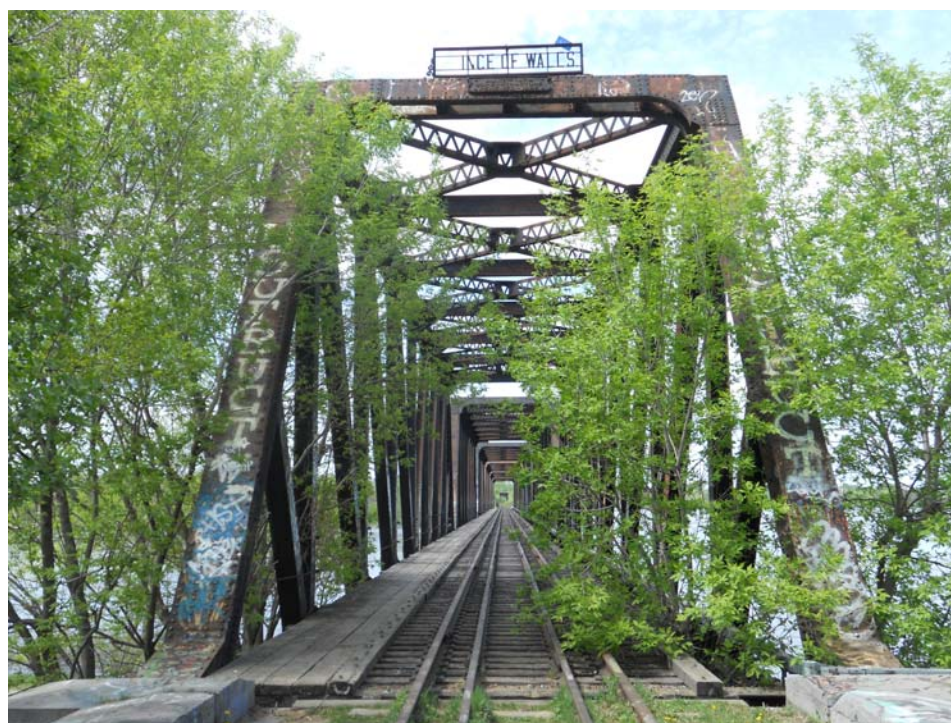




CONCEPT FOR THE MOOSE PROJECT 125 CONSORTIUM PRE-FEASIBILITY STUDY - Phase 1(a)



PRINCE OF WALES BRIDGE & LEMIEUX ISLAND RAILWAY LINK IMPROVEMENT INCLUDING "RAILS-WITH-TRAILS" PEDESTRIAN & CYCLING PATHWAYS



REMISZ

Consulting
Engineers

TABLE OF CONTENTS

| | |
|---|-----------|
| 1.0 INTRODUCTION | 3 |
| 1.1 EXECUTIVE SUMMARY | 3 |
| 1.2 CONTEXT | 3 |
| 1.3 SCOPE OF WORK | 4 |
| 2.0 PROJECT DESCRIPTION & HISTORY..... | 5 |
| 2.1 POW BRIDGE AND LEMIEUX ISLAND | 5 |
| 2.2 A BRIEF HISTORY – THE FIRST RAILWAY BRIDGE ACROSS THE OTTAWA RIVER..... | 5 |
| 2.3 INTEGRATED PRIVATE SECTOR TRANSIT SYSTEM | 6 |
| 2.4 BRIDGE CONDITION – MCCORMICK RANKIN STUDY..... | 6 |
| 3.0 OPTIONS ANALYSIS | 7 |
| 3.1 PRINCE OF WALES BRIDGE - CANTILEVERED PEDESTRIAN & CYCLIST PATHWAYS..... | 7 |
| 3.2 LEMIEUX ISLAND – PEDESTRIAN & CYCLIST PATHWAYS & RECREATIONAL AREA | 7 |
| 3.3 PEDESTRIAN – CYCLIST PATHWAY LINK..... | 9 |
| 3.4 RESTING AND LOOKOUT AREAS..... | 10 |
| 3.3 TRAIL CONNECTION – QUEBEC AND ONTARIO SHORE | 11 |
| 4.0 CONSIDERATIONS AND FEEDBACK..... | 12 |
| 4.1 BRIDGE/STRUCTURAL CONSIDERATIONS | 12 |
| 4.2 GEOTECHNICAL/FOUNDATION CONSIDERATIONS | 12 |
| 4.3 HERITAGE CONSIDERATIONS | 12 |
| 4.4 SAFETY CONSIDERATIONS | 12 |
| 5.0 PRELIMINARY COST ESTIMATE | 13 |
| 6.0 CLOSURE..... | 13 |
| APPENDIX A – PRELIMINARY DRAWINGS (FEASIBILITY STUDY – OPTION 2B)..... | 14 |
| DRAWING 2015-SP-1 NORTH BRIDGE ELEVATION AND SECTION 1 | |
| DRAWING 2015-SP-2 LEMIEUX ISLAND PLAN, ELEVATION AND SECTION | |
| DRAWING 2015-SP-3 SOUTH BRIDGE ELEVATION AND SECTION 3 | |
| DRAWING 2015-SP-4 LEMIEUX ISLAND SECTION 2 | |
| DRAWING 2015-SP-5 LEMIEUX ISLAND PEDESTRIAN OVERPASS PLAN AND SECTIONS | |
| DRAWING 2015-SP-6 LEMIEUX ISLAND SITE PLAN | |
| APPENDIX B –PRELIMINARY ITEMS (FEASIBILITY STUDY – OPTION 2B)..... | 15 |
| APPENDIX C – SITE PHOTOGRAPHS | 18 |
| APPENDIX D – PROJECT 125 CONSORTIUM COMPANY BIOS..... | 19 |
| APPENDIX E – PRECEDENT EXAMPLES | 22 |

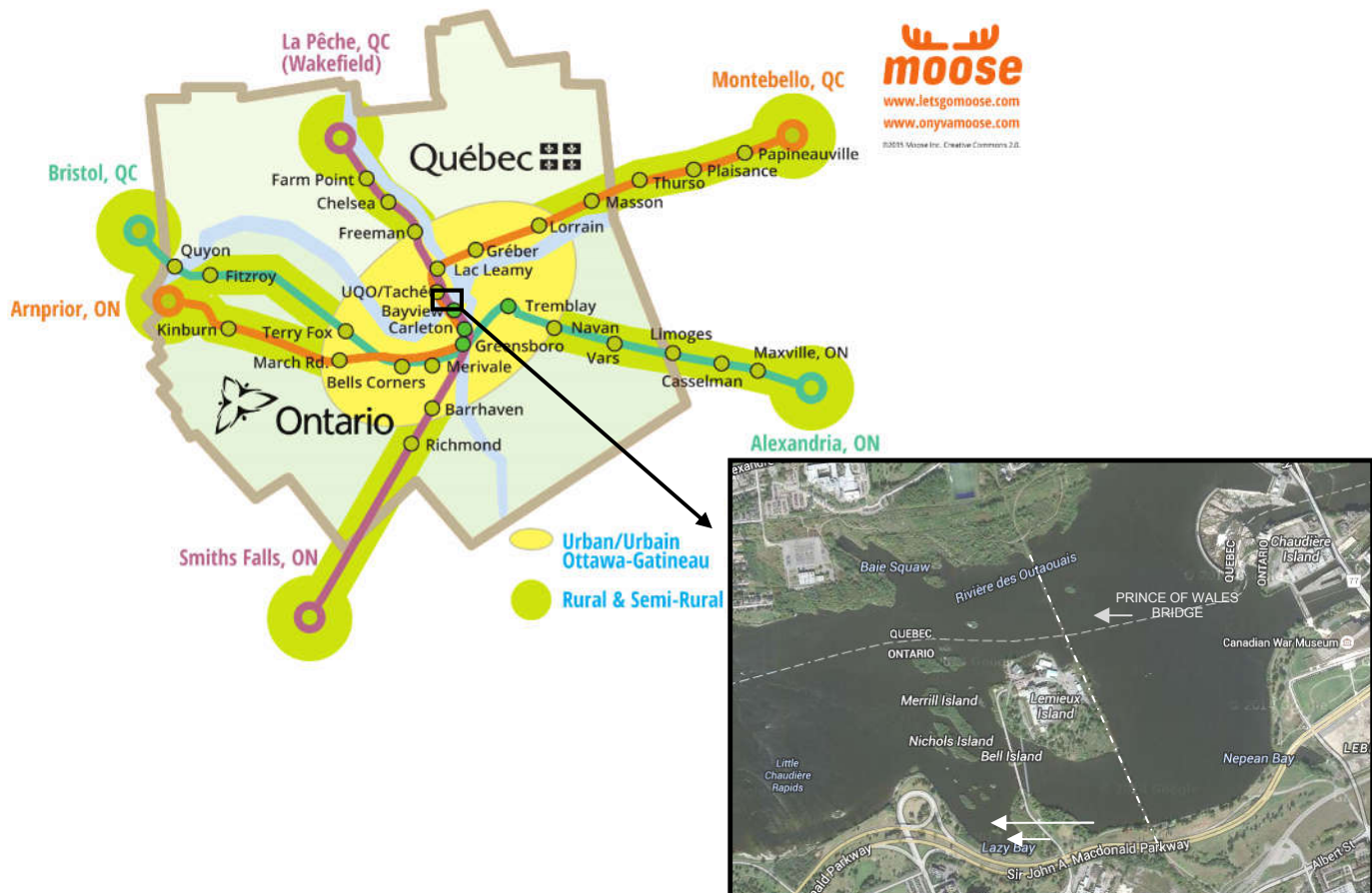
1.0 INTRODUCTION

1.1 Executive Summary

The following preliminary report is for the MOOSE Project 125 Consortium, Phase 1(a) prepared and provided under the consortium Phase 1(a) agreement. The report covers the Prince of Wales Bridge and Lemieux Island, which is essential to MOOSE Project 125. The Prince of Wales Bridge crosses the Ottawa River and is the rail link needed between Ontario and Quebec. The objective is to add a pedestrian and cycling pathway to Prince of Wales Bridge and Lemieux Island without interfering with the utility of the existing railway line, involving minimal intervention and respecting the heritage value of the structure and location. Please note, this report is for the pre-feasibility study only. Further work would be done for Phase 1(b) – The full six month feasibility study.

1.2 Context

Moose Inc. will apply to the City of Ottawa, the city of Gatineau, the National Capital Commission and the Canadian Transportation Agency (CTA) to undertake improvements to and maintenance of the inter-provincial Prince of Wales Bridge. The Moose Consortium requires these adjustments for its commercial railway undertakings, and plans to fully finance the improvements and maintenance from its own resources, without any expectations of City of Ottawa funds. In exchange for the many benefits to be gained by the City, Moose Inc plans to negotiate a mutually satisfactory agreement relating to lease fees and running rights. Moose Inc's commercial railway undertaking is fully complementary to, but outside the scope of Ottawa's Transportation Master Plan.



1.3 Scope of Work

The scope of work apportioned to REMISZ Consulting Engineers for the MOOSE Project 125, Phase 1(a), pre-feasibility was to provide structural engineering support and an options analysis for the improvement of the Prince of Wales Bridge. This support includes the following items:

- Study of options to retrofit both the North and South Prince of Wales Bridge structures
- Study of options to add a cantilevered pedestrian and bicycle pathway to the Prince of Wales Bridge structures
- Study of options to add a pedestrian and bicycle pathway on Lemieux Island (connecting the North and South cantilevered pathways)
- Study of options for resting/recreational areas along the East shore of Lemieux Island
- Study of options to connect the existing pathways on the Ottawa and Gatineau shores
- Bridge and Structural considerations
- Geo technical/Foundation considerations
- Accommodation of heritage considerations in the modifications
- Accommodation of safety considerations in the modifications
- Constructability /Feasibility (Precedent Examples)
- Preliminary cost estimates to add cantilevered pathways to the Prince of Wales Bridge Structures
- Preliminary cost estimates to add a pedestrian and bicycle pathway on Lemieux Island

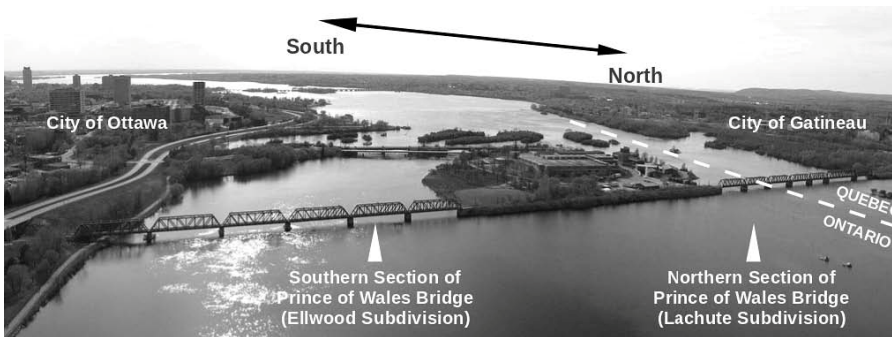
Further to the items listed above, REMSIZ Consulting Engineers also developed preliminary drawings, structure cross-sections (See Appendix A) and preliminary items (see Appendix B).

There has already been a condition assessment, structural evaluation and renewal options analysis report done by McCormick Rankin Corporation (a member of MMM Group) for the Prince of Wales Bridge North and Prince of Wales Bridge South for the City of Ottawa in June 2011. This report will be discussed in Section 2.2.

2.0 PROJECT DESCRIPTION & HISTORY

2.1 PRINCE OF WALES BRIDGE AND LEMIEUX ISLAND

The Prince of Wales Bridge is a Rail Bridge crossing the Ottawa River, connecting Ottawa, Ontario to Gatineau, Quebec. It is comprised of a North and South structure, designated as Bridge No. 119.1 and No. 119.5, connected by a short line on Lemieux Island. The total crossing length is 989 metres, and together the combined bridges have four abutments and thirteen spans, using a truss construction. The clear internal width of the structure is approximately 5 metres, carrying one track.



The South structure, Bridge No. 119.5, runs from the Ontario Shore to Lemieux Island, just west of Lebreton Flats, with six spans for a total of 943 feet and 6 inches. Bridge 119.5 is part of the Ellwood Subdivision, extending from Lemieux Island to Greenboro Station.

The North structure, Bridge No. 119.1 runs from the Quebec shore, just East of UQO (Université de Québec en Outaouais) to Lemieux Island with seven spans at a total length of 1204 feet. Bridge 119.1 is part of the Lachute Subdivision which extends from Lemieux Island in Ottawa, Ontario, through Gatineau and Montebello to Outremont in Montreal, Quebec

Lemieux Island is a small island in the middle of the Ottawa River. It is crossed by the Prince of Wales Bridge and serves a site to the water filtration plant and a public park. The public park is very popular among dog walkers, and has been used as an un-official dog park for many years.

2.2 A BRIEF HISTORY – THE FIRST RAILWAY BRIDGE ACROSS THE OTTAWA RIVER

The Prince of Wales Bridge carried passenger trains for exactly 100 years, from the winter of 1881, until the last regular VIA passenger train in early winter 1981. Freight service began in 1880 and ran successfully for 80 years until it declined in the 1950s, continuing occasionally until the most recent freight crossing in 2001. Today the Quebec Gatineau Railway maintains usage rights on the northern section of the bridge to manoeuvre freight cars.

This kilometer-long structure was built between 1877 and 1880 by the Quebec, Montreal, Ottawa and Occidental Railway ("QMO&O"), which was a wholly-owned enterprise of the Government of Quebec. As the first railway bridge built across the Ottawa River, its objective was to enable passengers to travel more directly from Montreal to Hull, rather than having to travel via Prescott and subsequently by ferry to Hull. It provided a connection between the QMO&O service through Hull, and the Canada Central Railway ("CCR") service through Ottawa.

The bridge was sold by QMO&O to Canadian Pacific Railway (CPR) in 1882, and CPR subsequently began renovations and rebuilding projects. In particular, the stone piers of the bridge were strengthened in 1911 by pouring concrete down to the bedrock to provide better protection from ice flows. In 1916 a siding was installed on Lemieux Island to supply equipment for a water filtration plant constructed by the City of Ottawa.

2.3 INTEGRATED PRIVATE SECTOR TRANSIT SYSTEM

Ottawa's Previous Experience with an Integrated Private Sector Transit System

The only truly integrated interprovincial transit system ever to operate throughout Canada's Capital was undertaken entirely through private sector entrepreneurship and finance. The Ottawa Electric Railway was created and operated from 1891 by Ottawa entrepreneurs Thomas Ahearn and Warren Soper. It was quickly followed in 1894 by the Hull Electric Railway created by Québec entrepreneurs Théophile Viau, banker Jacques-P. de Martigny, and millwright Stanislas Aubry. By 1901 these two Ottawa and Hull companies integrated their services across the Alexandra Bridge built by the Ottawa Northern and Western Railway Company, and they exchanged passengers with CP's regional service to the rural villages of the National Capital Region. At their peak, together the two urban electric railway firms were transporting 30 million passengers annually on 90 rail cars over 100 km of track.

2.4 BRIDGE CONDITION

A detailed-2-part engineering report including; a condition assessment, structural evaluation and renewal options was done by McCormick Rankin Corporation in June 2011, contracted by the city of Ottawa. A summary of this report will be discussed below and the full report is available upon request. An additional assessment and structural evaluations would need to be done for phase 2 of the Moose Project 125.

3.0 OPTIONS ANALYSIS

Objective:

The objective of the preliminary design was:

- To connect the Ottawa and Gatineau shores with a pedestrian and cycling pathway without interfering with the existing railway line and with minimal intervention to the existing truss system
 - To ensure minimal intervention, all connections will either be bolted or clamped or screwed so that they are removable and replaceable (ie no welding or rivets added to existing structure)
- For the overall design to be aesthetically pleasing, practical and consistent (steel with steel or wood with wood)
- For there to be either one or two practical connections between the pedestrian and cycling paths (east and west side of the tracks) on Lemieux Island or at the Ontario-Quebec border by means of an underpass or overpass

3.1 PRINCE OF WALES BRIDGE – Cantilevered Pedestrian and Cyclist Pathway

Option 1: **ALL STEEL** – OWSJ, FENCING, STEEL GRATING DECK

- The main cantilever would be large steel or built-up cross beams on hangers under each truss node (using Simpson Strong Tie or custom hangers) and built-up shapes would be consistent with the main truss components
- A couple stringers made of open web steel truss joists (OWSJ) perpendicular to cross beam (parallel to pedestrian traffic) would support the deck, spaced at 16 inches and butting to or resting on the crossbeams
- Steel Grating Deck (NCC standard - Max 13 mm apertures in grates) or Non Slip Fiberglass Grate
- Exterior railing would consist of steel posts and would otherwise be open
- The safety fence would be a very light wire netting (similar to what is used on construction sites) on interior truss side and supported on cables with turn buckles attached to main truss system, separating the pedestrians and trains

Option 2: **ALL WOOD** – DECK, BEAM, RAILING

- The main cantilever would consist of large timber built up cross-beams with custom hangers under each truss node (about every 20ft at the large joints and double or triple the size of a railway tie)
- The stringers would be LVL or Glulam (or regular wood joists from housing projects) perpendicular to cross beams and supporting decking planks, spaced at 16 inches and butting to or resting on the cross beams
- Pathway deck would be made of laminated or pressure treated wood planks (perpendicular to pedestrian/cyclist traffic and max 13mm spacing between planks)
- Consider all wood railing system, with main post at every cross beam and intermediate post with blocking if required (posts would be 1.5 m high for cyclists)

Option 3: **COMPOSITE WOOD AND FIBERGLASS** (Guardian Bridge – Rapid Construction)

- Contact Crawford – 519-831-9989 (Guardian Bridge Rapid Construction) Engineering & Sales

3.2 LEMIEUX ISLAND

For a more in detailed design and assessment of the structure for the pedestrian, bicycle path and resting areas, a contour map and a geo technical study is needed of the island. The following are preliminary conceptual options, which will be further studied if the project proceeds.



Figure 3. Lemieux Island site plan

Considerations:

- Dry stone wall and old telephone poles with potential heritage value
- Steep slope and rugged terrain on both sides of the track
- City park on South-West side of the Island (very popular among dog walkers)
- Popular location in the evenings for the nice view of Ottawa and Gatineau at night, especially when there are events with fireworks downstream (East), such as Canada Day or the International Firework Competition.

Dry Stone Wall & Telephone Poles on Lemieux Island:

The dry stone wall (with potential heritage significance) is approximately 3.5 meters from the middle of the track, and runs about 50 meters along the east side of the track and 200 along the west side of the track (on the North part of the Island). The dry stone retaining wall is about 1-2.5 meters high and likely gives stability to parts of the rail bed. The old telephone poles on the west side of the track (with potential heritage significance) are about 4.6m from the middle of the track inland. Since the stone wall is deteriorating in some areas a rehabilitation cost estimate for the wall will be obtained from Jo Hodgson (at <http://www.drystonewaller.ca/>). Both the dry stonewall and old telephone poles would be aesthetically pleasing features between the path and the railway.

3.2.1 PEDESTRIAN AND CYCLIST PATHWAYS

Due to a steep slope/rugged terrain on both sides of the track, the pathways would likely follow the terrain. On the west side of the track, there is approximately 15 meters between the middle of the track and the existing fence. This leaves plenty of room for the path to wind and follow the terrain without needing much back fill or stabilization. On the East side of the track there is less distance between the middle of the track and shore, so some piling or slope stabilization may be needed for the pathway.

3.2.2 RESTING/RECREATIONAL AREA

Considerations:

- There is a hydro dam downstream, so the resting/recreational area can't encourage people going into the water
- There is a nice city park on the south-west part of the island with a picnic spot and beach area, which is currently very popular among dog walkers
- The Lemieux Island and Prince of Wales bridge already have a lot of pedestrian and bicycle traffic, even though there is not currently a proper pathway it is a popular destination, particularly when there are events in the area such as Bluesfest (at Lebreton flats less than 1 km east)

Option 1:

Approximately 110 meters from the end of the South Bridge (looking north towards the island) there is an area which extends 12-13m from the centre of the track to the shore and is about 22m long which could be used for the resting area.

Note: There is a railway spur across from this area (leading to the water plant), which must be taken into account for the pedestrian cyclist overpass and the cycling pathway

Option 2:

Approximately 55 meters from the end of North Bridge (looking south towards the island) there is an area, which extends approximately 11.5m from the middle of the track to the shore and is about 40m long, which could be used for the resting area.

Note: The following images are conceptual ideas of how these recreational and resting areas could look, considering the existing terrain.

Following are some drawings and explanations of what the landscaped resting and recreational areas on the East side of the tracks on Lemieux Island could look like given the current terrain.

Figure 4. Landscaped resting/recreational area concept sketches

3.3 PEDESTRIAN – CYCLIST LINK Lemieux Island Underpass or Overpass

A link between the East and West pathways on either side of the track would be beneficial for several reasons. The first is to allow cyclists to lock their bikes on the upstream side and cross over to access the east path for the nice view of the river downstream, and have access to the proposed resting/recreational areas along the river. The second reason for the link would be to allow pedestrians coming from the Park on the Island (which has public parking) to access the pedestrian pathways from the Island. Although the link could be at either end of the bridge, the bridge is approximately 1km long so the underpass or overpass would also be for convenience and safety. Several options considered for the Lemieux Island link include:

Option 1: STEEL OVERPASS (SAFETY – RECCOMENDED)

A steel stairway overpass could be done at the two locations shown in drawing, and dry stone walls could be integrated into the landscaping at these points. The stairs would be 7.6 meters high, and would extend an extra 2.3 meters past the pathways on either side of the track. Drawing SP- 5 in Appendix A shows the details of this design.

Option 2: TUNNEL UNDERPASS

A tunnel underpass at several locations might be possible but further investigation is needed. The underpass would require excavation and tunnelling, which is doable but might be expensive since the Lemieux Island is likely rock. The underpass would allow for an easier and more accessible crossing, but the water levels and clearance needed between the track and the top of the tunnel could pose some issues.

Option 3: NORTH SHORE UNDERPASS

An underpass along the abutment on the North Shore could be considered, but the main concern is the clearance and water level, which varies throughout the year. This is a problem due to ice in the winter. A crank or removable deck option could be designed to overcome this problem, but would have to be further investigated. The figure below shows what this concept could look like.

Option 4: OTTAWA – QUEBEC BORDER UNDERPASS

An underpass at the Ottawa-Quebec border is another option similar to the one on the North shore. The additional loads could likely be accommodated but the main concern again, is the clearance below the trusses and Ice in the winter. This link would have an informational plaque, and would have an interesting view of the Old Prince of Wales Bridge structure. The figure below shows what this option could look like.

Figure 5. North Shore underpass concept sketch

Figure 6. Quebec border underpass concept sketch

3.4 TRAIL CONNECTIONS – Sentier des Voyageurs & Ottawa River Pathway

Gatineau, QC – Sentier des Voyageurs

Option 1: Redirect Trail to Existing Overpass

On the Gatineau side after the North Bridge, the rail line intersects with a recreational trail. About twenty meters north of the trail intersection the rail line splits, one line going East leading to the “Zibi” site (Windmill Developments) and the other North to the railway lines connecting to Montebello and Wakefield. There is steel overpass with stone foundations and wooden decking approximately 170 m North of the trail passing over the rail line, where the existing trail could be redirected. This overpass looks like it is an important heritage structure, as it was constructed and used by the Hull Electric Railway in 1896. It is in relatively good condition, and would be suitable for a recreational pathway. The overpass line also leads directly to the Université de Québec en Outaouais Campus, which the Sentier des Voyageurs does not currently directly connect to.

Option 2: Tunnel

A tunnel could also be considered, especially if this is the location of a station for Université du Québec en Outaouais (UQO). However it would be more expensive, less attractive, and in general less useful than the redirect that connects to the university campus.

Ottawa, ON – Trans Canada Trail/Ottawa River Pathway

Option 1:

On the Ottawa shore, the O-Train Corridor Multi-Use Pathway and the Ottawa River pathway intersect. The two pathways are already heavily used by cyclists and pedestrians and the trail already passes underneath the bridge, meaning both sides are easily accessible. A short extension to the Ottawa River Pathway (very similar to the one on the east side of the bridge) would have to be added on the west side of the bridge to connect the cyclists to the cantilevered bicycle pathway.

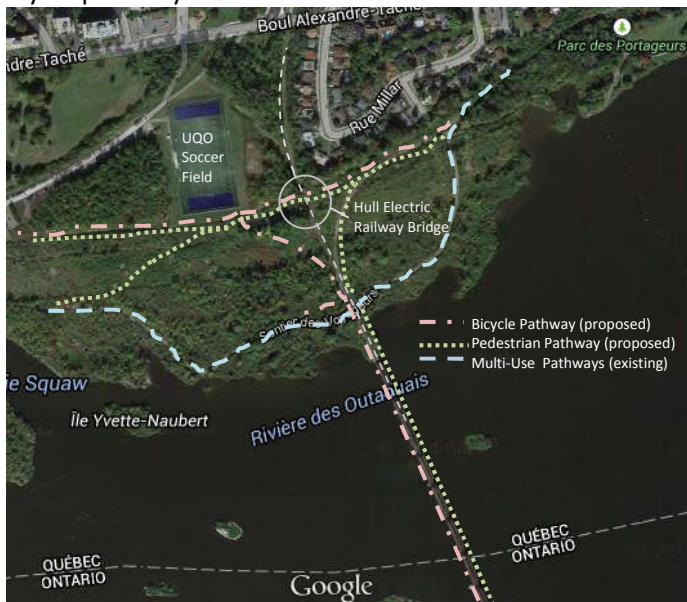


Figure 7. Gatineau, QC shore (Sentier des Voyageurs link)



Figure 8. Ottawa, ON shore (Trans Canada Trail/Ottawa River Pathway)

4.0 CONSIDERATIONS & FEEDBACK

4.1 BRIDGE & STRUCTURAL CONSIDERATIONS

Another condition and structural assessment would have to be done for the full design and addition of the cantilevered pathways on the Prince of Wales Bridge. From a preliminary assessment, it was determined that the addition of a cantilevered pathway with crossbeams on hangers or by replacing every couple of trail ties with cantilevered cross beams would be practical and safe. A further analysis would have to be done to determine which option is the most feasible.

4.2 GEOTECHNICAL/FOUNDATION CONSIDERATIONS

An elevation map of Lemieux Island would be needed to fully analyze geo technical and foundation considerations. These will be needed for seismic upgrades, widening of abutments for the cantilevered pathway as well as possible piling and slope stabilizations for the pathways and resting areas long the track on Lemieux Island.

4.3 HERITAGE CONSIDERATIONS

Although, from our understanding, the preliminary Statement of Cultural Heritage Value or Interest of the Prince of Wales Bridge and the preliminary Heritage impact Assessment of the proposed interventions to the bridge will be done by Senior Conservation Architect & Urbanist Mark Brandt, of MTBA Associates Inc., REMISZ has taken into consideration several site features that may have heritage value and are using a “minimal intervention” approach for our design options, as per the *Standards & Guidelines of the Conservation of Historic Places in Canada (Parks Canada, 2013)*.

4.4 SAFETY CONSIDERATIONS

All designs would either meet or surpass current safety codes and standards. Safety projects international within the MOOSE 125 Consortium is coordinating safety and risk assessment.

5.0 PRELIMINARY COST ESTIMATES

The preliminary cost estimate to maintain current configurations of the Prince of Wales Bridge with seismic upgrades (Option 2B) from McCormick Rankin and the addition of a cantilevered pedestrian and cyclist pathway from Remisz has been broken down into categories. Please note these are very preliminary Class D cost estimates. Option 2B of the McCormick Rankin study in June 2011, contracted by the City of Ottawa, to maintain the current configuration with seismic upgrades, it would cost 28.7 Million. Now, it is estimated that the total project cost of the Prince of Wales Bridge and Lemieux Island renewal with seismic upgrades will be between 41 and 45 million.

| PRINCE OF WALES BRIDGE SOUTH - (Ontario Side) | |
|--|---------------------|
| General Work | \$13,378,700 |
| New Construction – Add. Pathways | \$1,717,600 |
| Total | \$15,096,300 |
| PRINCE OF WALES BRIDGE NORTH - (Quebec Side) | |
| General Work | \$15,964,000 |
| New Construction – Add. Pathways | \$1,229,600 |
| Total | \$18,131,100 |
| LEMIEUX ISLAND – (CONSTRUCTION) | |
| General Work | \$452,000 |
| New Construction – Add. Pathways | \$528,000 |
| Total | \$980,000 |
| Subtotal | \$34,207,400 |
| DESIGN & ENGINEERING FEES | \$6,792,600 |
| Subtotal | \$41,000,000 |

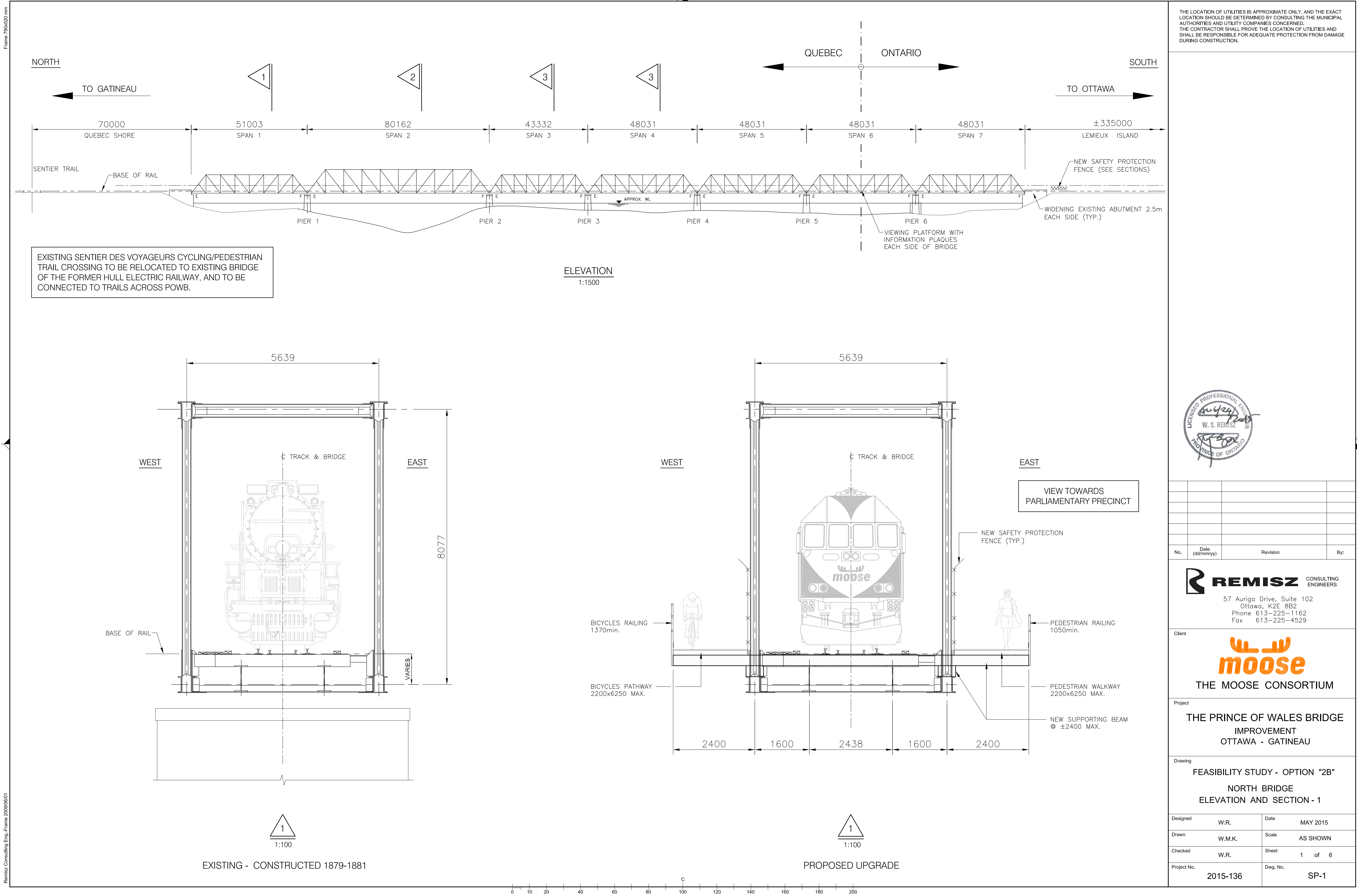
6.0 CLOSURE

This pre-feasibility study is for Project 125 Phase 1(a) and includes general concepts and preliminary (Class D) cost estimates to improve the Prince of Wales Bridge. The options provided and our scopes of work are for discussion as part of phase 1(a). We welcome feedback and trust this is sufficient to proceed to a full feasibility study under phase 1(b). As a member of the Moose Project 125 Consortium, and within the terms of the consortium agreement, REMISZ will lead the assessment and design of all upgrades relating to bridges, culverts, retaining walls and related structures for the MOOSE Project 125.





APPENDIX A – FEASIBILITY DRAWINGS

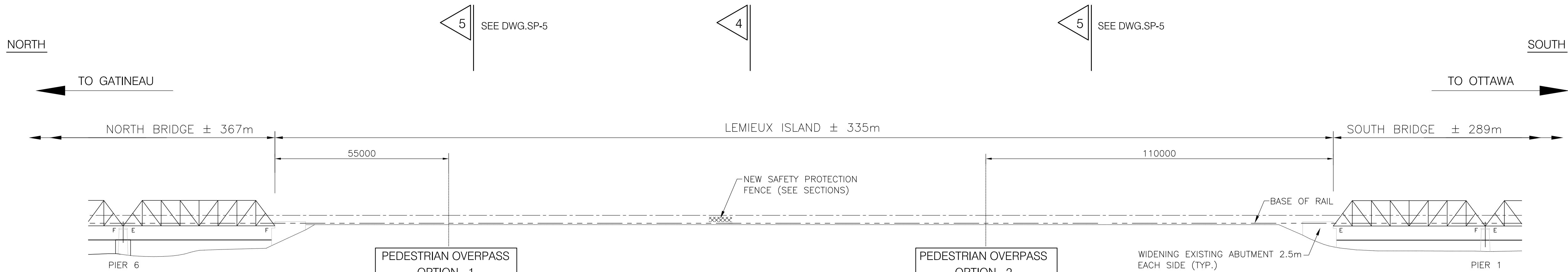


Frame 79x6520 mm

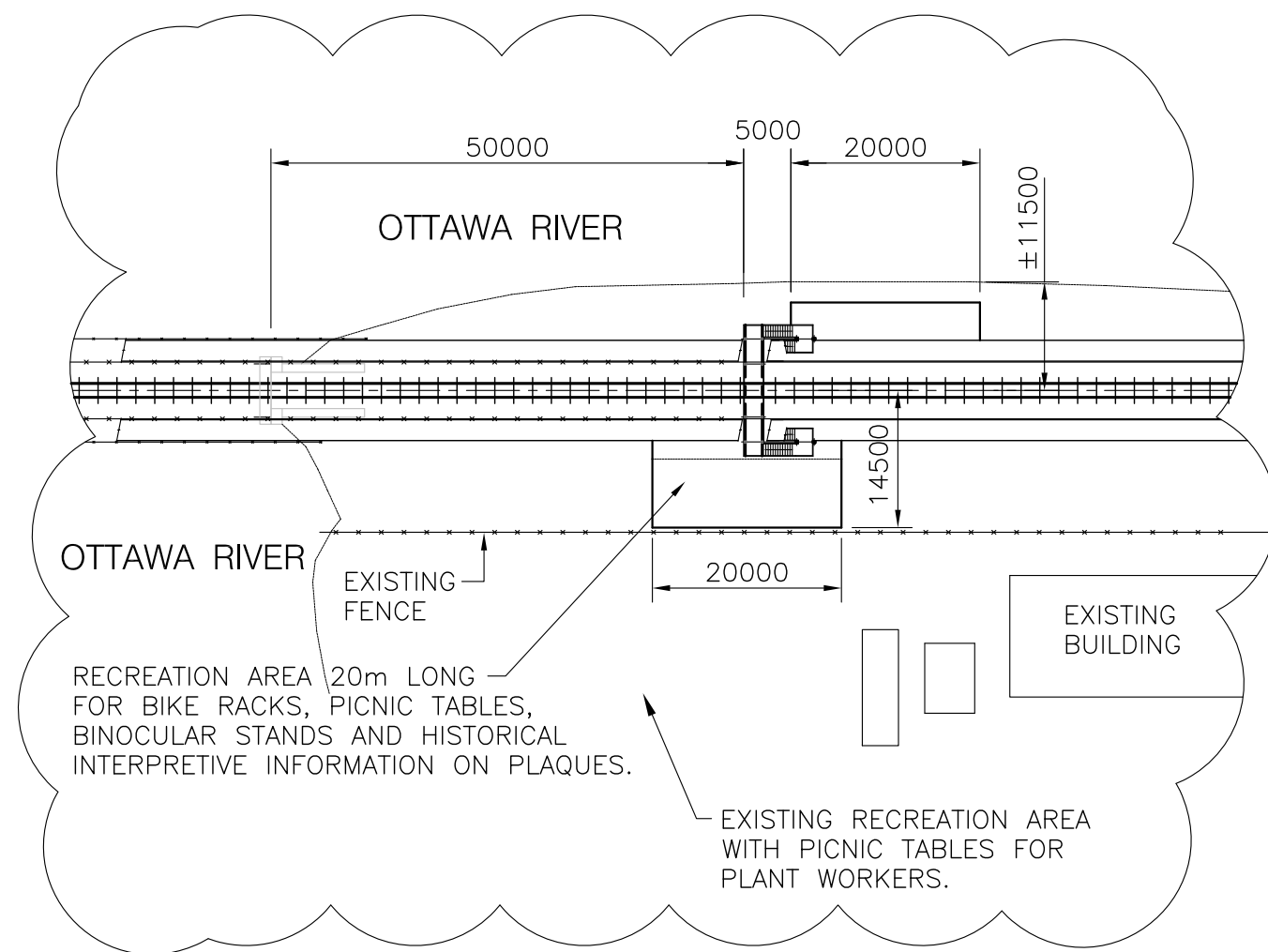
Remisz Consulting Eng-Frame 2009/06/01

Frame 79x520 mm

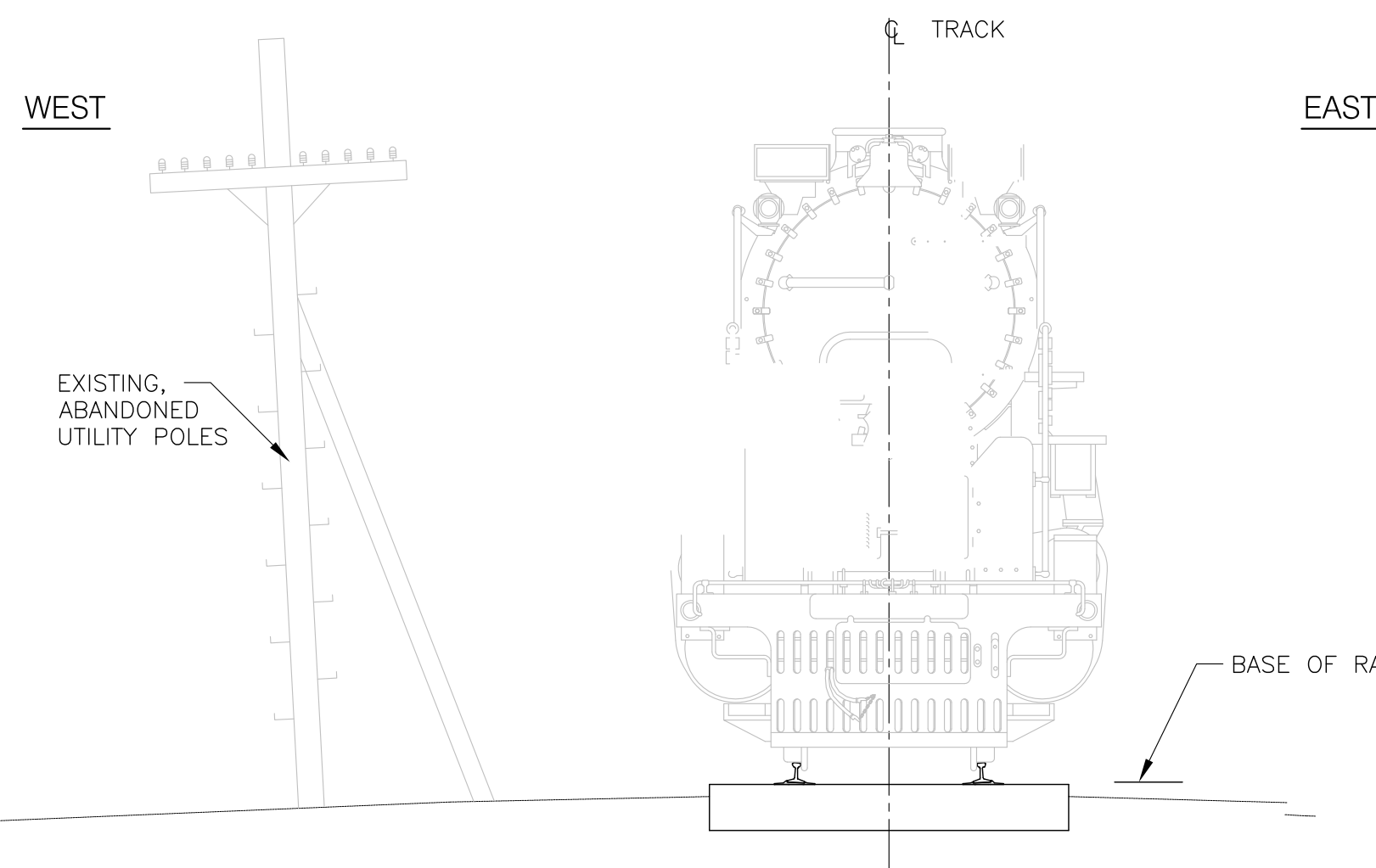
Remisz Consulting Eng-Frame 2009/06/01



ELEVATION
1:1500

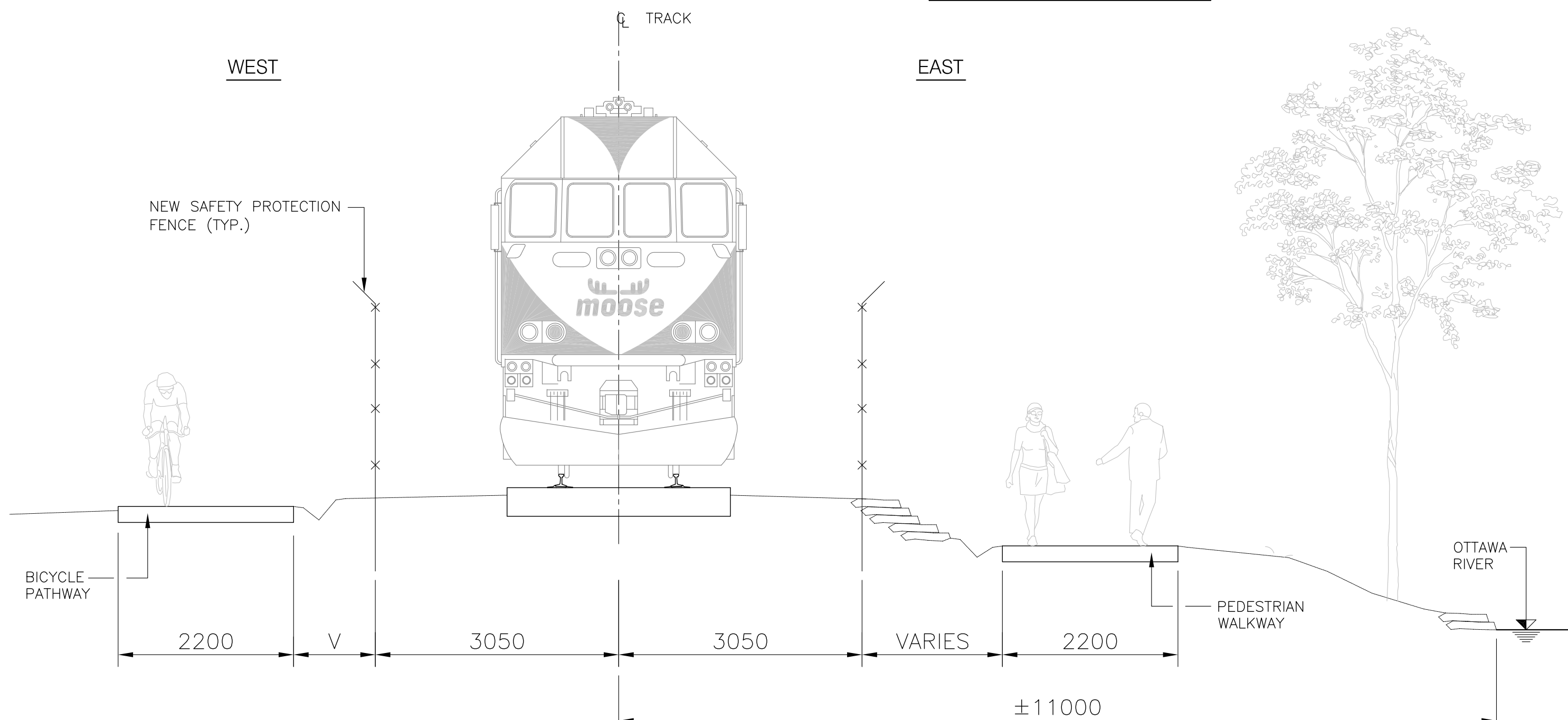


PARTIAL PLAN
1:1500

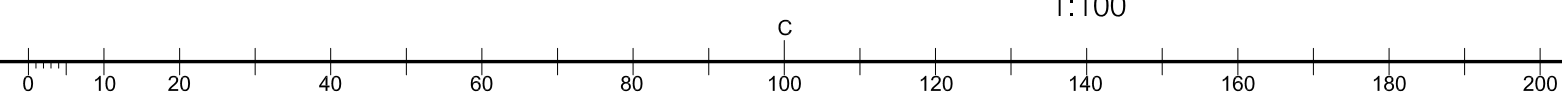


4
1:100

EXISTING - CONSTRUCTED 1879-1881



4
1:100
PROPOSED UPGRADE



THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



| | | | |
|-----|-----------------|----------|-----|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| No. | Date (dd/mm/yy) | Revision | By: |

REMISZ CONSULTING ENGINEERS
57 Auriga Drive, Suite 102
Ottawa, K2E 8B2
Phone 613-225-1162
Fax 613-225-4529

Client
moose
THE MOOSE CONSORTIUM

Project
**THE PRINCE OF WALES BRIDGE
IMPROVEMENT
OTTAWA - GATINEAU**

Drawing
**FEASIBILITY STUDY - OPTION "2B"
LEMIEUX ISLAND
PLAN, ELEVATION AND SECTION**

| | | | |
|-------------|----------|----------|----------|
| Designed | W.R. | Date | MAY 2015 |
| Drawn | W.M.K. | Scale | AS SHOWN |
| Checked | W.R. | Sheet | 2 of 6 |
| Project No. | 2015-136 | Dwg. No. | SP-2 |

Frame 79x520 mm

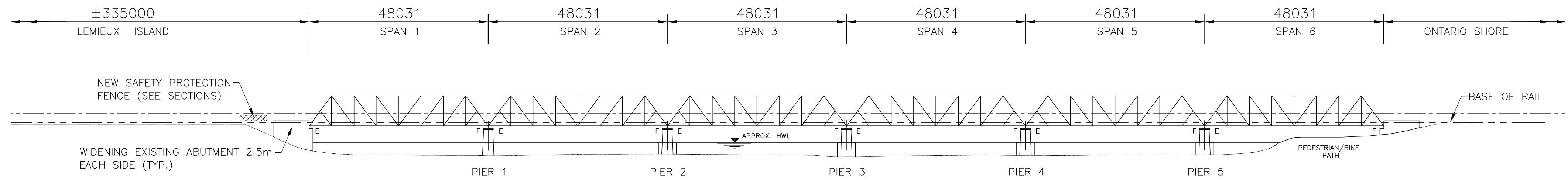
Remisz Consulting Eng. Frame 2009/06/01

NORTH

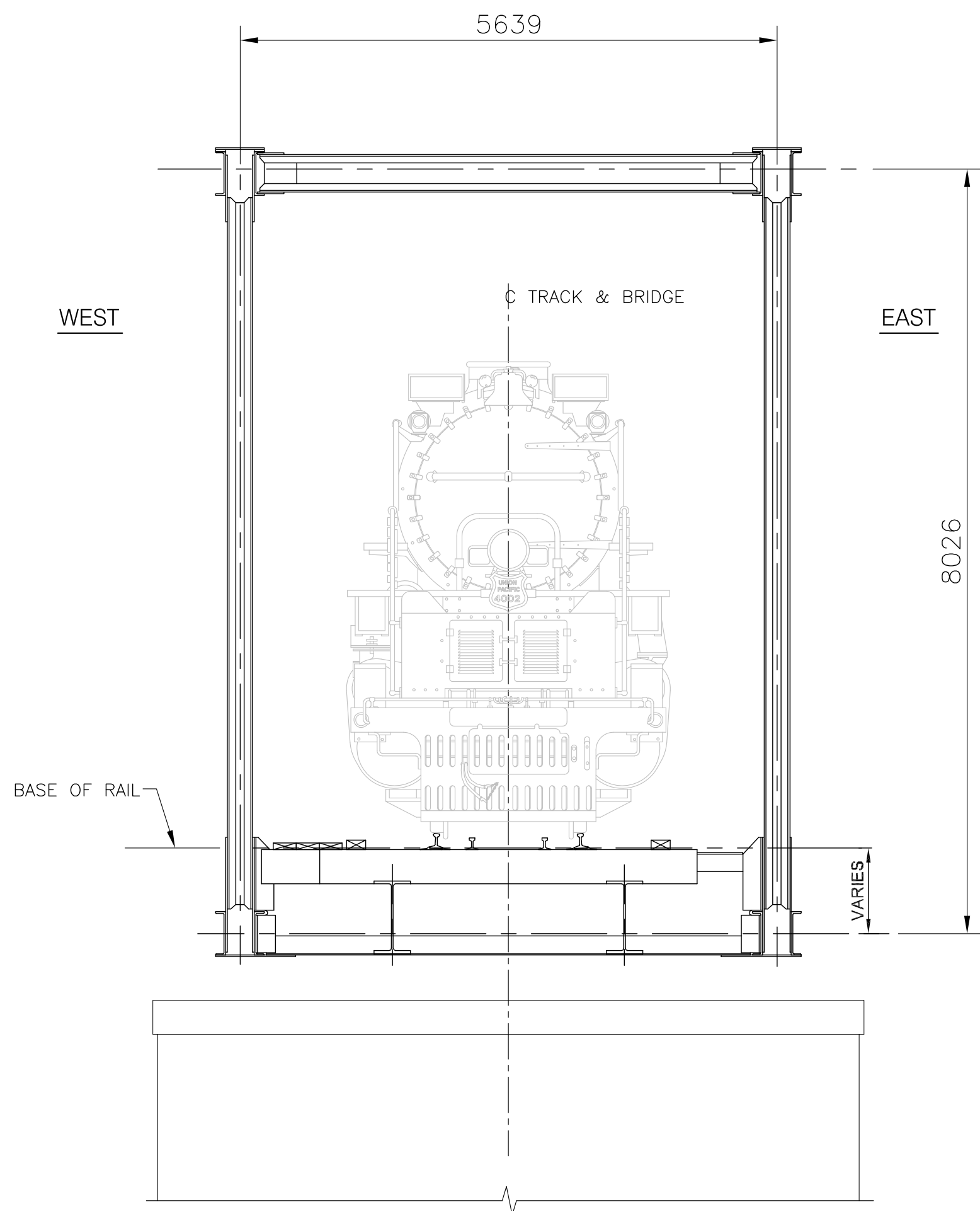
TO GATINEAU

SOUTH

TO OTTAWA

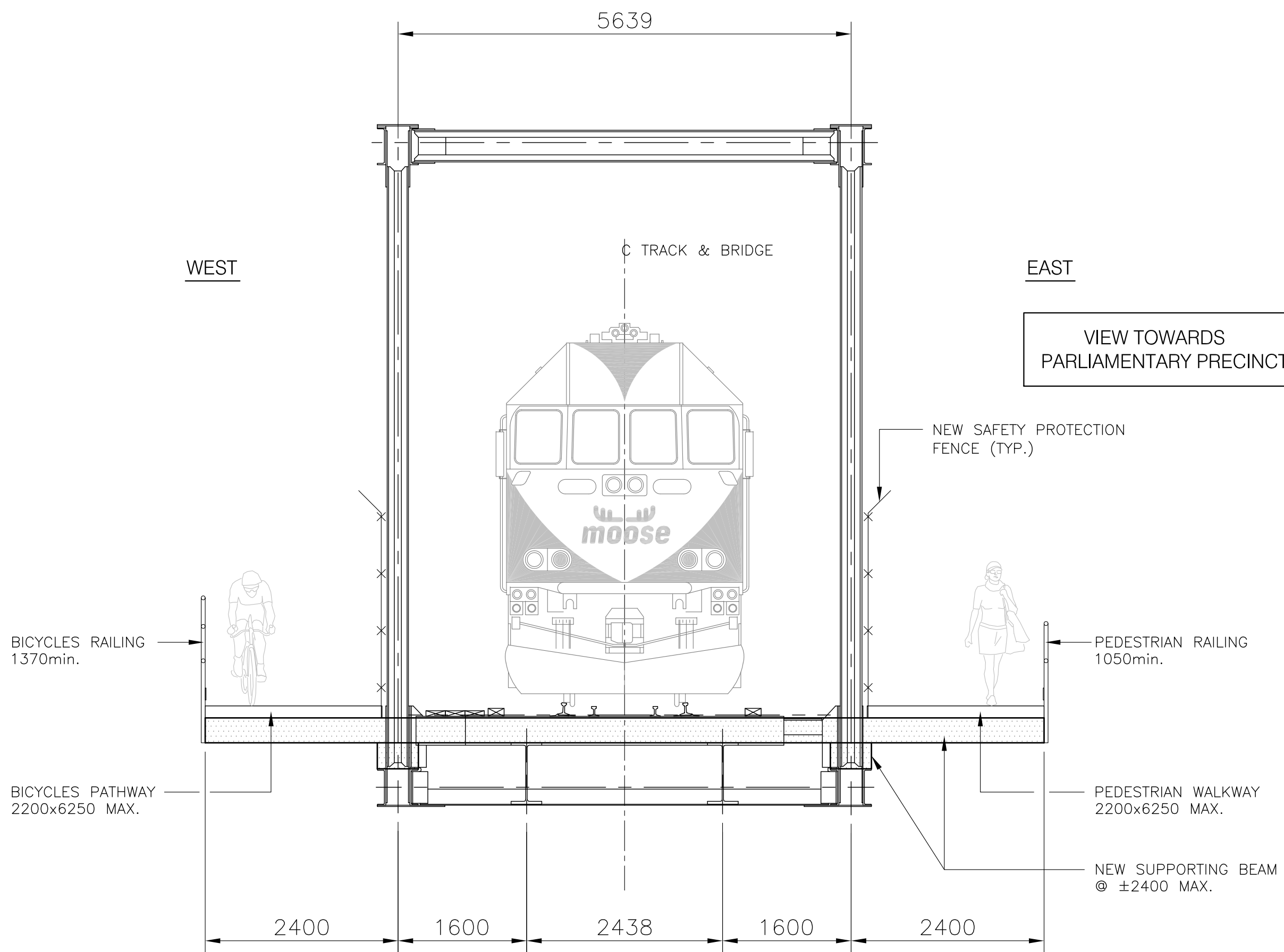


ELEVATION
1:1500



3
1:100

EXISTING - CONSTRUCTED 1879-1881



3
1:100

PROPOSED UPGRADE

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



| No. | Date (dd/mm/yy) | Revision | By: |
|-----|-----------------|----------|-----|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

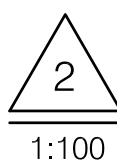
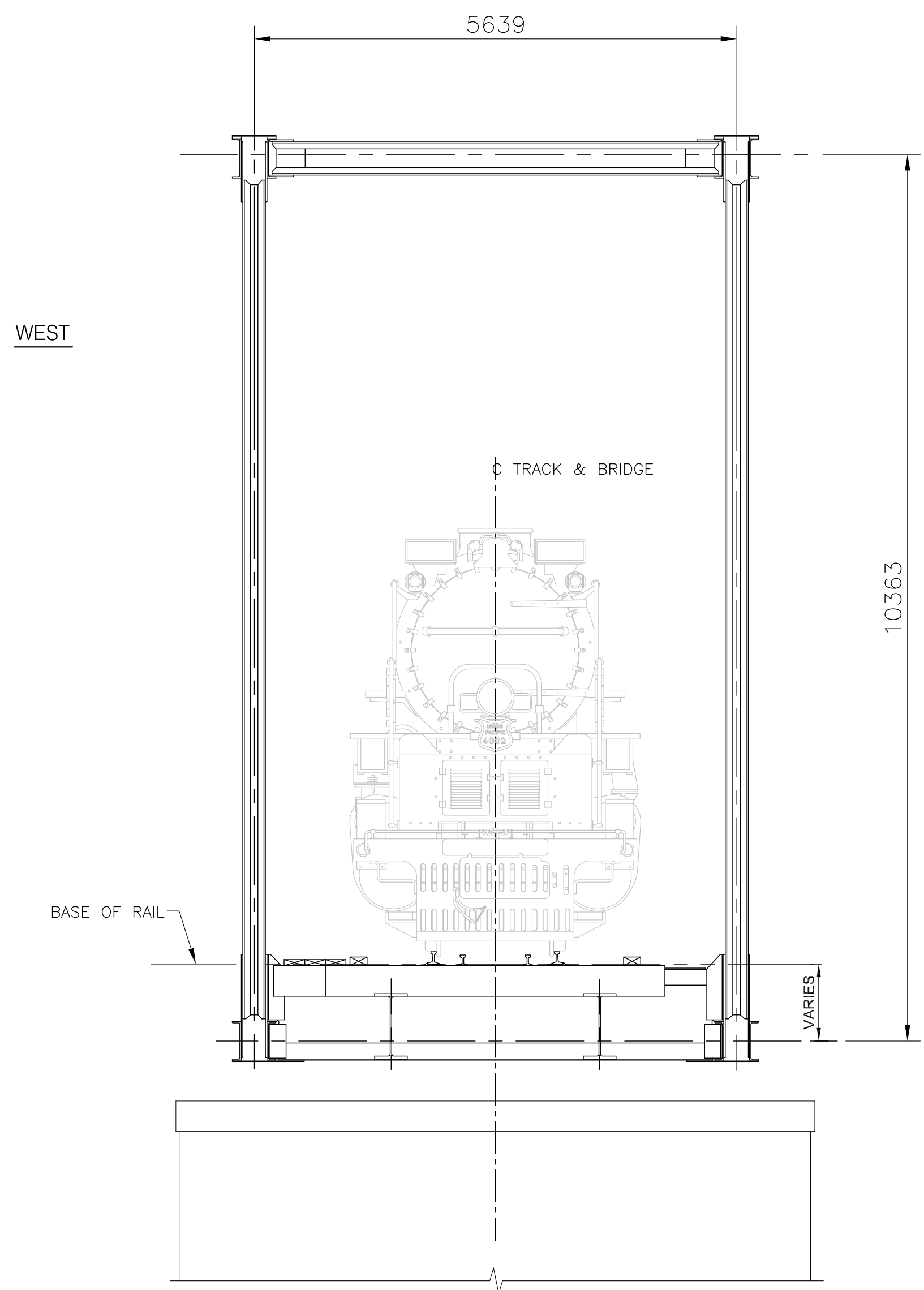
REMISZ CONSULTING ENGINEERS
57 Auriga Drive, Suite 102
Ottawa, K2E 8B2
Phone 613-225-1162
Fax 613-225-4529

Client
moose
THE MOOSE CONSORTIUM

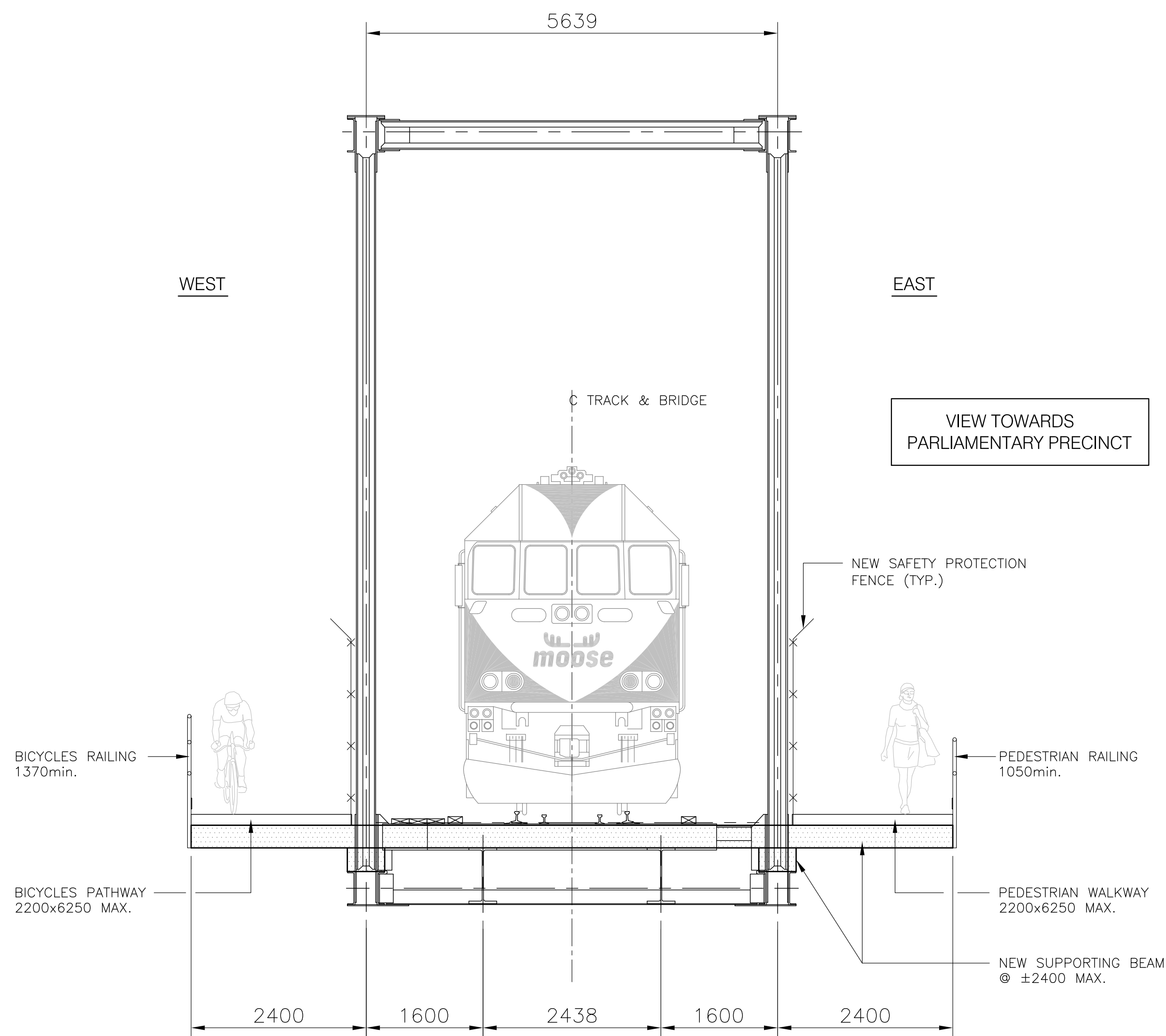
Project
**THE PRINCE OF WALES BRIDGE
IMPROVEMENT
OTTAWA - GATINEAU**

Drawing
**FEASIBILITY STUDY - OPTION "2B"
SOUTH BRIDGE
ELEVATION AND SECTION - 3**

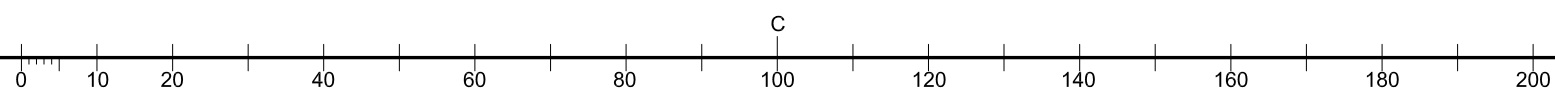
| | | | |
|-------------|----------|----------|----------|
| Designed | W.R. | Date | MAY 2015 |
| Drawn | W.M.K. | Scale | AS SHOWN |
| Checked | W.R. | Sheet | 3 of 6 |
| Project No. | 2015-136 | Dwg. No. | SP-3 |



EXISTING - CONSTRUCTED 1879-1881



PROPOSED UPGRADE



THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED.
THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



| No. | Date (dd/mm/yy) | Revision | By: |
|-----|-----------------|----------|-----|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

REMISZ CONSULTING ENGINEERS
57 Auriga Drive, Suite 102
Ottawa, K2E 8B2
Phone 613-225-1162
Fax 613-225-4529

Client
moose
THE MOOSE CONSORTIUM

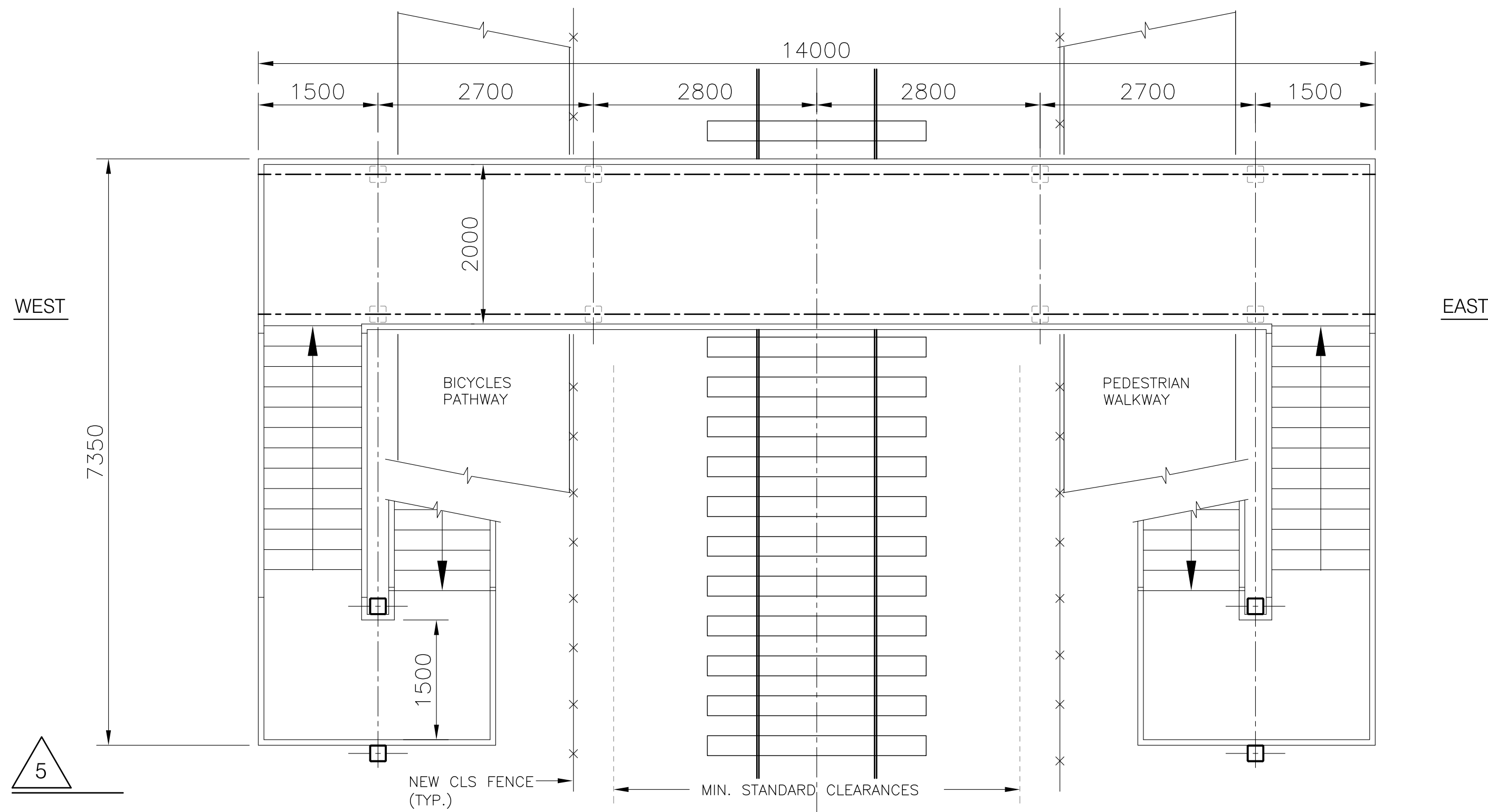
Project
**THE PRINCE OF WALES BRIDGE
IMPROVEMENT
OTTAWA - GATINEAU**

Drawing
**FEASIBILITY STUDY - OPTION "2B"
NORTH BRIDGE
SECTION - 2**

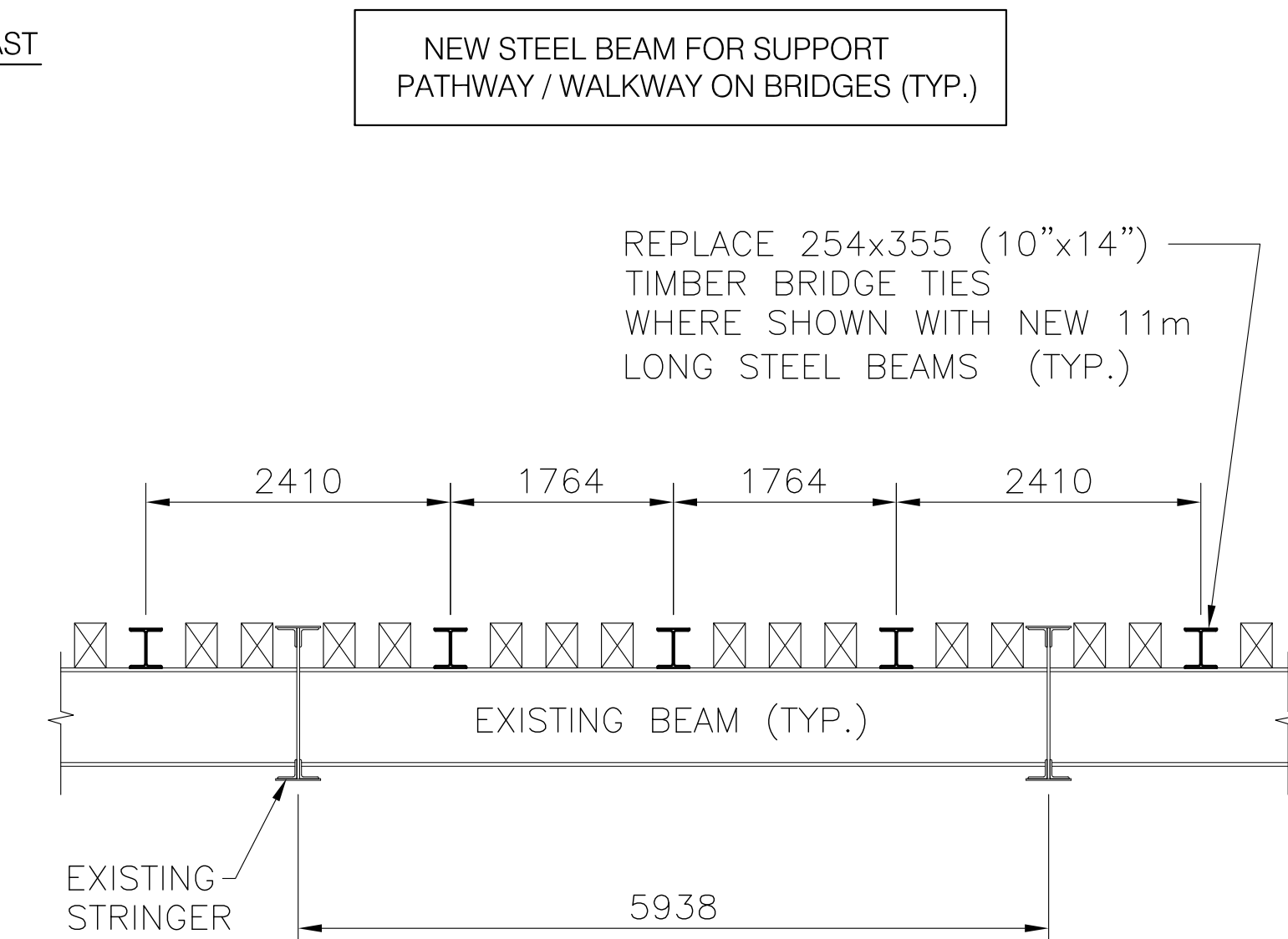
| | | | |
|-------------|----------|----------|----------|
| Designed | W.R. | Date | MAY 2015 |
| Drawn | W.M.K. | Scale | AS SHOWN |
| Checked | W.R. | Sheet | 4 of 6 |
| Project No. | 2015-136 | Dwg. No. | SP-4 |

Frame 790x520 mm

Remisz Consulting Eng-Frame 2009/06/01



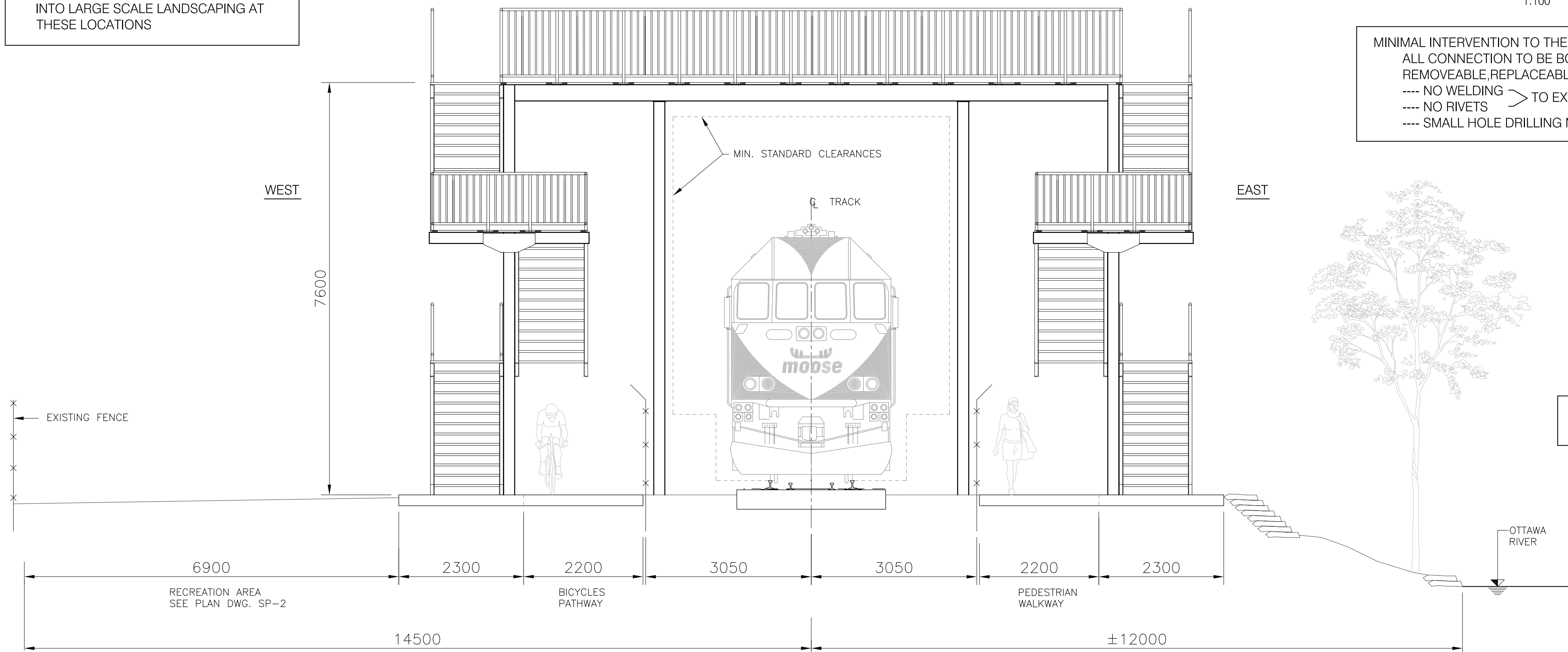
PLAN
1:100



TYPICAL SECTION
1:100

MINIMAL INTERVENTION TO THE EXISTING TRUSS SYSTEM
ALL CONNECTION TO BE BOLTED, CLAMPED,
REMOVEABLE, REPLACEABLE.
---- NO WELDING > TO EXISTING
---- NO RIVETS
---- SMALL HOLE DRILLING MAY BE PERMITTED.

★ ACTUAL SLOPE LINES MAY VARY
★ DRY STONE WALLS CAN BE INTEGRATED
INTO LARGE SCALE LANDSCAPING AT
THESE LOCATIONS



5 PROPOSED UPGRADE
1:100

VIEW TOWARDS
PARLIAMENTARY PRECINCT

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT
LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL
AUTHORITIES AND UTILITY COMPANIES CONCERNED.
THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND
SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE
DURING CONSTRUCTION.



| No. | Date (dd/mm/yy) | Revision | By: |
|-----|--------------------|----------|-----|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

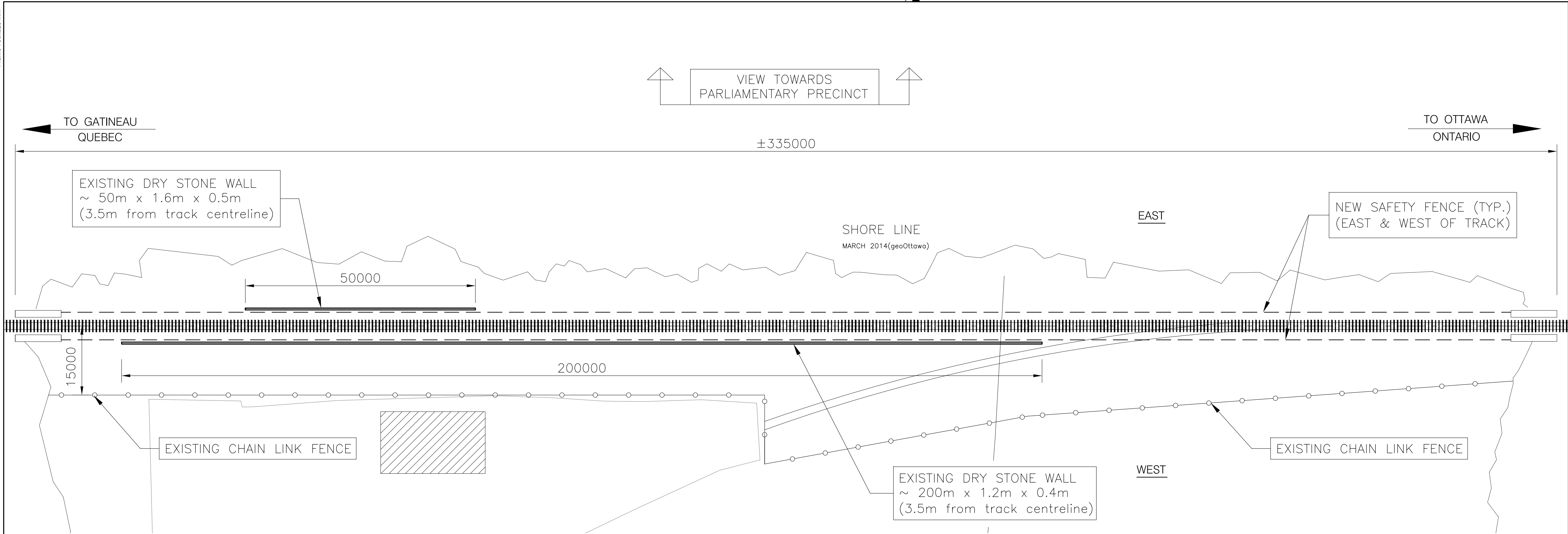
REMISZ CONSULTING
ENGINEERS
57 Auriga Drive, Suite 102
Ottawa, K2E 8B2
Phone 613-225-1162
Fax 613-225-4529

Client
moose
THE MOOSE CONSORTIUM

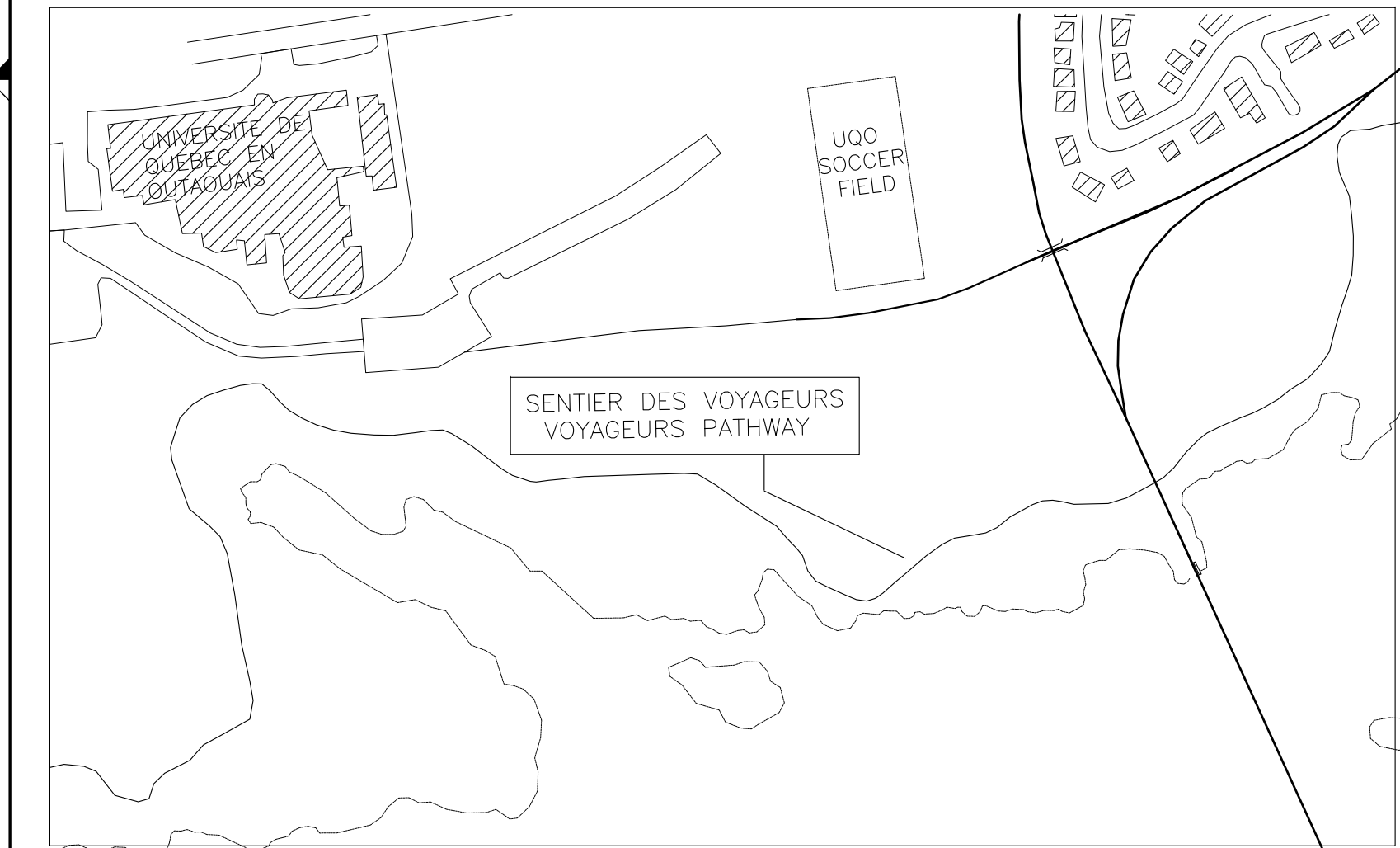
Project
**THE PRINCE OF WALES BRIDGE
IMPROVEMENT
OTTAWA - GATINEAU**

Drawing
**FEASIBILITY STUDY - OPTION "2B"
LEMIEUX ISLAND - PEDESTRIAN OVERPASS
PLAN AND SECTIONS**

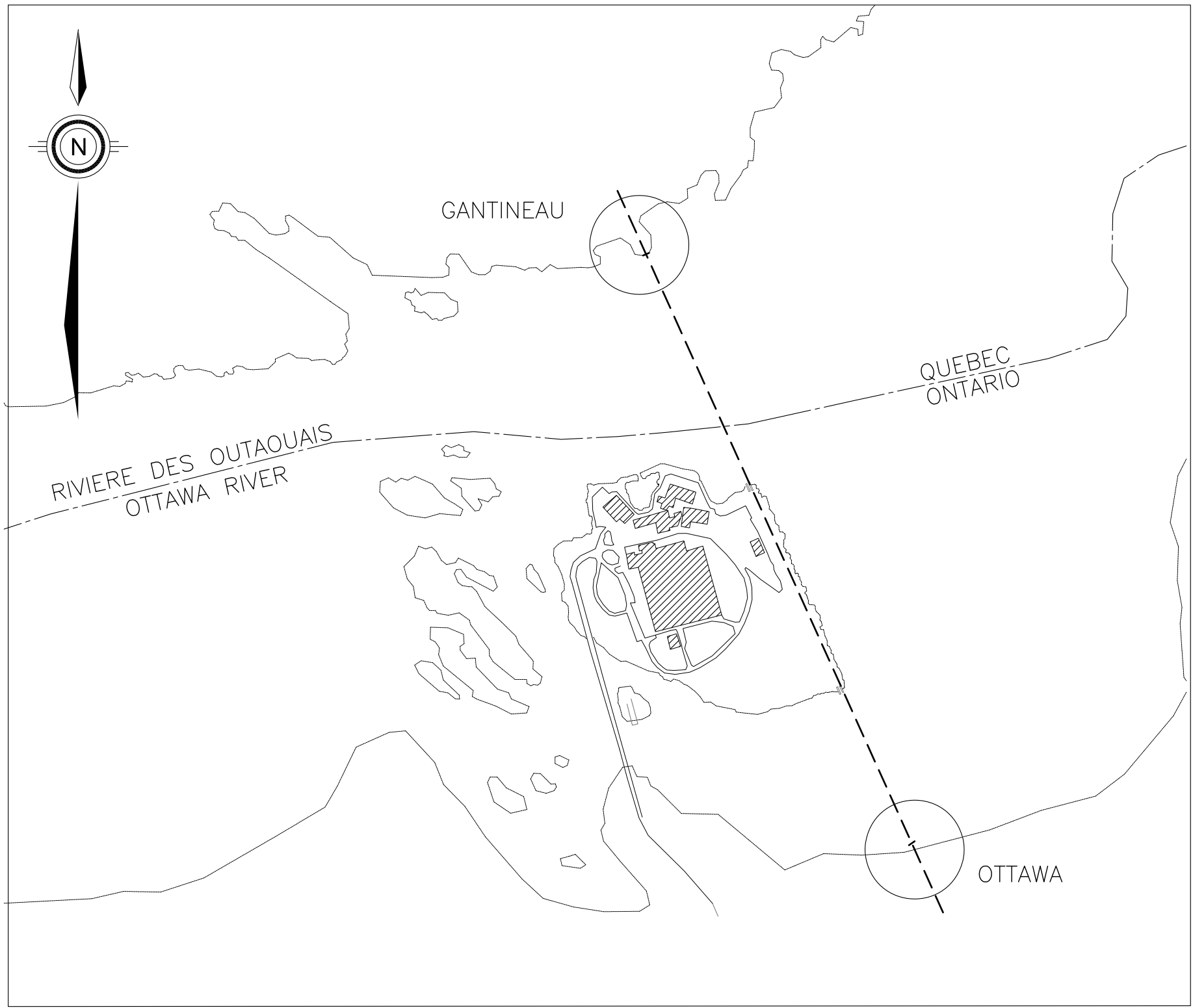
| | | | |
|-------------|----------|----------|----------|
| Designed | W.R. | Date | MAY 2015 |
| Drawn | W.M.K. | Scale | AS SHOWN |
| Checked | W.R. | Sheet | 5 of 6 |
| Project No. | 2015-136 | Dwg. No. | SP-5 |



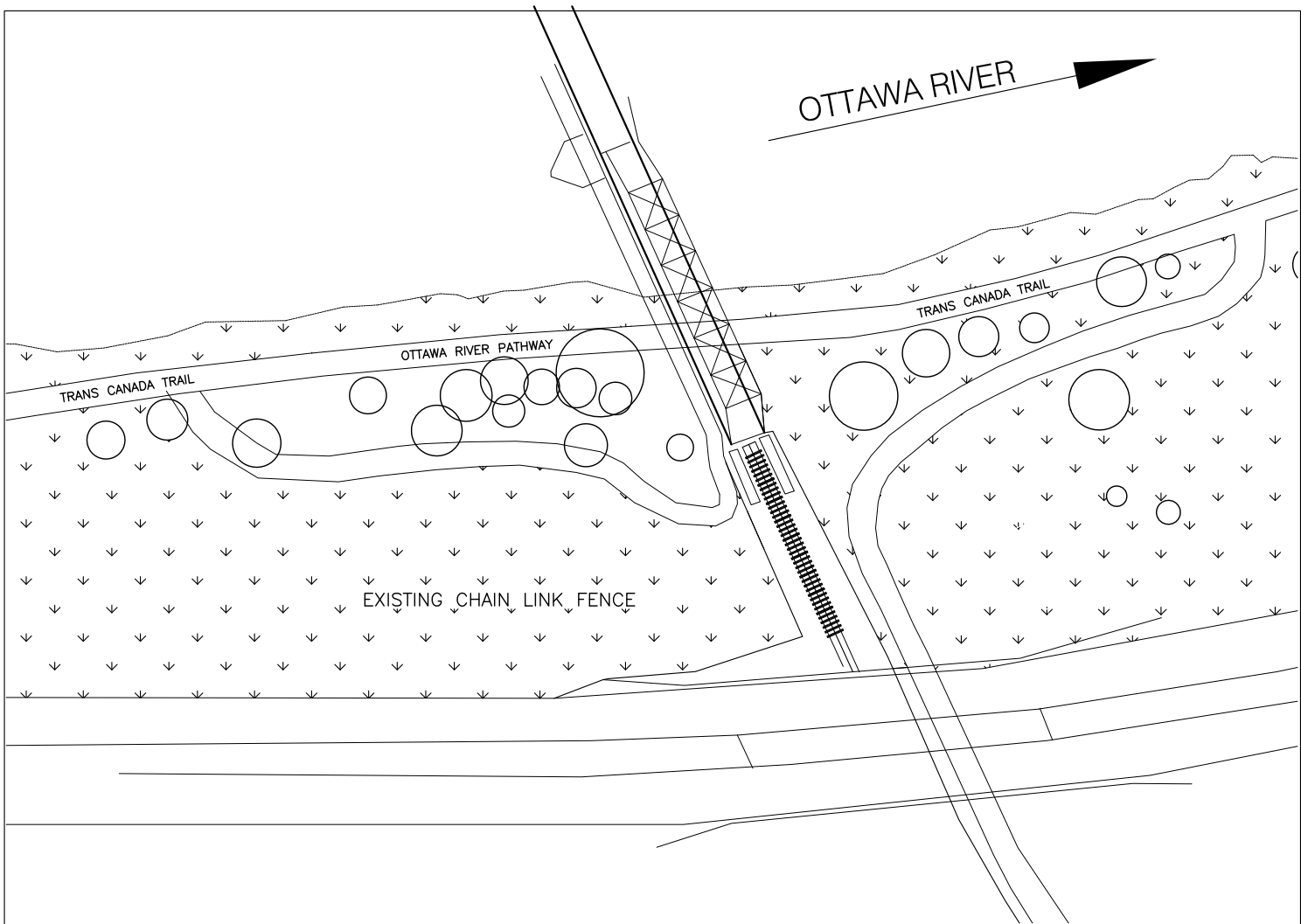
PLAN - LEMIEUX ISLAND
1:500



PLAN - GATINEAU SHORE
1:250



SITE PLAN
1:10000



PLAN - OTTAWA SHORE
1:250

THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, AND THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE DURING CONSTRUCTION.



REMISZ CONSULTING ENGINEERS
57 Auriga Drive, Suite 102
Ottawa, K2E 8B2
Phone 613-225-1162
Fax 613-225-4529

Client
moose
THE MOOSE CONSORTIUM

Project
**THE PRINCE OF WALES BRIDGE
IMPROVEMENT
OTTAWA - GATINEAU**

Drawing
**LEMIEUX ISLAND
SITE PLAN**

| | | | |
|-------------|----------|----------|----------|
| Designed | W.R. | Date | MAY 2015 |
| Drawn | A.S. | Scale | AS SHOWN |
| Checked | W.R. | Sheet | 6 of 6 |
| Project No. | 2015-136 | Dwg. No. | SP-6 |

APPENDIX B – PRELIMINARY ITEMS

ONTARIO SIDE (Prince of Wales Bridge South) – 289m

General Work (Current Configuration with Seismic Upgrades)

| Current Configuration with Seismic Upgrades (2b) | Quantity | Unit | Unit Cost | Total |
|--|----------|----------------|--------------|---------------------|
| Structural steel repairs | 12 | ea | \$8,000.00 | \$96,000 |
| Rivet replacement | 1 | L.S. | \$5,000.00 | \$5,000 |
| Deck replacement | 289 | m | \$1,400.00 | \$404,600 |
| Bearing replacement | 24 | ea | \$25,000.00 | \$600,000 |
| Seismic restrainers | 1 | L.S. | \$125,000.00 | \$125,000 |
| Truss strengthening for seismic considerations | 1 | L.S. | \$450,000.00 | \$450,000 |
| Structural steel recoating (incl. access) | 12000 | m ² | \$200.00 | \$2,400,000 |
| Total | | | | \$ 4,080,000 |

| | | | | |
|--|------|----------------|----------------|---------------------|
| Temporary support of structure | 1 | L.S. | \$1,575,000.00 | \$1,575,000 |
| Jacking of structure | 1 | L.S. | \$262,500.00 | \$262,500 |
| Dewatering and Cofferdams | 1 | L.S. | \$4,200,000.00 | \$4,200,000 |
| Earth excavation for abutment reconstruction | 300 | m ³ | \$55.00 | \$16,500 |
| Pier and abutment removal | 1000 | m ³ | \$500.00 | \$500,000 |
| Dowels into rock | 1 | L.S. | \$175,000.00 | \$175,000 |
| Concrete in piers | 725 | m ³ | \$1,500.00 | \$1,087,000 |
| Reinforcing steel in piers | 90 | t | \$2,800.00 | \$252,000 |
| Concrete in abutments | 255 | m ³ | \$1,500.00 | \$382,500 |
| Reinforcing Steel Abutments | 30 | t | \$2,800.00 | \$84,000 |
| Rock excavation | 50 | m ³ | \$250.00 | \$12,500 |
| New stone for Abutments and Piers | 590 | m ² | \$750.00 | \$442,500 |
| Total | | | | \$ 8,989,500 |

| | | | | |
|---------------------------|-----|---|----------|------------------|
| Track and Tie Replacement | 290 | m | \$750.00 | \$217,500 |
| Safety rail | 320 | m | \$60.00 | \$19,200 |
| Track & Tie Removal | 290 | m | \$250.00 | \$72,500 |
| Total | | | | \$309,200 |

South Bridge Total \$13,378,700

New Construction - Additional Cantilevered Pathways on bridge

| | | | | |
|-----------------------------------|-----|------|-------------|---------------------|
| New Supporting Beams | 144 | ea | \$3,000.00 | \$432,000 |
| Fiberglass pads | 92 | ea | \$10,600.00 | \$975,200 |
| Safety Protection Fence (2.4m) | 600 | m | \$200.00 | \$120,000 |
| Bicycles Rail | 312 | m | \$250.00 | \$78,000 |
| Pedestrian Rail | 312 | m | \$200.00 | \$62,400 |
| Electrical | 1 | L.S. | \$30,000.00 | \$30,000 |
| Landscaping | 1 | L.S. | \$20,000.00 | \$20,000 |
| Total for New Construction | | | | \$ 1,717,600 |

Subtotal \$15,096,300

QUEBEC SIDE (Prince of Wales Bridge NORTH) - 367m
General Work (Current Configuration with Seismic Upgrades)

| Current Configuration with Seismic Upgrades (2b) | Quantity | Unit | Unit Cost | Total |
|--|----------|----------------|--------------|--------------------|
| Structural steel repairs | 14 | ea | \$8,000.00 | \$114,000 |
| Rivet replacement | 1 | L.S. | \$5,500.00 | \$5,500 |
| Deck replacement | 367 | m | \$1,400.00 | \$513,800 |
| Bearing replacement | 28 | ea | \$25,000.00 | \$700,000 |
| Seismic restrainers | 1 | L.S. | \$150,000.00 | \$150,000 |
| Truss strengthening for seismic considerations | 1 | L.S. | \$525,000.00 | \$525,000 |
| Structural steel recoating (incl. access) | 16000 | m ² | \$200.00 | \$3,200,000 |
| Total | | | | \$5,208,300 |

| | | | | |
|--|------|----------------|----------------|---------------------|
| Temporary support of structure | 1 | L.S. | \$1,800,000.00 | \$1,800,000 |
| Jacking of structure | 1 | L.S. | \$300,000.00 | \$300,000 |
| Dewatering and Cofferdams | 1 | L.S. | \$4,800,000.00 | \$4,800,000 |
| Earth excavation for abutment reconstruction | 300 | m ³ | \$55.00 | \$16,500 |
| Pier and abutment removal | 1200 | m ³ | \$500.00 | \$600,000 |
| Dowels into rock | 1 | L.S. | \$200,000.00 | \$200,000 |
| Concrete in piers | 900 | m ³ | \$1,500.00 | \$1,350,000 |
| Reinforcing steel in piers | 100 | t | \$2,800.00 | \$280,000 |
| Concrete in abutments | 270 | m ³ | \$1,500.00 | \$405,000 |
| Reinforcing Steel Abutments | 34 | t | \$2,800.00 | \$95,200 |
| Rock excavation | 50 | m ³ | \$250.00 | \$12,500 |
| New stone for Abutments and Piers | 670 | m ² | \$750.00 | \$502,500 |
| Total | | | | \$10,361,000 |

| | | | | |
|---------------------------|-----|---|----------|------------------|
| Track and Tie Replacement | 370 | m | \$750.00 | \$277,500 |
| Safety rail | 400 | m | \$60.00 | \$24,000 |
| Track & Tie Removal | 370 | m | \$250.00 | \$92,500 |
| Total | | | | \$394,000 |

North Bridge Total \$15,964,000

New Construction - Additional Cantilevered Pathways on bridge

| | | | | |
|-----------------------------------|-----|------|-------------|--------------------|
| New Supporting Beams | 184 | ea | \$3,000.00 | \$552,000 |
| Fiberglass pads | 116 | ea | \$10,600.00 | \$1,229,600 |
| Safety Protection Fence (2.4m) | 800 | m | \$200.00 | \$160,000 |
| Bicycles Rail | 390 | m | \$250.00 | \$97,500 |
| Pedestrian Rail | 390 | m | \$200.00 | \$78,000 |
| Electrical | 1 | L.S. | \$30,000.00 | \$30,000 |
| Landscaping | 1 | L.S. | \$20,000.00 | \$20,000 |
| Total for New Construction | | | | \$2,167,100 |

Subtotal \$18,131,100



LEMIEUX ISLAND - 335m

General Work

| | Quantity | Unit | Unit Cost | Total |
|--------------------------------|----------|------|-----------|-----------|
| Removal Track and Tie | 335 | m | \$250.00 | \$83,750 |
| New Track and Tie | 335 | m | \$550.00 | \$184,250 |
| Ballast Replacement | 1000 | t | \$50.00 | \$50,000 |
| Safety Protection Fence (2.4m) | 670 | m | \$200.00 | \$134,000 |

Total \$ 452,000

New Construction – Additional Pathways on Island

| | | | | |
|---|-----|----|--------------|-----------|
| Concrete Bicycle and Pedestrian Paths | 670 | m | \$120.00 | \$80,400 |
| Dry Stone Walls | 1 | LS | \$50,000.00 | \$50,000 |
| Overpass Structure | 1 | LS | \$300,000.00 | \$300,000 |
| Electrical | 1 | LS | \$50,000.00 | \$50,000 |
| Landscaping | 1 | LS | \$30,000.00 | \$30,000 |
| Recreation Area (2) | 1 | LS | \$25,000.00 | \$25,000 |
| Bike Racks, Picnic Tables, Historical Info Plaques Picnic | 1 | LS | \$18,000.00 | \$18,000 |

Total \$528,000

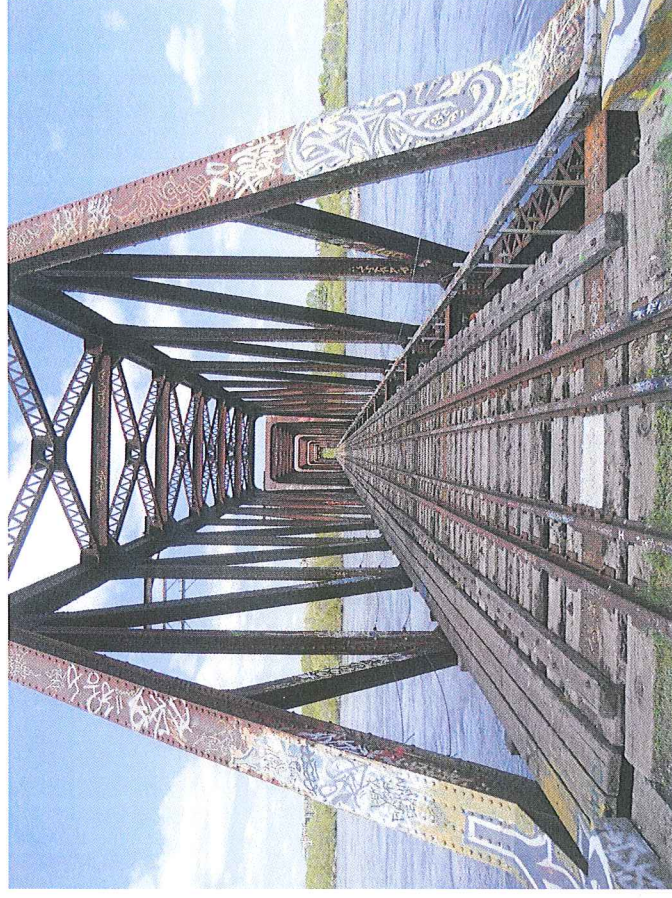
Subtotal \$980,000



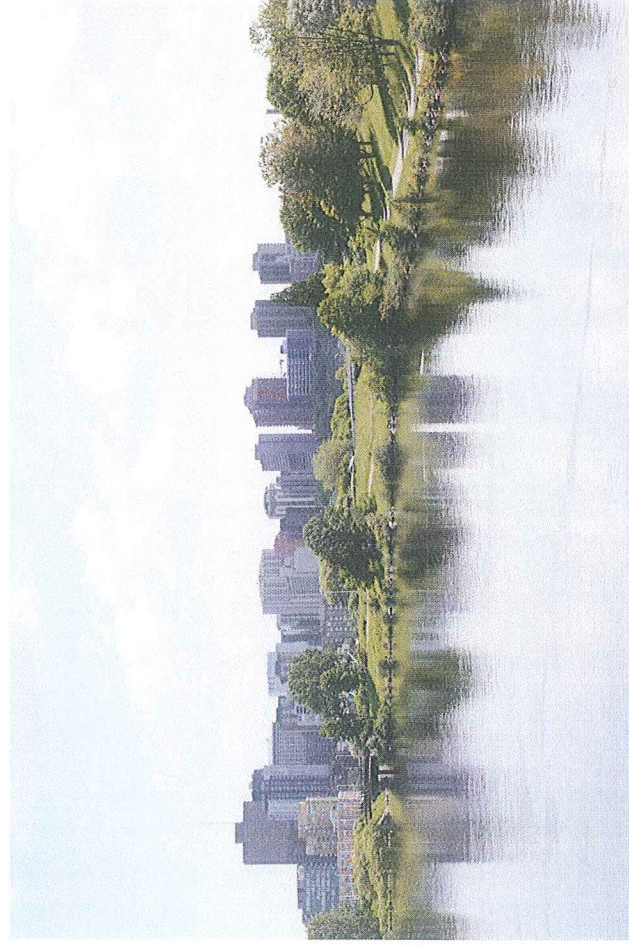
APPENDIX C – SITE PHOTOGRAPHS



POW SOUTH BRIDGE .JPG



POW NORTH BRIDGE .JPG



OTTAWA - LOOKING EAST FROM BRIDGE .JPG



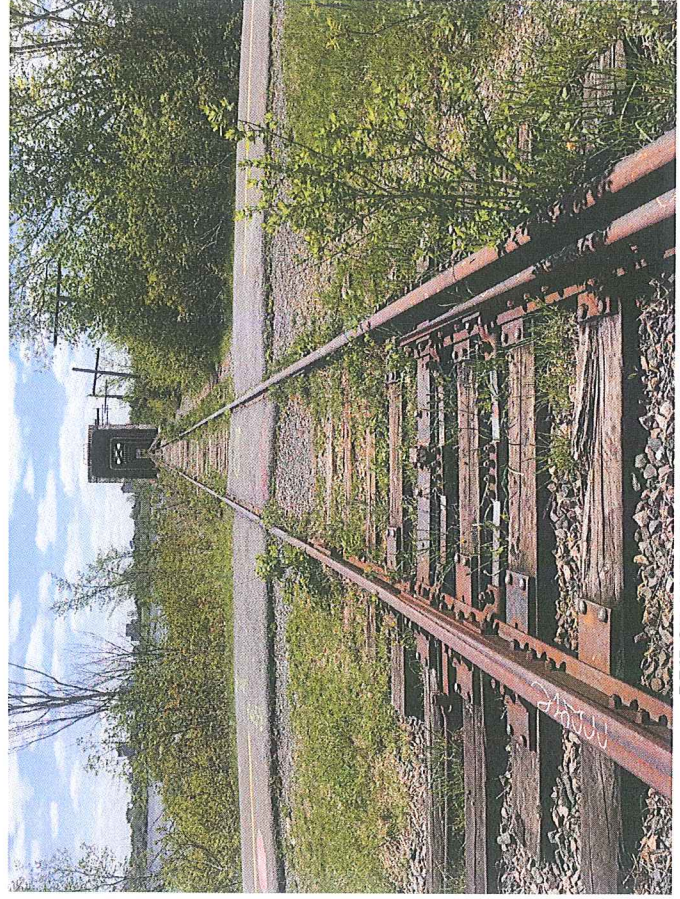
GATINEAU - VIEW LOOKING EAST FROM BRIDGE.JPG



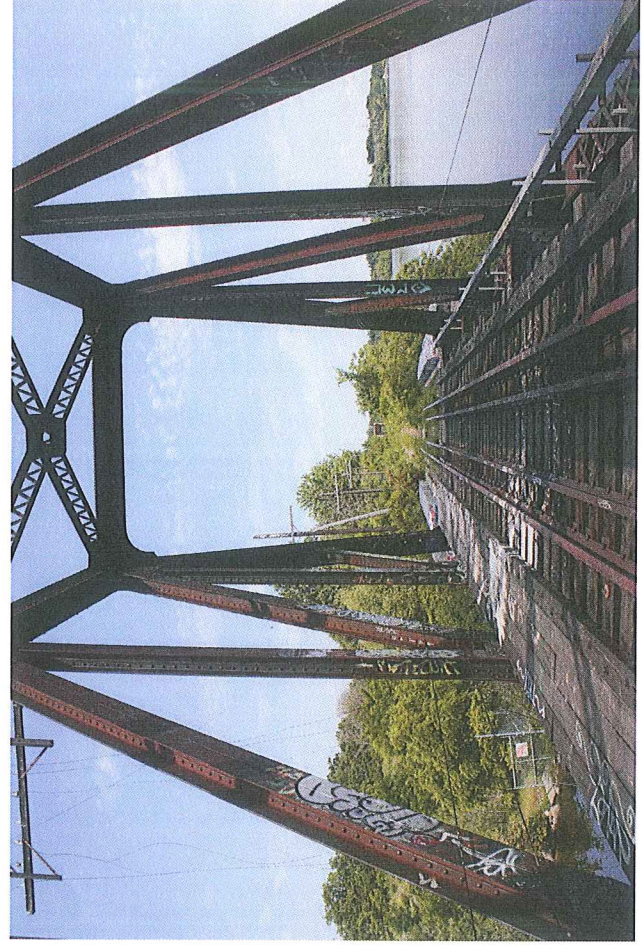
BRIDGE ACCESS FROM LEMIEUX ISLAND .JPG



BRIDGE ACCESS FROM OTTAWA SHORE.JPG



BRIDGE ACCESS FROM GATINEAU SHORE.JPG



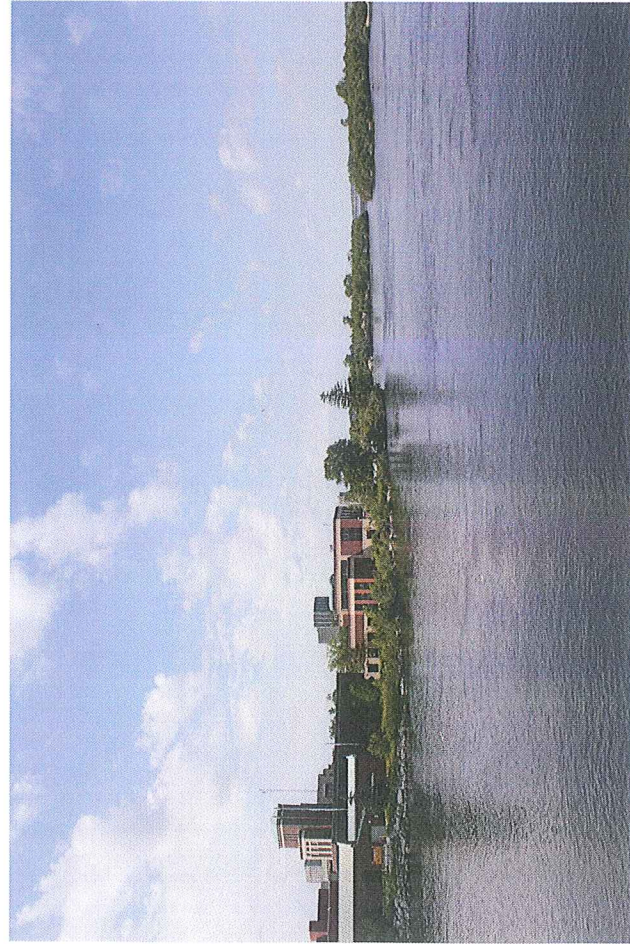
LEMIEUX ISLAND - LOOKING NORTH.JPG



OTTAWA - VIEW LOOKING EAST FROM BRIDGE.JPG



OTTAWA - VIEW LOOK EAST FROM BRIDGE.JPG



LEMIEUX ISLAND NORTH SHORE.JPG



GATINEAU SHORE- LOOKING EAST.JPG



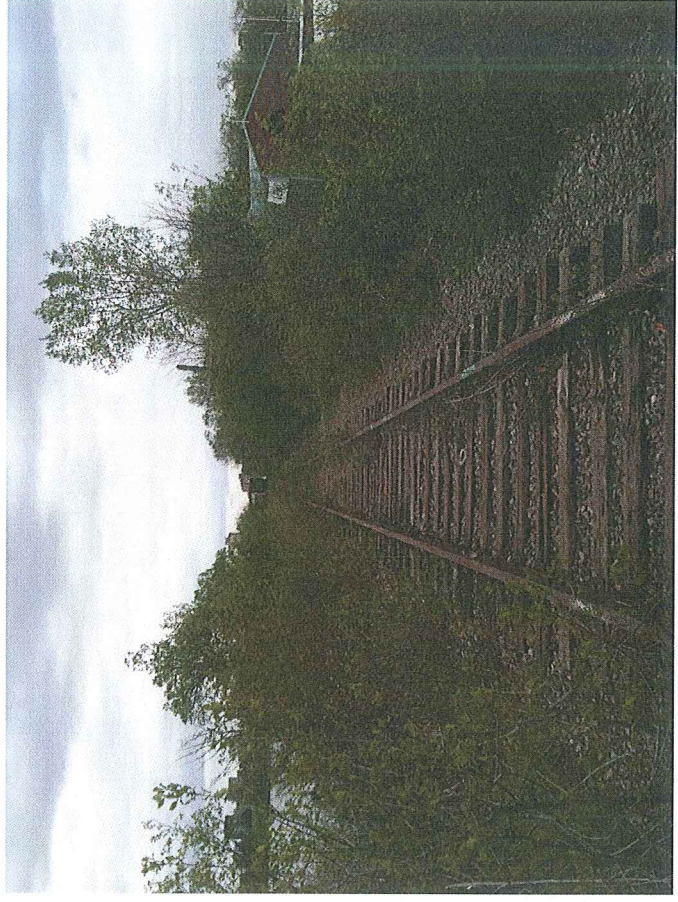
DRY STONE WALL.JPG



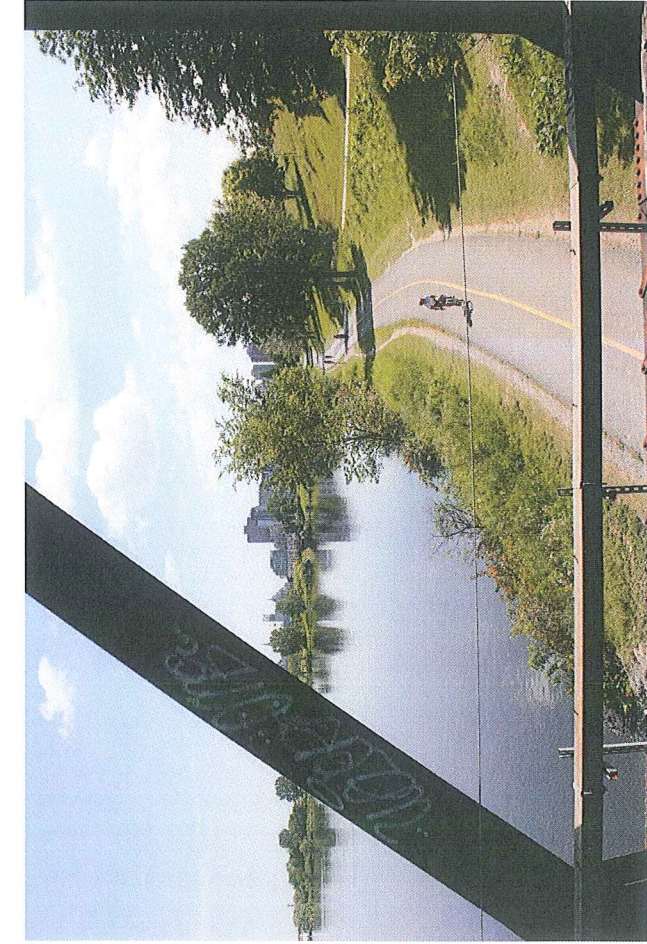
LEMIEUX ISLAND SOUTH SHORE.JPG



LEMIEUX ISLAND TRACK - LOOKING NORTH .JPG



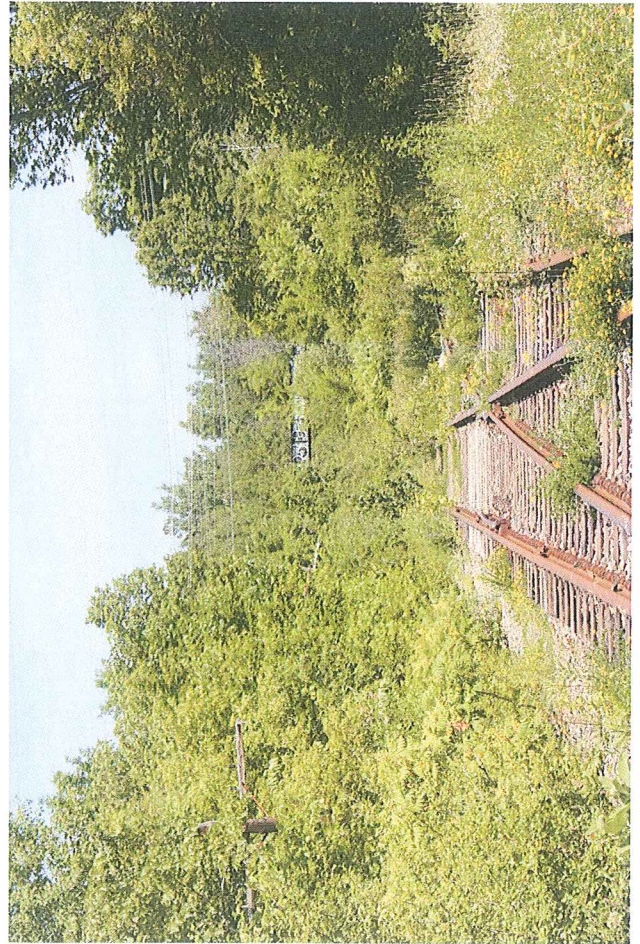
LEMIEUX ISLAND TRACK - LOOKING SOUTH .JPG



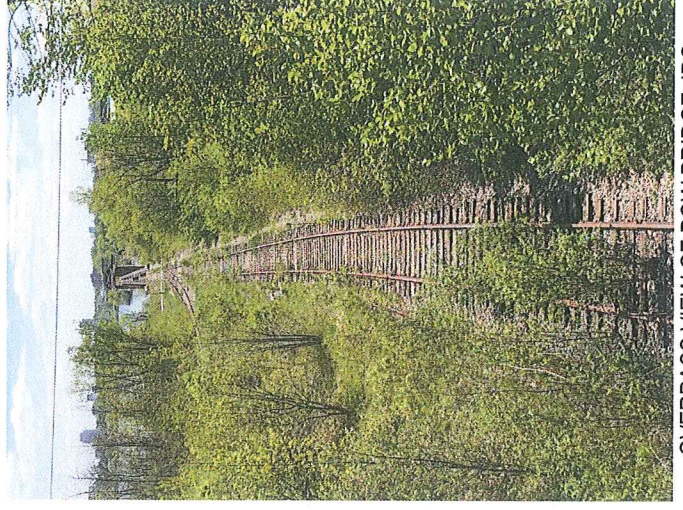
OTTAWA - PATHWAY CROSSING .JPG



TRACK INTERSECTION - OTTAWA RIVER PATHWAY .JPG



OVERPASS NORTH OF SENTIER DES VOYAGEURS.JPG



OVERPASS VIEW OF POW BRIDGE.JPG

APPENDIX D – COMPANY BIOS

**Mobility Ottawa-Outaouais: Systems & Enterprises Inc. (Consortium Builder)**

Moose Inc. is a federally incorporated firm whose sole purpose is to create a private-sector Consortium to develop and operate a whole-region metropolitan railway system on the 400 km of existing tracks and bridges along three inter-provincial routes in a six-pointed star pattern that radiates from the urban core of Ottawa/Gatineau to the rural areas:

- Smiths Falls ON ↔ Ottawa ON ↔ Gatineau QC ↔ La Pêche (Wakefield) QC;
- Arnprior ON ↔ Ottawa ON ↔ Gatineau QC ↔ Montebello QC;
- Alexandria ON ↔ Ottawa ON ↔ Bristol QC.

Moose Consortium's passenger rail service will reduce the number of cars on Ottawa streets each day by 25,000. It will achieve net annual carbon emission reductions of more than 22,000 tonnes. And the cash savings for travelers throughout the region will translate into more than a \$20 million boost to household disposable income per year.

Moose Inc's plans are based on the *Property-Powered Rail Open Development Model*. This entrepreneurial passenger railway concept is 100% based on the optimization of real property values (asset and income) within walking distance of stations, re-conceptualizing these as "lifestyle centres". For transit stakeholders this approach promises a self-financing metropolitan-scale passenger railway system with zero dependence upon public debt or taxes. This innovative transit financing model has been the focus of a series of triennial panels co-hosted by the School of Public Policy & Administration, Carleton University, and the Département des sciences administratives, Université du Québec en Outaouais (2011, 2014, and 2017). Property-Powered Rail was featured in June 2015 at the University of Michigan, at a workshop co-organized with the SMART (Sustainable Mobility & Accessibility Research & Transformation), in collaboration with the Network on European Communications and Transport Activities Research. In July 2015, Moose Inc lead in the UK the First International Conference on Transport & Health on Property-Powered Rail.

**REMISZ Consulting Engineers Ltd. (Project 125 Consortium Member)**

Established in 1990, REMISZ Consulting Engineers Limited is an Ottawa-based professional engineering firm which offers diversified consulting engineering services to all levels of governments, municipalities, as well as the private sector.

REMISZ's expertise is in the design of new structures, rehabilitation design of existing structures, building structure modifications, institutional and residential buildings, heritage structures, and purpose built structures. Works encompass bridges, culverts, retaining walls, free-standing walls, dams, wharfs, surface drainage systems, and civil landscaping works. REMISZ's portfolio of projects extends to different areas in Ontario and Quebec, as well as in the province of Prince Edward Island, High Canadian Arctic, Newfoundland and Labrador, and internationally such as in Europe, United States, and the Caribbean.

REMISZ provides planning, design review, seismic assessment, condition inspection, appraisal, evaluation, needs assessment, structural evaluation, feasibility studies, engineering cost estimates, life cycle costing, construction inspection, supervision, construction management, tendering, contract administration and quality verification engineering (QVE) services.

REMISZ was the first in Ontario to introduce CFRPs (Carbon Fibre Reinforced Polymers) to bridge strengthening, the first in Canada to develop detailed design of transverse bridge pre-stressing using CFRPs, and to develop repair details to the CN Tower radome roof in Toronto using GFRP (Glass Fibre Reinforced Polymers).

REMISZ received The Business Achievement Innovation Award, a 'Superior' evaluation rating granted by PWGSC, and in 2014 our firm was awarded with the Consulting Engineers of Ontario's most prestigious award, The Willis Chipman Award, for the Rockcliffe Parkway Recreational Pathway design (Lisgar Road to Rockcliffe Boathouse) for the National Capital Commission.

**MTB Architects (Project 125 Consortium Member)**

MTBA is a service-focused team of dedicated professionals consulting in the architecture, planning and conservation fields since 1988. The key to MTBA's success is working responsively and creatively with the client's needs and with a project's holistic context. We bring this thorough approach to a diverse body of work in building projects, evaluation and analysis, and on behalf of a wide range of public, non-profit and private sector clients

In an increasingly complex world of advancing regulations, stakeholder input, cross-discipline thinking and specialized knowledge, MTBA is a broadly-capable and deeply experienced resource who can lead the team and/or be a significant contributor with valuable skill sets.

MTBA's "hands-on" size and long-term experience in these fields makes it especially effective in the delivery of services for small to medium size building commissions, and studies, planning and reports for projects of all sizes. MTBA also collaborates with others to bring specialized skills to large-scale building and development projects.

MTBA's prime work in sustainability, heritage conservation, and interventions to existing buildings & districts is complemented by the Firm's value-added expertise in such areas as stakeholder consultation and gaining community consensus, assembling and leading effective multi-disciplinary teams, public communications and strategies, risk management and urban design.

**Safety Projects International (Project 125 Consortium Member)**

Dr. Bill Pomfret & Associates and Safety Projects International Inc have combined their resources as an independent organization specializing in safety and loss control training. We also conduct both basic and comprehensive health, safety and loss control audits using the internationally acclaimed 5-Star Health and Safety Management System™ incorporating the USA-OSHA standards.

The Mission of *Safety Projects International Inc.* is to educate and influence management to adopt effective Safety Health and Risk Control policies, practices and procedures that prevent and mitigate human and economic losses arising from accidental causes and adverse occupational and environmental health exposures.

To achieve its mission, *Safety Projects International Inc.* has five interrelated services, currently in use in over 30 countries, these include:

- 5 Star Health & Safety Management System™ Audits in any of the Industry Modules
- Training Films on Risk Control and Professional training courses in Power Point (over 1000 course modules)
- Publications, Manuals, Books, C.D. ROM etc.
- Management & Safety Practitioner Training
- Health & Safety Management System Audits

**The Opman Company****(Project 125 Consortium Member)**

The Opman Company helps large and small sets of clients to advance, operationalize and sustain tangible outcomes to their mutual advantage. The company's VECTOR Method (Visualize-Enable-Coordinate-Transfer-Optimize-Replicate) is employed to structure “over the fence” conversations, respecting boundaries by treating them as interfaces. This enables diverse parties to work effectively together, while at the same time operating within their own mandates and jurisdictions. Engagements have been completed or are ongoing with global Fortune 500 corporations, multilateral institutions, NGOs and boutique services firms, national commercial, public and civil society organizations, as well as entities that function at local or regional levels. The company works to advance socio-economic well-being based upon the long-term availability of resources, the restoration and maintenance of ecosystem integrity, and the comprehensiveness of a diverse social and cultural fabric.

Wilson-Young Events Management**(Project 125 Consortium Member)**

Wilson, Young and Associates plans and manages events of all types and sizes. With offices in Ottawa and Vancouver, the firm has worked with a diverse range of clients and audiences - all levels of government, NGO's, associations, small and big businesses - in locations across the world. It services include Event Program Development; Revenue Generation (Registration Fee Setting & Incentives; Sponsorship & Fundraising; In-kind Services & Cost cutting; Sourcing, Contracting and Supplier Arrangements; Contributions by Partners & Governments; Sale of Merchandise); Room Usage & Layouts; Budgets & Procurement; Facility & Housing Selection/Negotiation; Travel & Transport; Marketing & Promotion; Audio-Visual, Staging & Décor Site Operations; Food & Beverage; Entertainment; Registration Systems; Evaluation & Reporting; Collaterals.



APPENDIX E – PRECEDENT EXAMPLES

PONT NOIR BRIDGE

The Prince of Wales Bridge is very similar to the Pont Noir Bridge in its structural system. Both bridges are steel truss with masonry foundations. Pont Noir is located in Gatineau, Quebec crossing the Gatineau River.

The Pont Noire Bridge was rehabilitated to accommodate the Rapibus, trains, and a single cantilevered path was added to accommodate both pedestrians and cyclists. The overall project cost was close to 7.1 Million, and the contractor was Construction BSL Inc. The STO (Societe de transport de l'Outaouais) owns the 9.2 km railway section between the Prince of Wales Bridge and Montée Paiement, which includes the Pont Noir Bridge. More information about the bridge and railway corridor owned by the STO can be found at (<http://www.rapibus.sto.ca/index.php?id=653>). The photo below shows the Pont Noire Bridge after it was rehabilitated.



The following is the description of the work that was done on the Pont Noir Bridge, found on the Rapibus/STO website (<http://www.rapibus.sto.ca/index.php?id=643>):

- Removal and relocation of the rails, guard rails and wood ties on the deck of the Pont Noir bridge and the east and approaches;
- Sandblasting and application of anticorrosion paint to the existing bridge structure from the lower level of the lattice beams to 3 m above the Pont Noir bridge deck;
- Modification of the back walls of the east and west abutments;
- Installation of a steel foot bridge for the bicycle path on the north side of the existing bridge;
- Installation of steel grating and guard rails on the Pont Noir bridge deck; Dismantling of the rails and guard rails, and replacement of the wood ties;
- Resetting of the rails and guard rails;
- Lighting and electrical cables.

The Standards and Regulations Used:

“The design for all the railway aspects complies with the acts, standards and regulations in effect, including Quebec’s Act to ensure safety in guided land transport (R.S.Q., chapter S-3.3) and the standards set out by AREMA (the American Railway Engineering and Maintenance-of-Way Association).” (<http://www.rapibus.sto.ca/index.php?id=653>)

In Relation to the Prince of Wales Bridge

The cantilevered pathway design concept proposed by REMISZ for the Prince of Wales Bridge is similar to the cantilevered design of the Noir Bridge pathway, but the cross beams would likely be smaller in size (about half the depth) due to; a narrower pathway (maximum of 2.4 meters), a lighter railing system and possibly a lighter sidewalk material. The hanger system would be similar, with the bolted connections and the crossbeams would be centred.

Below are some photos from our investigation of the Pont Noire Bridge, which will be helpful in the full design of the cantilevered pathways on the Prince of Wales Bridge if the project proceeds.



Additional abutment & support column for cantilevered pathway



Structural System – Steel Hangers for the cantilevered pathway



Steel cross-beam and bolted hanger detail

MINTO BRIDGES REHABILITATION

The Minto Bridges are steel truss bridges located in Ottawa, similar in type to the Prince of Wales Bridges. The West Minto Bridge was rehabilitated in 2012 by Cruickshank for 2.5 million. The rehabilitation involved structural steel repairs, sandblast and recoating of the steel structure, environmental protection, removing existing steel grate bridge deck and replacing it with a composite wood deck and stone masonry repairs.

The cantilevered pedestrian pathway on these bridges is attached using brackets, and are at a similar span to the nodes on the Prince Of Wales Bridges.



Cantilevered pedestrian pathway on the Minto Bridge



Cantilevered pedestrian pathway on the Minto Bridge



Bolted steel brackets supporting the cantilevered pathway



Existing stone abutments, similar to the Prince of Wales Bridge

Bridges, Dams, Culverts

Retaining Walls

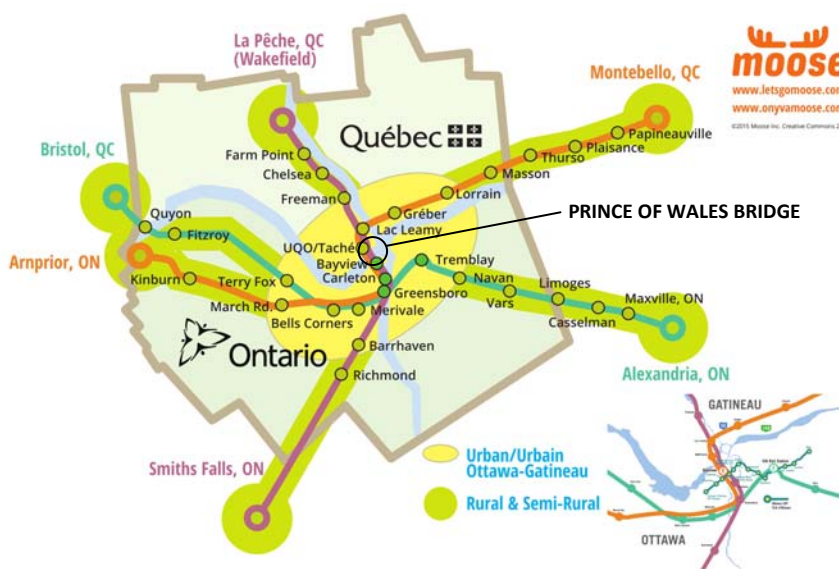
Falsework, Formwork, Temporary Structures

Parking Garages, Parking Lots

Sewage and Storm Water Management

Piles, Platforms

Condominiums, Apartments Buildings, Office Buildings



PROFESSIONAL SERVICES PROVIDED WITH CARE,
COMPETENCE AND INTEGRITY THAT DELIVER
PRACTICAL SOLUTIONS TO COMPLEX PROBLEMS

