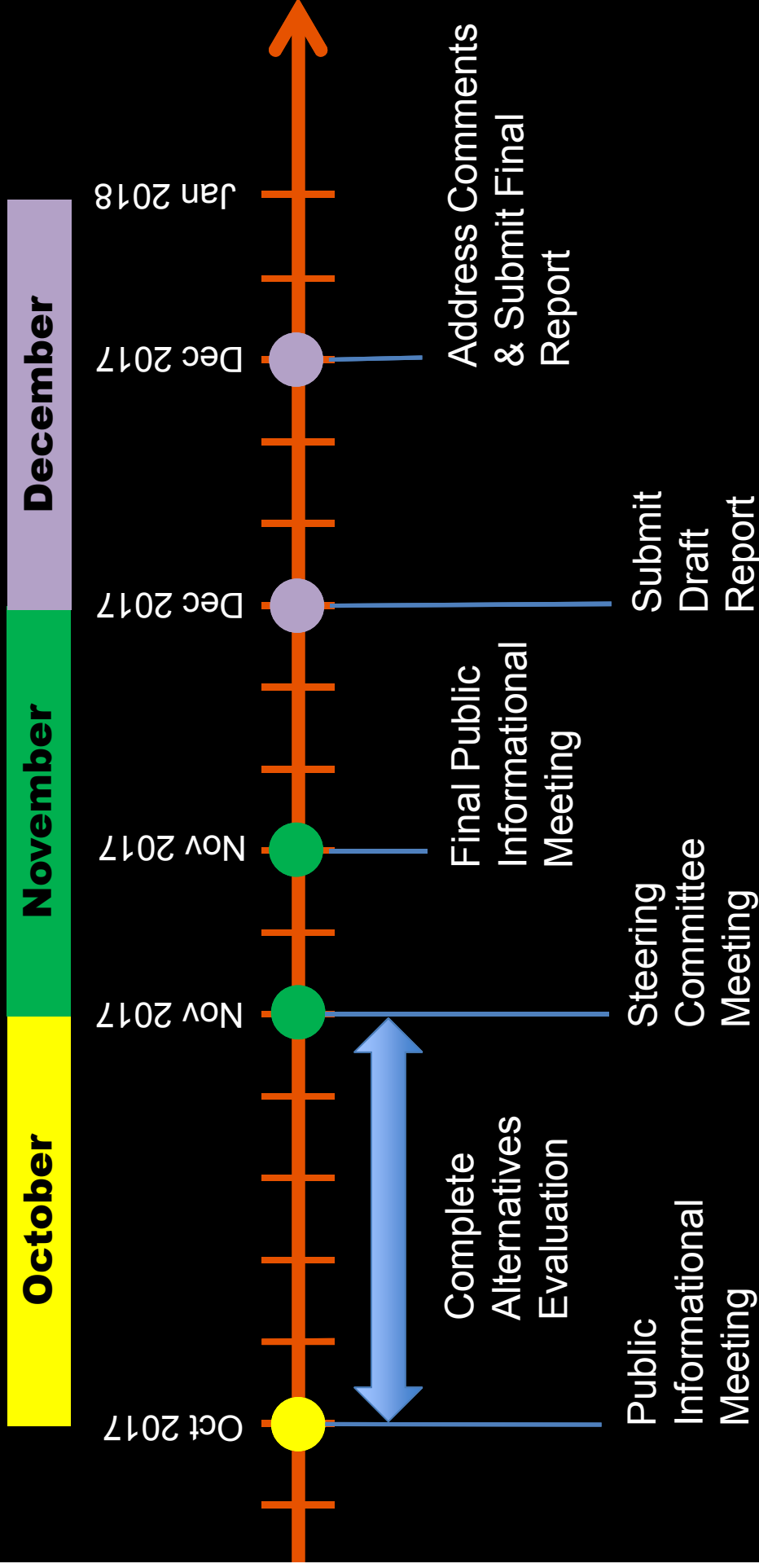




Next Steps:

- Complete economic analysis
- Quantify environmental impacts
- Coordinate with agencies having jurisdiction
- Finalize alternative rankings
- Final Public Information Meeting
- Complete and submit final report

Schedule





Breakout Stations





Irondequoit Bay Outlet Bridge Alternatives Analysis Study

January 11, 2018





Agenda

- Recap feasibility study process
- Present evaluation criteria
- Present alternatives for year-round access
- Present final scoring
- Question and answer session



Study Purpose:

The purpose of the study is to explore options to provide year-round access across the Bay Outlet, creating a better regional transportation system for all modes of travel. The feasibility study will provide a mechanism to assess whether any reasonable design solutions are available to provide year-round access to all travelers, including vehicles, boats, bikes and pedestrians while preserving the Irondequoit Bay's ability to serve as a Safe Harbor.

★ Only the feasibility study has been funded at this time. No funding has been obtained for design and construction of a follow on project.





Study Tasks:

- Project Initiation
- Existing Conditions Analysis
 - Public Information Meeting
- Development of Alternatives
 - Identify impacts & costs
 - Public Information Meeting
- Alternative Ranking based on Evaluation Criteria
- Present Ranking Results
 - Public Information Meeting
- Complete Draft Report





Alternative Evaluation Criteria: established by the steering committee during the meeting on January 26, 2017.

- Cost
- Property Impacts
- Economic Impacts
- Environmental Impacts
- Emergency Access
- Improved Year Round Access
- Aesthetic Impacts
- Operation and Maintenance Costs
- Improved Non-Motorist Access
- Impacts on Highway User Costs
- Construction Impacts





Alternative Evaluation Criteria: ranked in order from highest priority to least priority by steering committee, public meeting participants, online survey.

Alternatives Analysis Criteria	Steering Committee	Public Meeting	On-Line Survey	Average	Overall Rank
Aesthetic Impacts	7	5	8	6.67	7
Construction Impacts	11	7	11	9.67	11
Economic Impacts	3	9	3	5.00	5
Emergency Access	5	3	2	3.33	2
Environmental Impacts	4	4	4	4.00	3
Impacts on Highway User Costs	10	11	5	8.67	10
Improved Access for Non-Motorized Users	9	10	6	8.33	9
Improved Year Round Access	6	1	1	2.67	1
Operation & Maintenance Costs	8	8	7	7.67	8
Project Costs	1	6	9	5.33	6
Impacts to Properties	2	2	10	4.67	4



Alternative Evaluation Criteria:

Final prioritized ranking is based on all input received.

1. Improved Year Round Access
2. Emergency Access
3. Environmental Impacts
4. Property Impacts
5. Economic Impacts
6. Cost
7. Aesthetic Impacts
8. Operation and Maintenance Costs
9. Improved Non-Motorized Access
10. Impacts on Highway User Costs
11. Construction Impacts



Development of Alternatives

- Null Alternative (no change)
- Rehabilitation of existing bridge for year round operation
- Fixed Bridge at existing location (Girder)
- Fixed Bridge at existing location (Truss)
- Extension of the ramps at Irondequoit Bay Bridge
- Tunnel at existing location
- Movable Bridge at existing location (Rolling Lift)
- Route 104 to Ridge Road connection
- Ferry



Alternatives Eliminated

- Null Alternative (no change/maintain existing bridge)
- Rehabilitation of existing bridge for year round operation
- ~~Fixed bridge at existing location (Girder)~~
- ~~Fixed bridge at existing location (Truss)~~
- Route 104 to Sea Breeze Drive Connection
- ~~Tunnel at existing location~~
- Moveable bridge at existing location (Rolling Lift)
- Route 104 to Ridge Road Connection
- ~~Ferry~~



Alternatives for Further Consideration

- A - Null Alternative (no change)
- B - Rehabilitation of existing bridge for year round operation
- C - Route 104 to Sea Breeze Drive Connection
- D - Moveable bridge at existing location (Rolling Lift)
- E - Route 104 to Ridge Road Connection



Null Alternative (no change)

- No change from existing conditions
- No improvement to year round access or emergency access
- Environmental considerations are unchanged



Retrofit Moveable Bridge at Existing Location





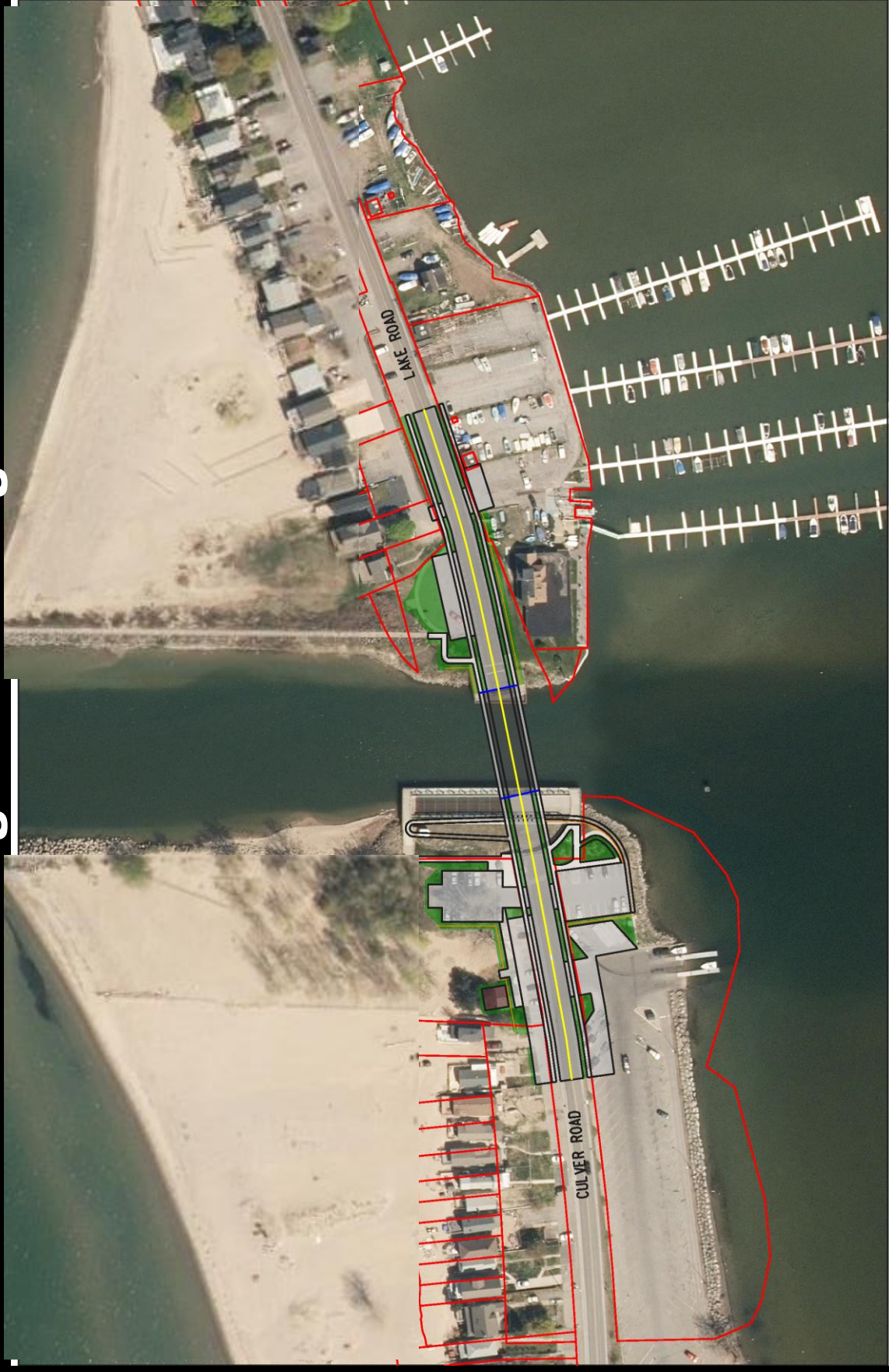
Retrofit Moveable Bridge at Existing Location

- Year round access is provided for all modes of travel
- Moderate environmental impacts related to construction activities
- Partial acquisition impacts to 5 properties
- Potential for improved economic impacts
- Increase operation and maintenance costs
- Minimal aesthetic changes
- Noise Analysis Considerations
- Floodplain Considerations





New Moveable Bridge at Existing Location





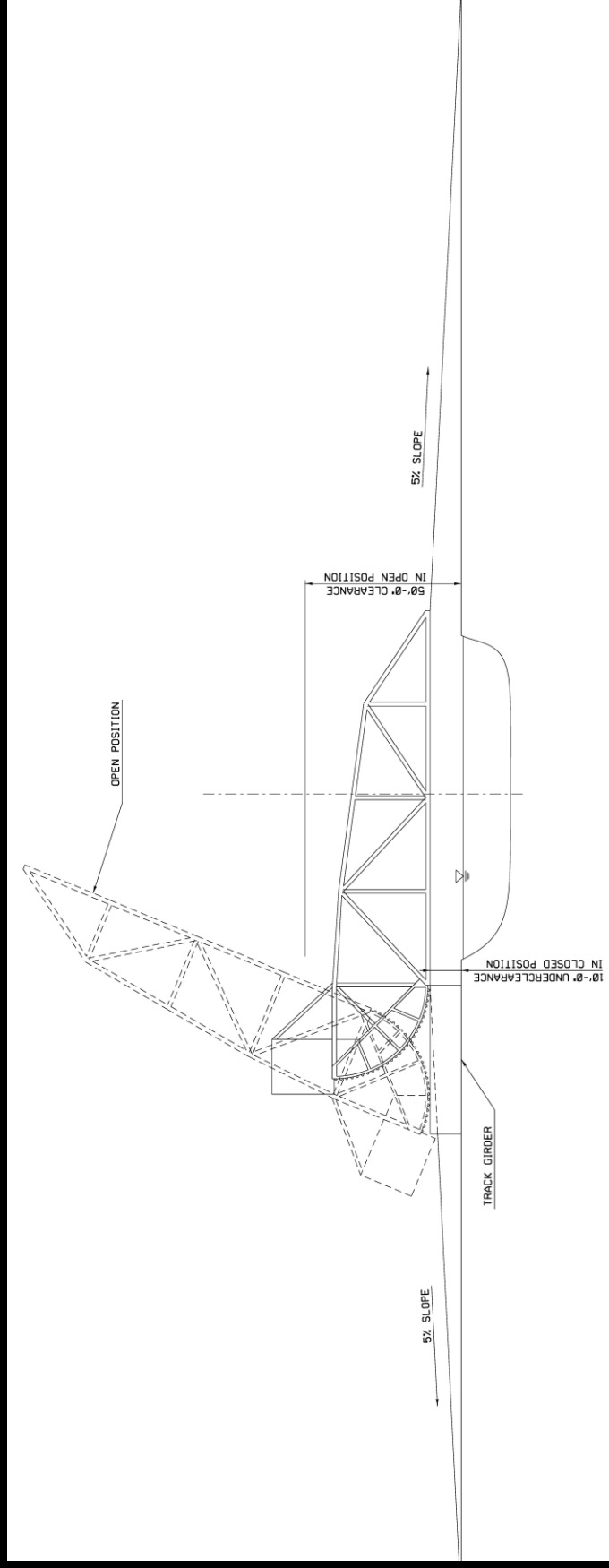
New Moveable Bridge at Existing Location

- Year round access is provided for all modes of travel
- Moderate environmental impacts related to construction activities
- Partial acquisition impacts to 5 properties
- Potential for improved economic impacts
- Increase operation and maintenance costs
- Minimal aesthetic changes
- Noise Analysis Considerations
- Floodplain Considerations





Moveable Bridge at Existing Location (Rolling Lift)





Moveable Bridge (bridge operation cycle)

- Lower safety gates and signals change to red – 90 seconds
- Open bridge span – 90 seconds
- Marine traffic passage (5 mph) – 120 seconds
- Close bridge span – 90 seconds
- Open gates and signals to green – 30 seconds
- Total opening time approximately 7 minutes



Current Traffic Conditions: 2010 ADT Open for Cars

Source: GTC Regional Travel Demand
Model Estimates





Current Traffic Conditions: 2010 ADT Closed for Cars

Source: GTC Regional Travel Demand
Model Estimates





Moveable Bridge (off-peak vehicle queue weekend)





Moveable Bridge (off-peak vehicle queue week day)





Moveable Bridge (peak vehicle queue weekend)





Moveable Bridge (peak vehicle queue week day)





Route 104 to Sea Breeze Drive Connection

- Limited to 5% grade
- 75 feet of elevation difference
- Bridges required for Titus Ave Extension
- Property acquisitions
 - (17 parcels)
- Pedestrians and bicyclists not accommodated on Bay Bridge
- Traffic operations
 - 8600 AADT NB
 - 3500 AADT NB and SB Ramps
 - Midblock intersection



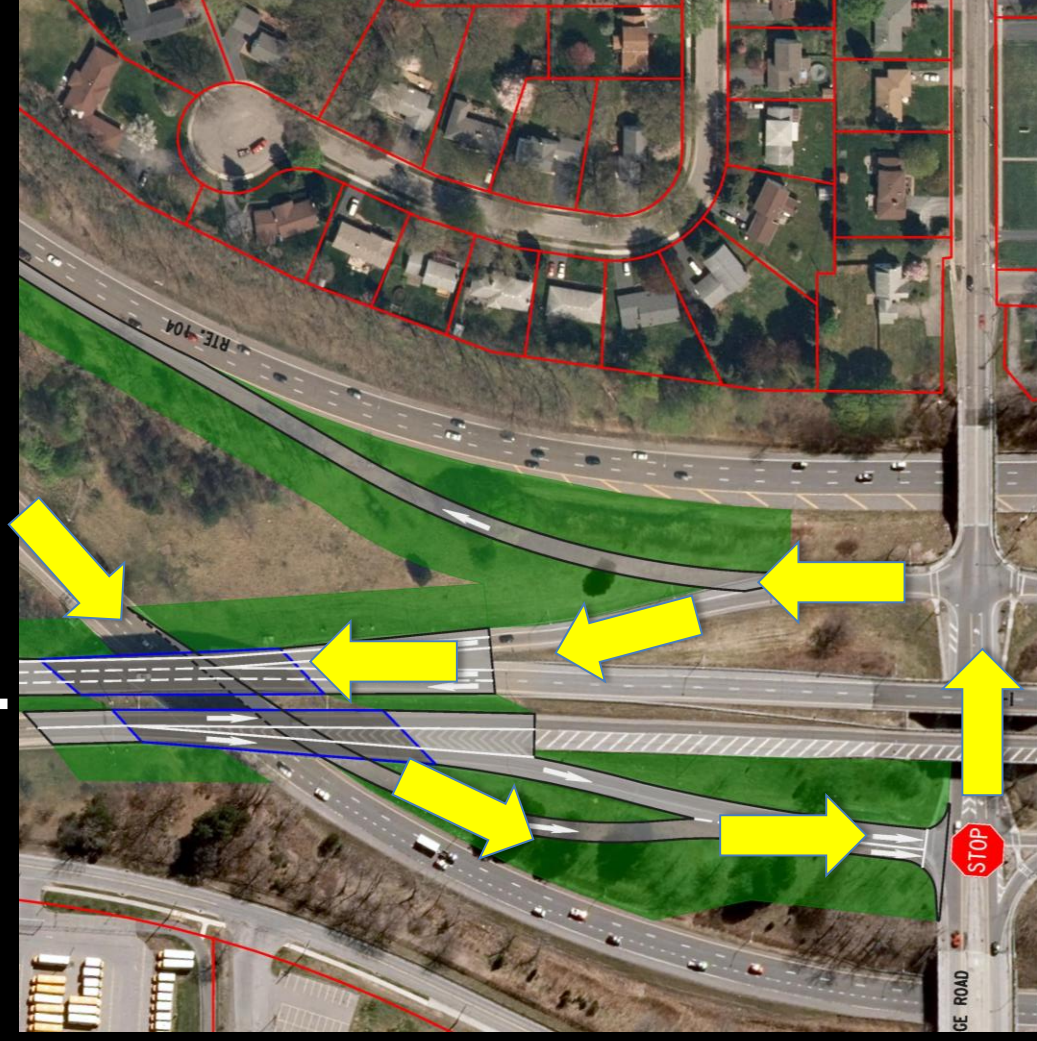


Route 104 to Ridge Road Connection



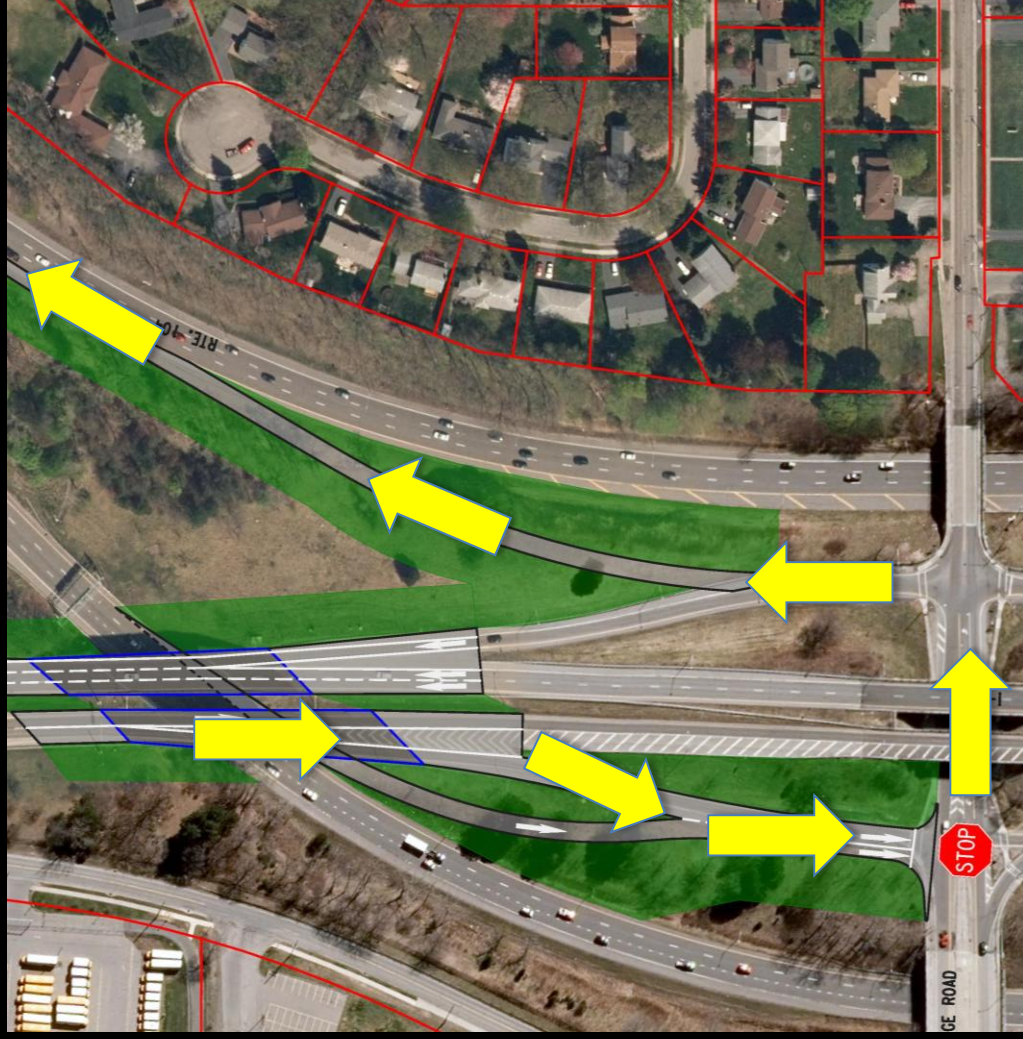


Route 104 to Ridge Road Connection Webster to Irondequoit





Route 104 to Ridge Road Connection Irondequoit to Webster





Route 104 to Ridge Road Connection

- Limited to 5% grade
- Bridge replacements required for Route 590
- Pedestrians and bicyclists not accommodated on Bay Bridge
- No property acquisitions
- Minimal environmental impacts
- Travel Demand Model indicates most access improvements are for access to southern portions of Irondequoit, does not achieve desired connectivity between northern Webster and northern Irondequoit





Construction Cost Summary

	Null Alternative	Moveable Rehabilitate Existing Bridge	Route 104 to Sea Breeze Drive Connection	Moveable New Rolling Lift Bridge	Route 104 to Ridge Road Connection
Construction Costs	\$0	\$16,000,000	\$29,800,000	\$32,900,000	\$21,000,000
Routine Operations & Maintenance Costs	\$300,000	\$3,900,000	\$300,000	\$3,900,000	\$300,000
Major Rehabilitation Costs	\$2,700,000	\$3,300,000	\$1,300,000	\$2,800,000	\$1,300,000
ROW Acquisitions Costs	\$0	\$200,000	\$3,170,000	\$200,000	\$0
Project Development Costs	\$1,500,000	\$4,860,000	\$7,220,000	\$8,140,000	\$5,460,000
Total Project Costs	\$4,500,000	\$28,260,000	\$41,790,000	\$47,940,000	\$28,060,000

Only the feasibility study has been funded at this time. No funding has been established for a follow on construction project.



Alternative Evaluation Criteria and Scoring:

Alternatives	Criterion											Weighted Sum Score
	Improved Year Round Access	Emergency Access	Environmental Impact	Impacts to Properties	Economic Impacts	Project Costs	Aesthetics Impacts	Operation & Maintenance Costs	Improved Access for Non-Motorized Users	Impacts on Highway User Costs	Construction Impacts	
Criterion Weighting Factor	1	2	3	4	5	6	7	8	9	10	11	
Alt A - Null Alternative	3	3	1	1	2	1	2	1	3	3	1	122
Alt B - Rehabilitate existing swing bridge	1	1	2	2	1	2	2	3	1	1	1	102
Alt C - Ramps 104 to Sea Breeze Drive	2	2	2	3	1	3	3	2	2	2	2	144
Alt D - New moveable -Rolling Lift bridge	1	1	2	2	1	3	2	3	1	1	1	108
Alt E - Ramps 104 to Ridge Road	2	2	2	1	2	2	2	2	2	2	3	139

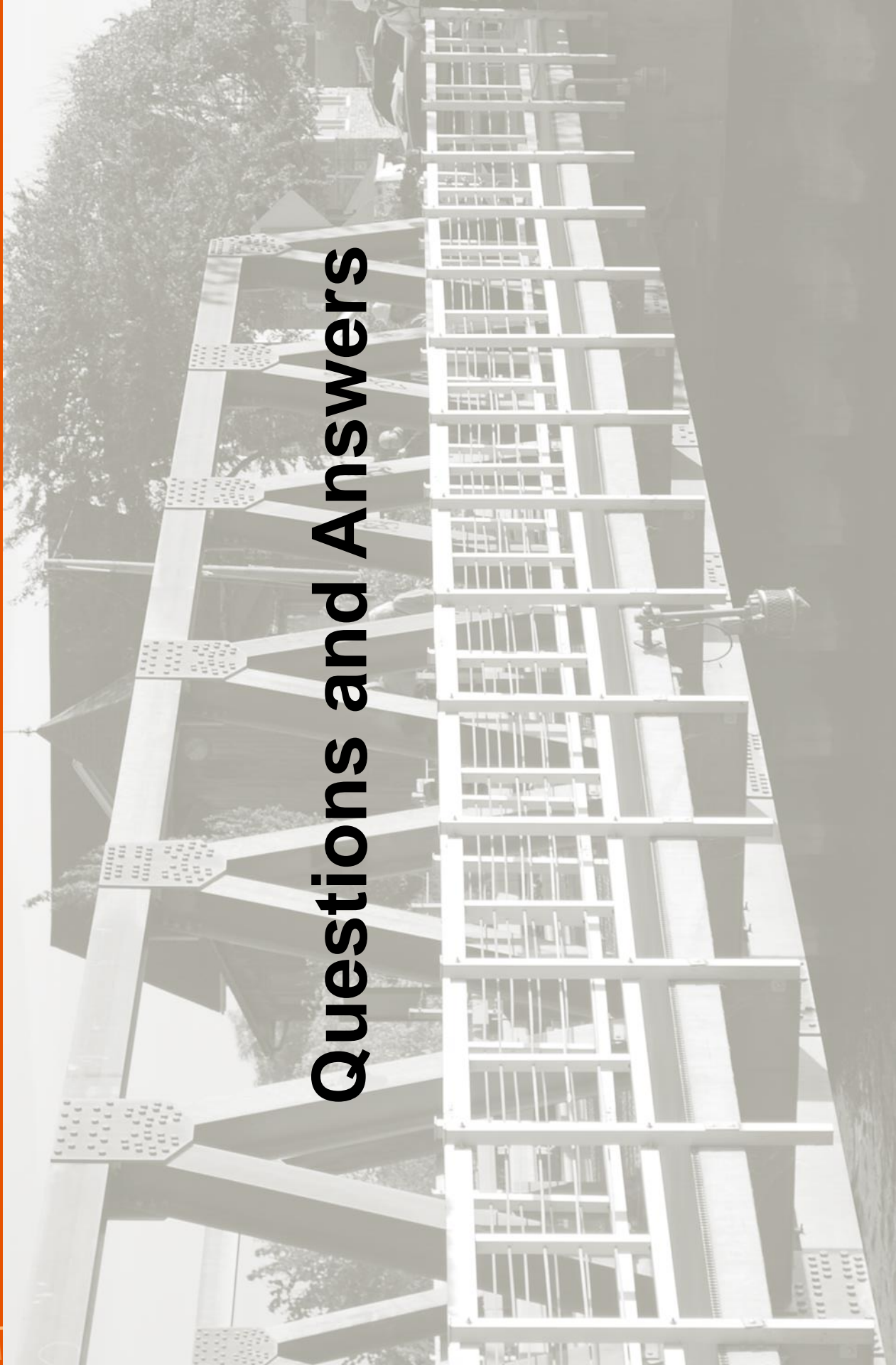


Next Steps:

- Finalize Draft Final Report
- Distribute for public review and comment
- Hard copies – will be at Webster and Irondequoit Town Halls and libraries
- Electronic copy – will be available on Town of Irondequoit website



Questions and Answers



Summary of Comments Received Through Public Participation

A number of comments were received through the course of public outreach during the study. These comments were received through public meetings, online surveys, and direct emails to the steering committee. These comments generally fall into several categories. Below is a summary of the comments received.

Comment Received	Number of Commenters
Provide a year round bridge	69
Build a new movable/lift bridge	12
Provide a year round bridge for cars that still accommodates boats	8
Construct the connection between I-590 and Route 104 that was never finished	13
Do nothing to the existing bridge	31
Change the current open/closed schedule to be open to cars for a longer duration of the year	14
Remove safe harbor status from Irondequoit Bay	2
Improved emergency access is needed	13
Build a tunnel	3
There is insufficient parking in the area	4
Improved bicycle and pedestrian access is needed	8
Do not impact boat access	8
Increase police enforcement in the area	3
Improve/expand recreational facilities in the area	5
Remove the existing bridge completely	1

Appendix B

Alternatives	Criterion											
	Improved Year Round Access	Emergency Access	Environmental Impact	Impacts to Properties	Economic Impacts	Project Costs	Aesthetics Impacts	Operation & Maintenance Costs	Improved Access for Non-Motorized Users	Impacts on Highway User Costs	Construction Impacts	Weighted Sum Score
Criterion Weighting Factor	1	2	3	4	5	6	7	8	9	10	11	
A - Null Alternative	3	3	1	1	2	1	2	1	3	3	1	122
B - Rehabilitate existing swing bridge	1	1	2	2	1	2	2	3	1	1	1	102
C - Ramps 104 to Sea Breeze Drive	2	2	2	3	1	3	3	2	2	2	2	144
D - New moveable -Rolling Lift bridge	1	1	2	2	1	3	2	3	1	1	1	108
E - Ramps 104 to Ridge Road	2	2	2	1	2	2	2	2	2	2	3	139

Improved Year Round Access

- 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians)
- 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians)
- 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)

Emergency Access

- 1 Provides improved response time throughout the calendar year allowing mutual support
- 2 Provides some improved response time throughout the calendar year potentially allowing mutual support
- 3 Provides no improved response time or intermittent improvements

Environmental Impact

- 1 Little to no impacts
- 2 moderate impacts
- 3 Major impacts

Impacts to Properties

- 1 No property acquisitions or mitigation measures are necessary
- 2 Partial property acquisitions or mitigation measures are necessary
- 3 Major property impacts or total acquisitions or mitigation measures are necessary

Economic Impacts

- 1 anticipated increase in retail business opportunity
- 2 no change
- 3 anticipated decrease in retail business opportunity

Project Costs

- 1 Low Project Costs \$0 to \$15Million
- 2 Moderate \$15 to 30 Million
- 3 High greater than \$30 Million

Aesthetics Impacts

- 1 improves the current character of the area
- 2 Maintains the current character of the area
- 3 decrease the current character of the area

Operation & Maintenance Costs

- 1 Low - programmed maintenance costs
- 2 Moderate - programmed maintenance costs
- 3 High - programmed maintenance costs

Improved Access for Non-Motorized Users

- 1 Excellent - provides direct connection with the shortest distance
- 2 Good - provides connect path for pedestrians and bicyclists with increased distance
- 3 Poor - provides no accommodation for pedestrians and bicyclists

Impacts on Highway User Costs

- 1 reduction in highway user costs for all users
- 2 small change in user costs – benefits to some but not all users
- 3 no change

Construction Impacts

- 1 Minor - impacts to roadway users and nearby residents/businesses
- 2 Moderate - impacts to roadway users and nearby residents/businesses
- 3 Major - impacts to roadway users and nearby residents/businesses

Criterion	Criterion Number	Alternative A - Null Alternative		Comment
		Criterion Weighting Factor	Criterion Weighted Score	
Improved Year Round Access 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians) 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians) 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)	1	3	3	The null condition provides no vehicular, bicycle or pedestrian access during the summer months
Emergency Access 1 Provides improved response time throughout the calendar year allowing mutual support 2 Provides some improved response time throughout the calendar year potentially allowing mutual support 3 Provides no improved response time or intermittent improvements	2	3	6	The null condition provides no change to emergency access
Environmental Impact 1 Little to no impacts 2 moderate impacts 3 Major impacts	3	1	3	The null condition does not affect environmental conditions
Impacts to Properties 1 No property acquisitions or mitigation measures are necessary 2 Partial property acquisitions or mitigation measures are necessary 3 Major property impacts or total acquisitions or mitigation measures are necessary	4	1	4	No change to property ownership under this alternative
Economic Impacts 1 anticipated increase in retail business opportunity 2 no change 3 anticipated decrease in retail business opportunity	5	2	10	No change to business retail opportunities under this alternative. No change in property values.
Project Costs 1 Low Project Costs \$0 to \$15Million 2 Moderate \$15 to 30 Million 3 High greater than \$30 Million	6	1	6	Regular programmed maintenance is required to attain the expected 30 year remaining life.
Aesthetics Impacts 1 improves the current character of the area 2 Maintains the current character of the area 3 decrease the current character of the area	7	2	14	No change to the aesthetics in the area
Operation & Maintenance Costs 1 Low - programmed maintenance costs 2 Moderate - programmed maintenance costs 3 High - programmed maintenance costs	8	1	8	This alternative continues the relatively low O&M costs associated with seasonal movement of the bridge
Improved Access for Non-Motorized Users 1 Excellent - provides direct connection with the shortest distance 2 Good - provides connect path for pedestrians and bicyclists with increased distance 3 Poor - provides no accommodation for pedestrians and bicyclists	9	3	27	No change, and no access during summer months for peds and bikes
Impacts on Highway User Costs 1 reduction in highway user costs for all users 2 small change in user costs – benefits to some but not all users 3 no change	10	3	30	no change
Construction Impacts 1 Minor - impacts to roadway users and nearby residents/businesses 2 Moderate - impacts to roadway users and nearby residents/businesses 3 Major - impacts to roadway users and nearby residents/businesses	11	1	11	None
Total Weighted Score			122	

Alternative B - Rehabilitation of Existing Bridge for Year Round Operation

Criterion	Criterion Number	Criterion Weighting Factor	Criterion Weighted Score	Comment
Improved Year Round Access 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians) 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians) 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)	1	1	1	A year round moveable bridge will provide continual and improved access for Vehicles, Bicycles and Pedestrians.
Emergency Access 1 Provides improved response time throughout the calendar year allowing mutual support 2 Provides some improved response time throughout the calendar year potentially allowing mutual support 3 Provides no improved response time or intermittent improvements	2	1	2	A year round moveable bridge will provide continual emergency access during the summer months when current service agreements are interrupted
Environmental Impact 1 Little to no impacts 2 moderate impacts 3 Major impacts	3	2	6	investigations based on endangered species will be necessary, permits will be required for surface water, wetland delineation and mitigation may be necessary, project is in a floodplain but minimal impacts are expected, SHPO coordination necessary
Impacts to Properties 1 No property acquisitions or mitigation measures are necessary 2 Partial property acquisitions or mitigation measures are necessary 3 Major property impacts or total acquisitions or mitigation measures are necessary	4	2	8	5 parcels would have partial acquisitions totaling 2,400 sf
Economic Impacts 1 anticipated increase in retail business opportunity 2 no change 3 anticipated decrease in retail business opportunity	5	1	5	Due to improved year round access and the increased number of vehicular trips to the area a potential improvement to retail operations is expected.
Project Costs 1 Low Project Costs \$0 to \$15Million 2 Moderate \$15 to 30 Million 3 High greater than \$30 Million	6	2	12	Construction cost estimate \$16 million
Aesthetics Impacts 1 improves the current character of the area 2 Maintains the current character of the area 3 decrease the current character of the area	7	2	14	This option slightly raised the bridge profile in elevation, however the overall aesthetics would be similar to existing conditions.
Operation & Maintenance Costs 1 Low - programmed maintenance costs 2 Moderate - programmed maintenance costs 3 High - programmed maintenance costs	8	3	24	This option would have high O&M costs associated with maintenance of the re-utilized superstructure and operator costs.
Improved Access for Non-Motorized Use 1 Excellent - provides direct connection with the shortest distance 2 Good - provides connect path for pedestrians and bicyclists with increased distance 3 Poor - provides no accommodation for pedestrians and bicyclists	9	1	9	Provides complete access for all modes of transportation
Impacts on Highway User Costs 1 reduction in highway user costs for all users 2 small change in user costs – benefits to some but not all users 3 no change	10	1	10	Reduced costs associated with shorter year round trips reduces time spent and vehicle maintenance costs
Construction Impacts 1 Minor - impacts to roadway users and nearby residents/businesses 2 Moderate - impacts to roadway users and nearby residents/businesses 3 Major - impacts to roadway users and nearby residents/businesses	11	1	11	Relatively small project area would impact properties immediately adjacent to the project site, vehicular traffic would be largely unaffected due to summertime construction duration.
Total Weighted Score			102	

Alternative C - Route 104 Connection to Sea Breeze Drive

Criterion	Criterion Number	Criterion Weighting Factor	Criterion Weighted Score	Comment
Improved Year Round Access 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians) 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians) 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)	1	2	2	improved access for vehicular traffic based on GTC model. However, pedestrian and bicycle access is not improved due to the additional travel length.
Emergency Access 1 Provides improved response time throughout the calendar year allowing mutual support 2 Provides some improved response time throughout the calendar year potentially allowing mutual support 3 Provides no improved response time or intermittent improvements	2	2	4	Due to the increased travel distance for this option mutual support and emergency access is not improved significantly
Environmental Impact 1 Little to no impacts 2 moderate impacts 3 Major impacts	3	2	6	investigations based on endangered species will be necessary, permits will be required for surface water, wetland delineation and mitigation may be necessary, project is in a floodplain but minimal impacts are expected, SHPO coordination necessary
Impacts to Properties 1 No property acquisitions or mitigation measures are necessary 2 Partial property acquisitions or mitigation measures are necessary 3 Major property impacts or total acquisitions or mitigation measures are necessary	4	3	12	10 complete acquisitions of residential properties and 7 partial takings would be necessary for this alternative
Economic Impacts 1 anticipated increase in retail business opportunity 2 no change 3 anticipated decrease in retail business opportunity	5	1	5	Due to the distance from the outlet this alternative is not expected to have an impact to retail business operations at the outlet.
Project Costs 1 Low Project Costs \$0 to \$15Million 2 Moderate \$15 to 30 Million 3 High greater than \$30 Million	6	3	18	Construction Cost Estimate \$30 million
Aesthetics Impacts 1 improves the current character of the area 2 Maintains the current character of the area 3 decrease the current character of the area	7	3	21	This option would change the aesthetics of the neighborhood along Titus Ave Ext with the removal of homes, introduction of a bridge and ramps in the area.
Operation & Maintenance Costs 1 Low - programmed maintenance costs 2 Moderate - programmed maintenance costs 3 High - programmed maintenance costs	8	2	16	typical roadway and bridge maintenance costs
Improved Access for Non-Motorized Use 1 Excellent - provides direct connection with the shortest distance 2 Good - provides connect path for pedestrians and bicyclists with increased distance 3 Poor - provides no accommodation for pedestrians and bicyclists	9	2	18	There is the potential for access at longer distances, most likely no improvement for pedestrians, some potential for bikes access improvement
Impacts on Highway User Costs 1 reduction in highway user costs for all users 2 small change in user costs – benefits to some but not all users 3 no change	10	2	20	minimal improvements to user costs based on relatively unchanged travel distances but slightly shorter travel times.
Construction Impacts 1 Minor - impacts to roadway users and nearby residents/businesses 2 Moderate - impacts to roadway users and nearby residents/businesses 3 Major - impacts to roadway users and nearby residents/businesses	11	2	22	Most of the construction impacts would occur off alignment resulting in minimal affects to the travelling public.
Total Weighted Score			144	

Alternative D - New Moveable Bridge at Existing Location (Rolling Lift)

Criterion	Criterion Number	Criterion Weighting Factor	Criterion Weighted Score	Comment
Improved Year Round Access 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians) 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians) 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)	1	1	1	A year round moveable bridge will provide continual and improved access for Vehicles, Bicycles and Pedestrians.
Emergency Access 1 Provides improved response time throughout the calendar year allowing mutual support 2 Provides some improved response time throughout the calendar year potentially allowing mutual support 3 Provides no improved response time or intermittent improvements	2	1	2	A year round moveable bridge will provide continual emergency access during the summer months when current service agreements are interrupted
Environmental Impact 1 Little to no impacts 2 moderate impacts 3 Major impacts	3	2	6	investigations based on endangered species will be necessary, permits will be required for surface water, wetland delineation and mitigation may be necessary, project is in a floodplain but minimal impacts are expected, SHPO coordination necessary
Impacts to Properties 1 No property acquisitions or mitigation measures are necessary 2 Partial property acquisitions or mitigation measures are necessary 3 Major property impacts or total acquisitions or mitigation measures are necessary	4	2	8	5 parcels would have partial acquisitions totaling 2,400 sf
Economic Impacts 1 anticipated increase in retail business opportunity 2 no change 3 anticipated decrease in retail business opportunity	5	1	5	Due to improved year round access and the increased number of vehicular trips to the area a potential improvement to retail operations is expected.
Project Costs 1 Low Project Costs \$0 to \$15Million 2 Moderate \$15 to 30 Million 3 High greater than \$30 Million	6	3	18	Construction Cost Estimate \$33 million
Aesthetics Impacts 1 improves the current character of the area 2 Maintains the current character of the area 3 decrease the current character of the area	7	2	14	This option slightly raised the bridge profile in elevation, however the overall aesthetics would be similar to existing conditions.
Operation & Maintenance Costs 1 Low - programmed maintenance costs 2 Moderate - programmed maintenance costs 3 High - programmed maintenance costs	8	3	24	This option would have high O&M costs associated with maintenance of the moveable bridge and operator costs.
Improved Access for Non-Motorized Use 1 Excellent - provides direct connection with the shortest distance 2 Good - provides connect path for pedestrians and bicyclists with increased distance 3 Poor - provides no accommodation for pedestrians and bicyclists	9	1	9	Provides complete access for all modes of transportation
Impacts on Highway User Costs 1 reduction in highway user costs for all users 2 small change in user costs – benefits to some but not all users 3 no change	10	1	10	Reduced costs associated with shorter year round trips reduces time spent and vehicle maintenance costs
Construction Impacts 1 Minor - impacts to roadway users and nearby residents/businesses 2 Moderate - impacts to roadway users and nearby residents/businesses 3 Major - impacts to roadway users and nearby residents/businesses	11	1	11	Relatively small project area would impact properties immediately adjacent to the project site, vehicular traffic would be largely unaffected due to summertime construction duration.
Total Weighted Score			108	

Alternative E - Route 104 Connection to Ridge Road

Criterion	Criterion Number	Criterion Weighting Factor	Criterion Weighted Score	Comment
Improved Year Round Access 1 Provides improved year round access to all modes of transportation (Vehicles, Bicycles, Pedestrians) 2 Provides improved year round access to some modes of transportation (Vehicles, Bicycles, Pedestrians) 3 Provides no improved year round access to any modes of transportation (Vehicles, Bicycles, Pedestrians)	1	2	2	A connection from Route 104 to Ridge Road would provide improved access for vehicular traffic heading to Ridge Road and western parts of Irondequoit based on GTC model. However, pedestrian and bicycle access is not improved due to the additional travel length.
Emergency Access 1 Provides improved response time throughout the calendar year allowing mutual support 2 Provides some improved response time throughout the calendar year potentially allowing mutual support 3 Provides no improved response time or intermittent improvements	2	2	4	Due to the increased travel distance for this option mutual support and emergency access is not improved significantly
Environmental Impact 1 Little to no impacts 2 moderate impacts 3 Major impacts	3	2	6	investigations based on endangered species will be necessary, permits will be required for surface water, wetland delineation and mitigation may be necessary, project is in a floodplain but minimal impacts are expected, SHPO coordination necessary
Impacts to Properties 1 No property acquisitions or mitigation measures are necessary 2 Partial property acquisitions or mitigation measures are necessary 3 Major property impacts or total acquisitions or mitigation measures are necessary	4	1	4	No change to property ownership under this alternative
Economic Impacts 1 anticipated increase in retail business opportunity 2 no change 3 anticipated decrease in retail business opportunity	5	2	10	Due to the distance from the outlet this alternative is not expected to have an impact to retail business operations at the outlet.
Project Costs 1 Low Project Costs \$0 to \$15Million 2 Moderate \$15 to 30 Million 3 High greater than \$30 Million	6	2	12	Construction cost estimate \$21 million
Aesthetics Impacts 1 improves the current character of the area 2 Maintains the current character of the area 3 decrease the current character of the area	7	2	14	This alternative would have minimal aesthetic impacts as the improvements would occur within an existing interchange.
Operation & Maintenance Costs 1 Low - programmed maintenance costs 2 Moderate - programmed maintenance costs 3 High - programmed maintenance costs	8	2	16	typical roadway and bridge maintenance costs
Improved Access for Non-Motorized Use 1 Excellent - provides direct connection with the shortest distance 2 Good - provides connect path for pedestrians and bicyclists with increased distance 3 Poor - provides no accommodation for pedestrians and bicyclists	9	2	18	There is the potential for access at longer distances, most likely no improvement for pedestrians, some potential for bikes access improvement
Impacts on Highway User Costs 1 reduction in highway user costs for all users 2 small change in user costs – benefits to some but not all users 3 no change	10	2	20	minimal improvements to user costs based on relatively unchanged travel distances but slightly shorter travel times.
Construction Impacts 1 Minor - impacts to roadway users and nearby residents/businesses 2 Moderate - impacts to roadway users and nearby residents/businesses 3 Major - impacts to roadway users and nearby residents/businesses	11	3	33	Construction would require partial detours for Route 590 traffic and Route 104 traffic while the new 590 bridges are being constructed.
Total Weighted Score			139	