APPENDIX D

Public Information Centre #2
Display Panels

Wellington Road 109 Bridges
Municipal Class Environmental (EA) Study

From Highway 6 to Sideroad 7
Township of North Wellington

PUBLIC INFORMATION CENTRE #2
Online Package

Spring 2021

Welcome

Welcome to the **online Public Information Centre (PIC)** for the Wellington Road 109 Bridges Class EA Study. This is the **second of two Public Information Centres** planned for this study.

We encourage your input and feedback on the materials presented through this online PIC. Questions or comments can be submitted online via the URL listed above, or email to:

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There is an opportunity at any time during the EA process for interested persons to provide written input. However, we ask that comments on the PIC materials be provided by **June 24, 2021** so that the Project Team can consider the feedback as we wrap up the study.

Any comments received will be collected under the **Municipal Freedom of Information and Protection of Privacy Act** and, with the exception of personal information, will become part of the public record.

About this PIC

Purpose of This Package

- Provide an update on the EA study
- Confirm the preferred planning solution to replace all four structures
- Provide a summary of public feedback from PIC 1
- Present and seek input on the bridge design alternatives and key considerations such as construction staging and traffic management.
- Identify the next steps in the study

How You Can Participate

Review this information package

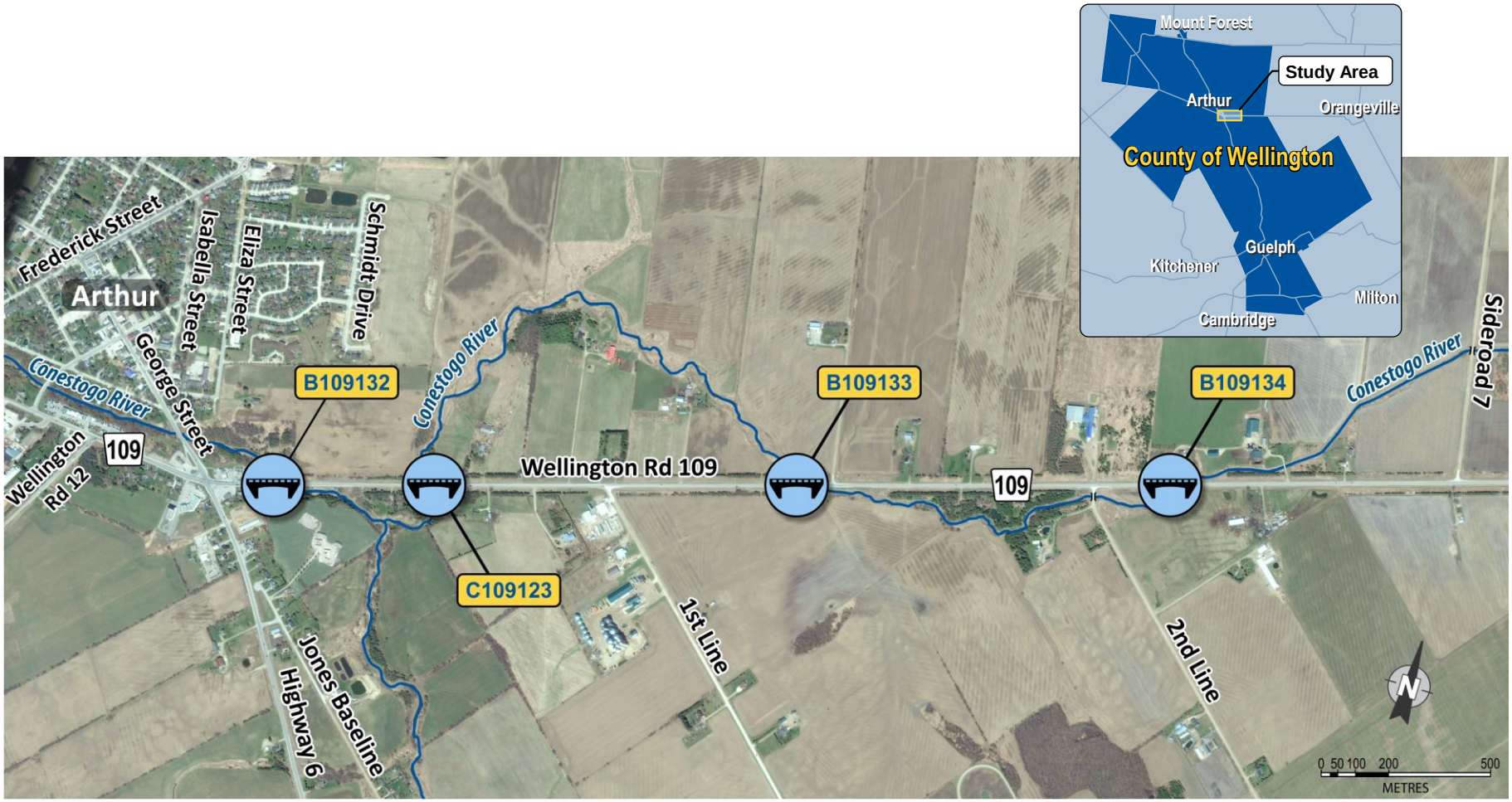
Refer to **Frequently Asked Questions**

Contact us directly

What is This Study About?

- Wellington Road 109 crosses the Conestogo River at four locations over a distance of about 3 km, just east of Arthur.
- All four structures are in an advanced state of deterioration.
- A long-term solution must be found to address the poor condition
- Given the close proximity, the poor condition of the structures, the County is completing the planning and design of all four structures under one Class EA Study.

Study Area


Mount Forest
Study Area
Arthur
Orangeville
County of Wellington
Guelph
Kitchener
Milton
Cambridge
Frederick Street
Arthur
Isabella Street
Eliza Street
Schmidt Drive
George Street
Conestogo River
B109132
Conestogo River
B109133
B109134
Conestogo River
Sideroad 7
Wellington Rd 12
109
Wellington Rd 109
109
C109123
1st Line
2nd Line
Jones Baseline
Highway 6
N
0 50 100 200 500
METRES

Municipal Class EA Schedule C Process

Phase 1: Problem and Opportunity
- ✓ Identify problems and opportunities

Phase 2: Alternative Planning Solutions
- ✓ Inventory natural, social, economic and cultural environments
- ✓ Identify and evaluate the planning alternatives
- ✓ Identify a Recommended Planning Solution
- ✓ Consult agencies and the public and select Preferred Planning Solution

Phase 3: Alternative Design Concepts
- ✓ Develop, assess and evaluate the design alternatives
- ✓ Complete supporting technical studies
- ✓ Identify a Preliminary Preferred Design
- ✓ Consult with agencies and the public
- ✓ Confirm the Preferred Design

Phase 4: Environmental Study Report
- Complete the Environmental Study Report (ESR)
- 30 day public review and comment period

Design, Permits/Approvals and Construction

Notice of Study Commencement
September 2020

Public Information Package #1
December 2020
- ✓ Existing conditions
- ✓ Problems and Opportunities
- ✓ Alternative Planning Solutions
- ✓ Road Cross-Section Alternatives
- ✓ Design Considerations

Public Information Package #2
May-June 2021
- Design Alternatives
- Evaluation of Design Alternatives
- Preliminary Preferred Design

We Are Here

Notice of Study Completion
Fall 2021

Summary of Public Information Centre 1

The PIC 1 package was made available on the Wellington County website in December 2020 to present and obtain community feedback on:

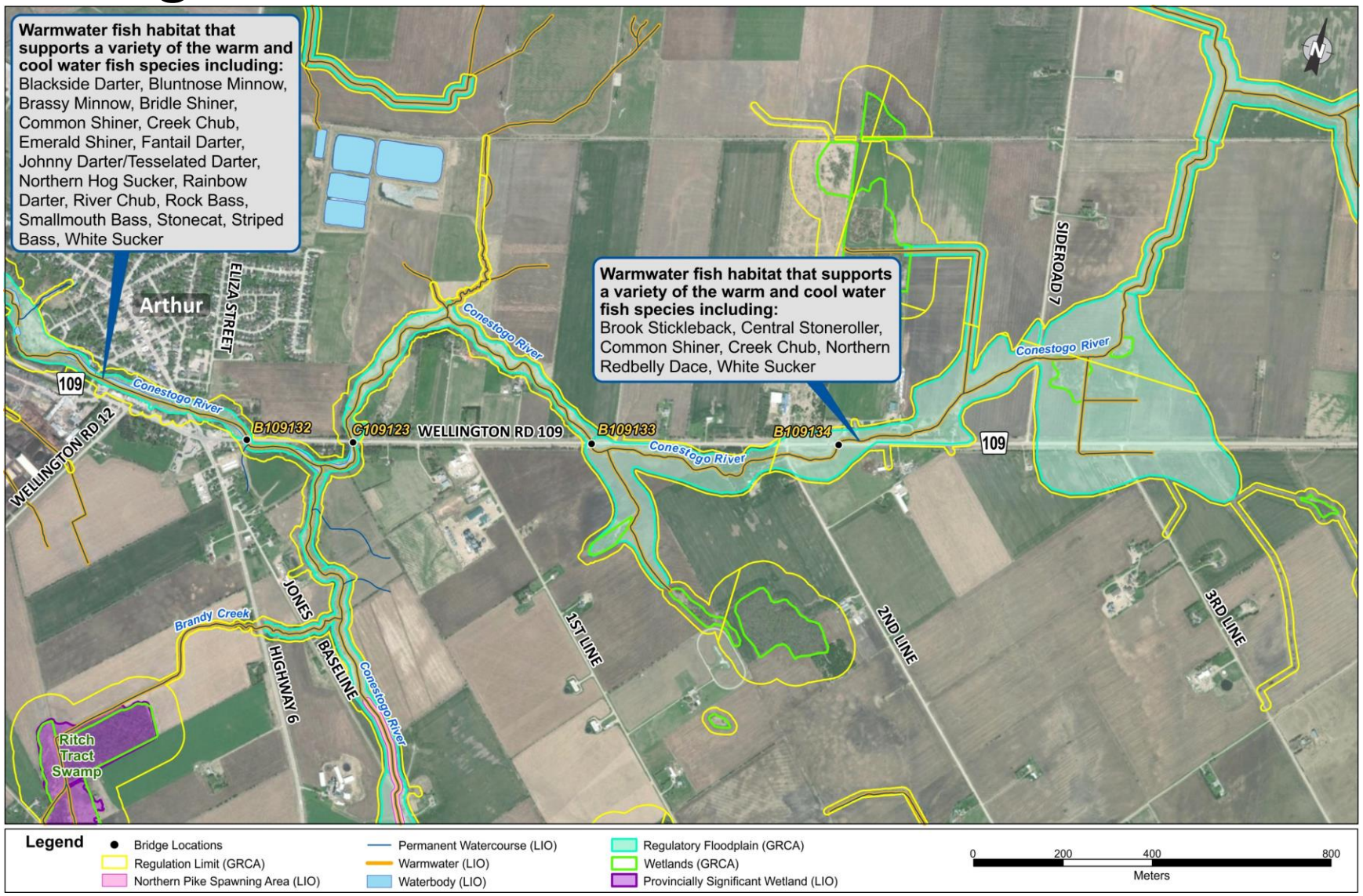
- Study overview and background
- Existing conditions
- Problems and opportunities
- Alternative planning solutions
- Preliminary preferred solution to replace all four bridges

You can view the PIC 1 package at www.wellington.ca/109EA

The next few slides provide a summary of information presented.

Study Area Overview

Existing Conditions – Natural Environment



PIC 1 Summary

Existing Conditions – Structure Summary

Structure Number	Structure Type	Location	Clear Span (m)	Rehabilitation History	Condition	Meets Flood Conveyance Requirements
B109132	Rigid Frame	0.2 km east of Highway 6	17.1	1989 - Railing and sidewalk repairs; overlay, waterproof and pave deck; soffit repairs; substructure repairs	Poor	Yes
C109123	Concrete Barrel Arch	0.7 km east of Highway 6	13.7	Shotcrete repairs to fascia and barrel - date unknown but likely in 1989 under same contract as adjacent bridge rehabilitations	Poor	Yes
B109133	Rigid Frame	1.7 km east of Highway 6	13.7	1989 - Repairs to superstructure, railings and curbs; patch, waterproof and pave deck; repair soffit	Poor	No
B109134	Rigid Frame	1 km east of Wellington Road 45	12.2	1989 - Repair railings and curbs; overlay, waterproof and pave deck; deck soffit repairs 2007 - Repair scour along west abutment	Poor	No

PIC 1 Summary

Problems and Opportunities

- The four WR109 structures are in **poor condition with major elements in an advanced state of deterioration**.
- In future, the **structures may be subject to load restrictions or closures** which would be extremely disruptive to residents, businesses and travel.
- Two structures **do not meet flood conveyance criteria**.
- **Multi-year construction will come with challenges** for local residents, businesses and travellers.
- Consider a localized permanent realignment of WR109 to reduce the river crossings.

Alternative Planning Solutions Summary

Alternative Planning Solution	Assessment Summary	Conclusion
Do Nothing	• Not a reasonable alternative because significant structural deficiencies would not be addressed. • Would lead to load restrictions and eventually, road closure.	Does not address the problem and therefore is not considered an acceptable alternative. Therefore, this alternative is not recommended.
Rehabilitation	• Extensive and ongoing rehabilitation would be required. • Rehabilitation would have limited additional service life to the bridges. • Only defers/delays a longer-term solution.	Addresses some of the structural deficiencies but would not address design deficiencies or flood conveyance requirements. Therefore, this alternative is not recommended.
Replacement	• Existing bridge would be removed and new foundation / abutments would be installed. • All design criteria would be met. • Traffic delays will occur over multiple construction seasons. Construction staging and traffic management can ease disruption. • Rapid replacement to be considered in next study phase.	Addresses the structural and functional deficiencies and has fewer impacts to socio-economic , natural and cultural environments than the New Road Alignment option. Initial capital costs and lifecycle costs are lower than the New Road Alignment option. **Recommended**
New Road Alignment	• New road would be constructed 'off-line' and then opened to traffic once complete. • Substantial impacts to property, residences, business, agricultural operations compared to other options. • Not consistent with / does not align with existing land use or transportation plans and policies.	Potential benefits do not outweigh the socio-economic, cultural and natural environmental impacts. Both initial capital costs and lifecycle costs are substantially higher than the Replacement option. Therefore, this alternative is not recommended.

PIC 1 Summary
What We Heard

- 11 responses were received via the online questionnaire or direct email.
- Most respondents are property owners within the study area who use Highway 6 multiple times daily as part of their travel to/from destinations such as Arthur, Mount Forest, Orangeville, Harriston, Fergus and Guelph.
- Most respondents were supportive of the recommendation to replace the bridges but were concerned about traffic management.
- A few respondents preferred the solution to realign WR 109.
- Some respondents suggested changing the scope of the study to examine traffic operational issues at the WR109 and Highway 6 intersection and around Arthur, generally.

The next 4 slides present the comments / themes

PIC 1 Summary
What We Heard

Public Comment / Theme	Project Team Discussion
• Concerns about traffic management during construction and how driveway access to/from Highway 6 will be managed to minimize delays.	The County's primary objective is to achieve a cost-conscious and efficient construction process that seeks to minimize disruption to road users. The County is committed to maintaining two lanes of traffic at the most westerly bridge, given the proximity to the intersection at Highway 6 and lack of space available for traffic queues. For the remaining structures, one lane of traffic will be maintained at all times in alternating directions, controlled by with temporary traffic signals. The preliminary approaches with local detour/lane arrangements are reviewed in subsequent PIC 2 displays.
• The study scope should be expanded to address all traffic congestion and operations issues at the WR109 and Highway 6 intersection. • Bypass options should be considered around Arthur (e.g. Hwy 6 re-routed to the west and the connection to WR 109 moved further west).	Addressing the condition of the four structures is a matter of urgency for Wellington County, not only because the bridges are nearing the end of their design life but also because the County has secured federal construction funding, to be utilized by 2025. Broader studies to look at travel demand, traffic congestion and operations at the Highway 6 intersection and in the Arthur area generally (e.g. bypass), are more complex with greater implications to socio-economic, natural and cultural environments, and would involve MTO as a co-proponent. Therefore, it is likely that this type of study would be on a longer timeframe. The Project Team has discussed the public feedback received from PIC 1 with MTO and we understand that MTO program priorities do not currently include short or long-term planning on Highway 6 at Arthur, although priorities are reviewed annually.

PIC 1 Summary
What We Heard

Public Comment / Theme	Project Team Discussion
• Straighten the river and eliminate the first two bridges east of Arthur.	There is no practical way to realign the Conestogo River to eliminate the first two bridges, east of Arthur. Given that two branches of river system have a confluence between the two bridges, it would be problematic to reconfigure not only the watercourse but the entire valley and floodplain (flood storage) as this would involve significant earthworks and property. Obtaining environmental approvals for this work would require justification that there are no other reasonable alternatives, which is not the case.
• Delays during construction will likely alter usual truck traffic patterns and speed on surrounding roadways. • Wellington Road 16 at Damascus should have additional speed calming measures permanently put in place.	Traffic patterns are likely to be altered temporarily during construction and the County will look closer at this in the future, when more detailed and site specific traffic management plans are developed. Recognizing that traffic may infiltrate onto local roads or through residential areas, the County will work with the Township of North Wellington to identify appropriate traffic calming measures in specific locations.
• It may be more expensive to realign WR109 now, but a lot less maintenance in the years ahead.	The cost analysis shows that in both short-term and long-term, the costs associated with the new realigned WR109 would be higher than replacing the four bridges.

PIC 1 Summary
What We Heard

Public Comment / Theme	Project Team Discussion
• Recommend complete road closure of WR109 to complete the bridge work. Too much traffic to try to manage with one lane and traffic lights. Much traffic will bypass Arthur east and west if they know the road is closed.	The Project Team will be considering a detour option as part of the study as a means of balancing local and regional demand and encouraging regional travel to use alternate routes. The County is unlikely to close WR109 for long periods of time because access needs to be maintained for residences, farm operations and business access, and the available routes around the proposed work zones are anticipated to exceed a 30-minute travel time. As is depicted in subsequent displays, the County is looking at the opportunity to maintain two lanes of traffic around the two bridges closest to Arthur, given the proximity to the Highway 6 intersection.
• Not supportive of rerouting the WR109 since it would unnecessarily destroy properties and farmland.	The impact to farmland (property and operations), was a key factor in the evaluation of alternative solutions.
• Bridge replacement is not the best option from an environmental perspective.	The permanent footprint of the new bridges will be only slightly larger than existing and vegetation removals and other temporary impacts in work zones with be restored following construction. During construction, impacts to the natural environmental are considered mitigable. Some examples of mitigation that are anticipated include employment of erosion and sediment control plans, with fencing is required prior to any site work, installation of water protection across bridge to prevent debris from falling into waterway, ensure that the storage, handling and disposal of materials used or generated during site preparation and construction are carried out in a manner that prevents these materials from entering into naturalized areas in the vicinity of the development.

PIC 1 Summary
What We Heard

Public Comment / Theme	Project Team Discussion
• The decision to replace the bridges is the wrong conclusion. There will be much disruption to the traffic on 109 during construction and environmental issues with temporary by-pass construction in the river. We will spend a lot of money on something that will likely be abandoned in the near future when the real traffic problems on 109 and Arthur are addressed.	Aspects of these comments have been discussed on the previous slides. Potential broader studies that consider travel demand, traffic congestion and operational issues on WR109 and Highway 6 will require MTO as a co-proponent. MTO has confirmed that the current program does not include plans for these types of studies on Highway 6 at Arthur. The County must proceed to address the condition of the bridges now, and have construction funding in place that must be accessed in the next few years. The realignment option only resulted in a net reduction of two watercourse crossings since the realignment would have one new crossing and two of the existing crossings on WR109 need to remain (be replaced) for continued residential and business access.

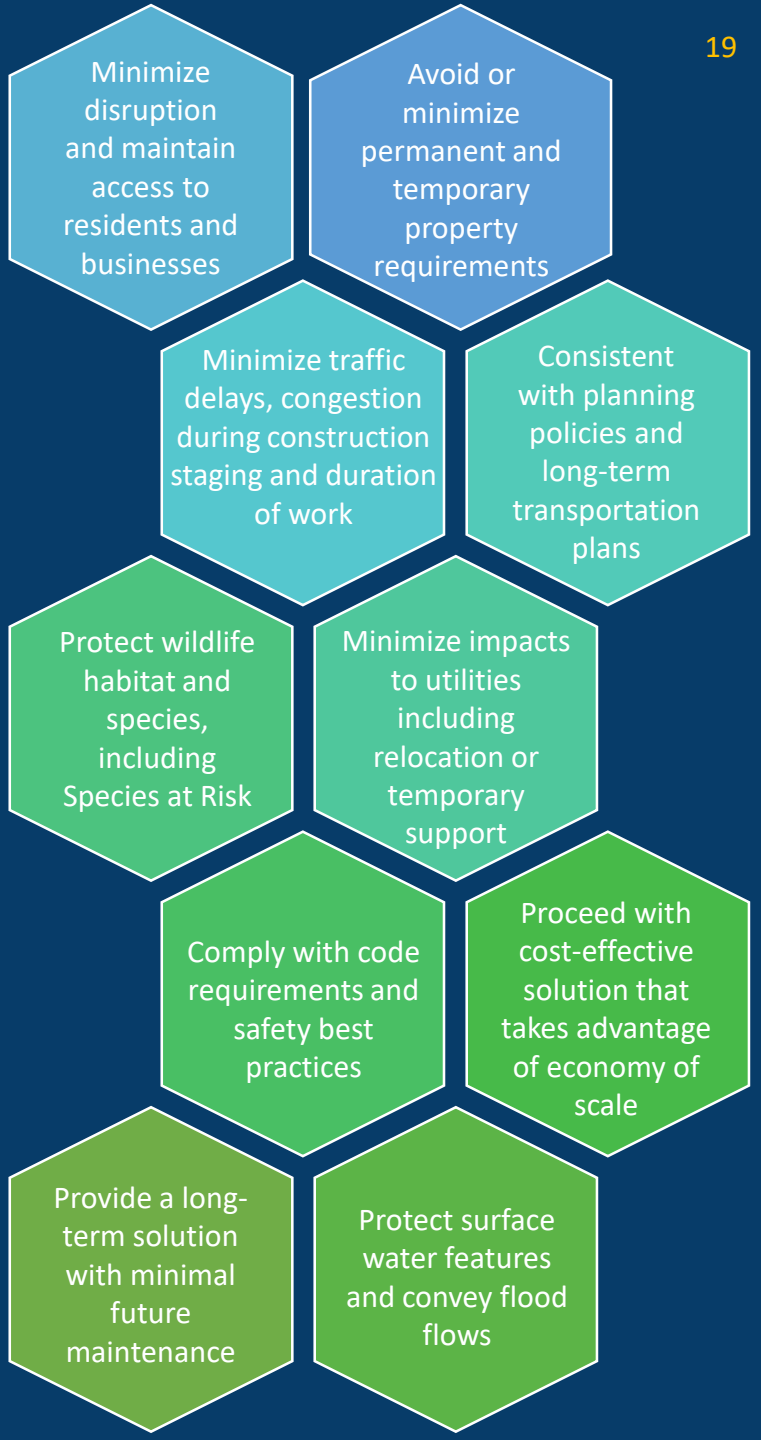
Design Alternatives

Since PIC 1, the Project Team has:

- Identified Design Criteria and Objectives to select a design that represents the best balance
- Developed a typical road cross-section for the bridges
- Developed and evaluated design alternatives
- Selected a preliminary recommended design approach that represents a best balance of all factors

Design Criteria and Objectives How Do We Develop the Recommended Design?

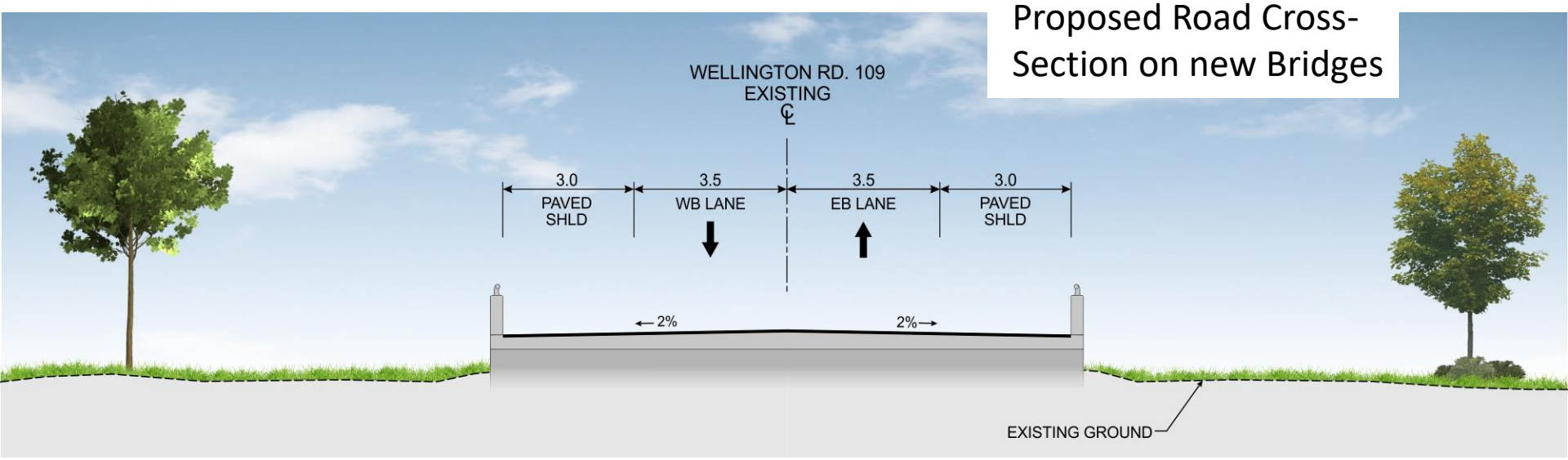
- Examine design requirements, constraints and opportunities through a variety of lenses
- Plan for an efficient use of resources and be cost-conscious
- Provide a long-term solution with minimal future maintenance
- Emphasize compatibility with surroundings and with user needs
- Work with stakeholders to manage/mitigate impacts



Typical Road Cross-Section at the Bridges

The recommended future road cross-section consists of 3.5m travel lanes and 3m shoulders on the bridges and at the approaches, consistent with design standards based on the posted speed, design speed and the vehicle volumes and percentage of truck traffic.

Proposed Road Cross-Section on new Bridges



Construction Methods
Why Consider This Aspect?

The County's primary objectives are to achieve a **cost-conscious** and **efficient construction process** that seeks to **minimize disruption to road users**.

Construction methods will have a direct influence on all of these aspects.

Consideration of construction methods also brings to light:

- Potential property and utility impacts
- Site access requirements, temporary construction work zone and easement requirements
- Need for temporary road closures
- Potential temporary impacts to the surrounding environment that must be mitigated

Construction Methods
The ABCs

What are Accelerated Bridge Construction (ABC) techniques?

ABC uses different methods of project delivery and construction to reduce the project schedule, on-site construction time, and public impact. ABC methods include for example:

- Prefabricated elements
- Lateral slide or temporary bridge (see next slide)
- Extended working hours with additional crews/resources
- Completion of activities in parallel/replacing multiple structures simultaneously

Accelerating the schedule may increase the cost of the project. However, the increased project delivery cost can be offset by reduced impacts to residents, businesses and travel.

The application of Accelerated Bridge Construction (ABC) is consistent with the County's objectives and these practices will be considered generally.

Construction Methods
Three Types Considered Here

Traditional Staging

Bridge replacement occurs by removing the existing structure and building the new structure in the same place. This may be achieved through full road closure or through temporary lane restrictions with traffic staging, where traffic is maintained / staged on half of the bridge while the other half is demolished and replaced, then flipped to complete the other half.

Temporary Bridge

A temporary structure is installed adjacent to the existing structure site to carry traffic during the demolition and in-place replacement of the permanent structure. Temporary foundation and abutments are installed to support the temporary structure. Roadway tie-ins and lane shifts create a seamless transition from the roadway approaches onto the temporary bridge.
For the Conestogo River crossings, it is anticipated that the temporary bridge would be a portable single span bailey bridge that could be utilized at each of the four locations.

Lateral Slide

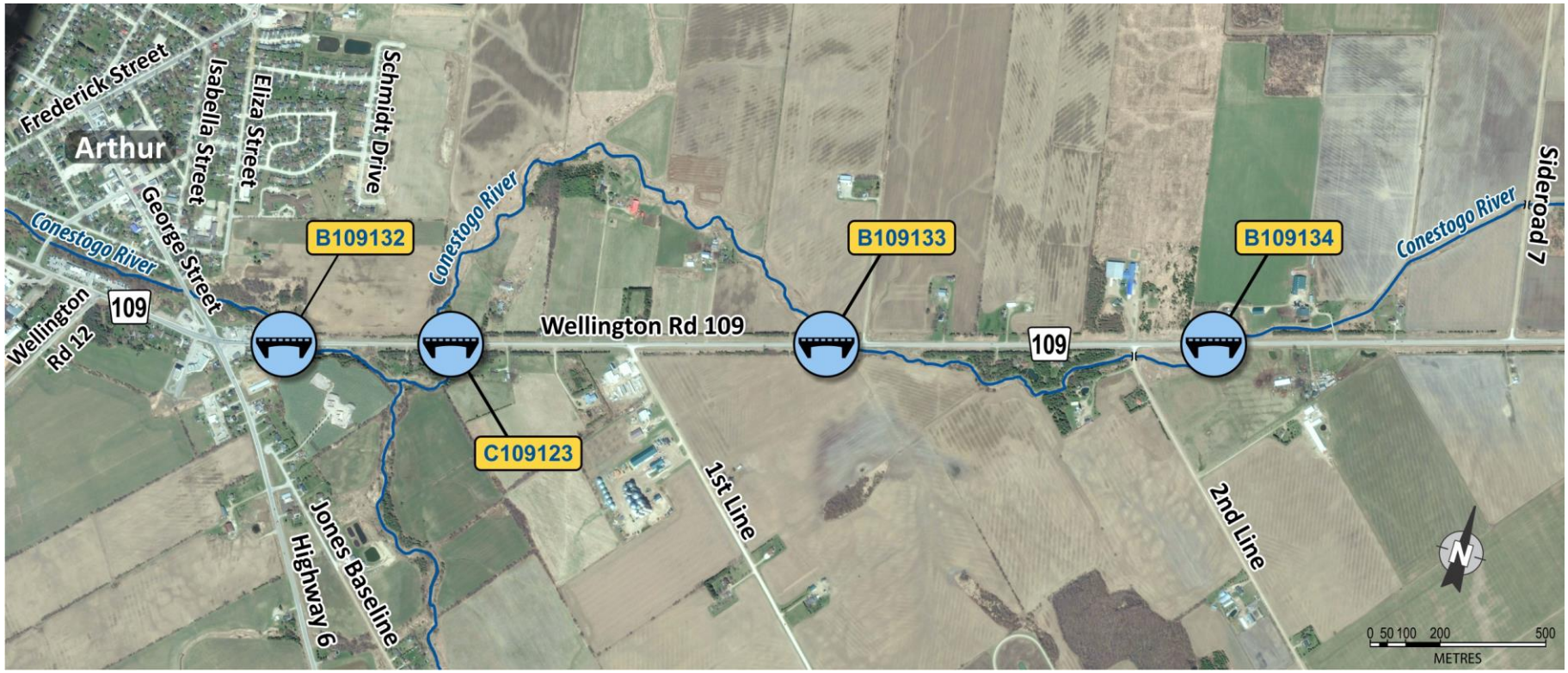
Bridge placement using lateral sliding (ABC method) where the entire superstructure is constructed in a temporary location and is moved into place over a night or weekend. This method is typically used for bridge replacement of a primary roadway where the new superstructure is constructed on temporary supports adjacent and parallel to the bridge being replaced.
Once the superstructure is fully constructed, the existing bridge structure is demolished, and the new bridge is moved transversely into place.

Construction Methods
General Overview

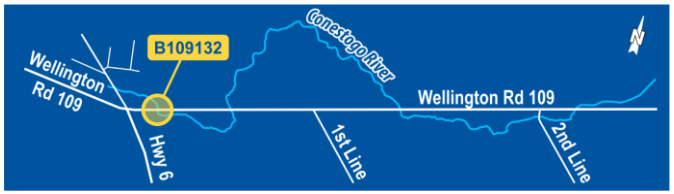
	Traditional Staging	Temporary Bridge	Lateral Slide
			
Benefits	• Lowest cost • No property impacts • Typically avoids utility impacts (some relocations may be expected) • No temporary structures/road realignment • Typically, less intrusion into adjacent valley areas and natural features • Very common construction method	• Shortest construction duration • Temporary bridge can be configured to maintain one or two-way traffic during construction, minimizing traffic impacts • If the Temporary Bridge is purchased by the County, it can be utilized following construction therefore high initial costs are amortized over continued use	• Shorter construction duration relative to traditional methods • Can construct partial or full width of proposed structure to reduce temporary footprint. • Can maintain one or two-way during most of the construction except for short-term closures when the new bridge is slid into place
Challenges	• Longest construction duration (typically two construction seasons) • Greatest traffic impacts (anticipate single lane in alternating directions with temporary traffic signals) for duration of construction	• Initial one-time cost for the temporary bridge • Requires adequate space adjacent to the existing bridge for the new bridge, abutments and road widening. • May temporarily encroach into private property which may require working easement or purchase. • Encroach into adjacent valley areas and sensitive habitat will require protection and mitigation measures.	• A short-term full road closure required to slide the bridge (24-48 hrs) • Higher cost associated with each site • Requires greater space adjacent to the existing bridge in order to construct the new bridge, typically larger work zone than the temporary bridge with similar or greater encroachment impacts to the temporary bridge. • More challenging when crossing watercourse with varying width or on a meander bend

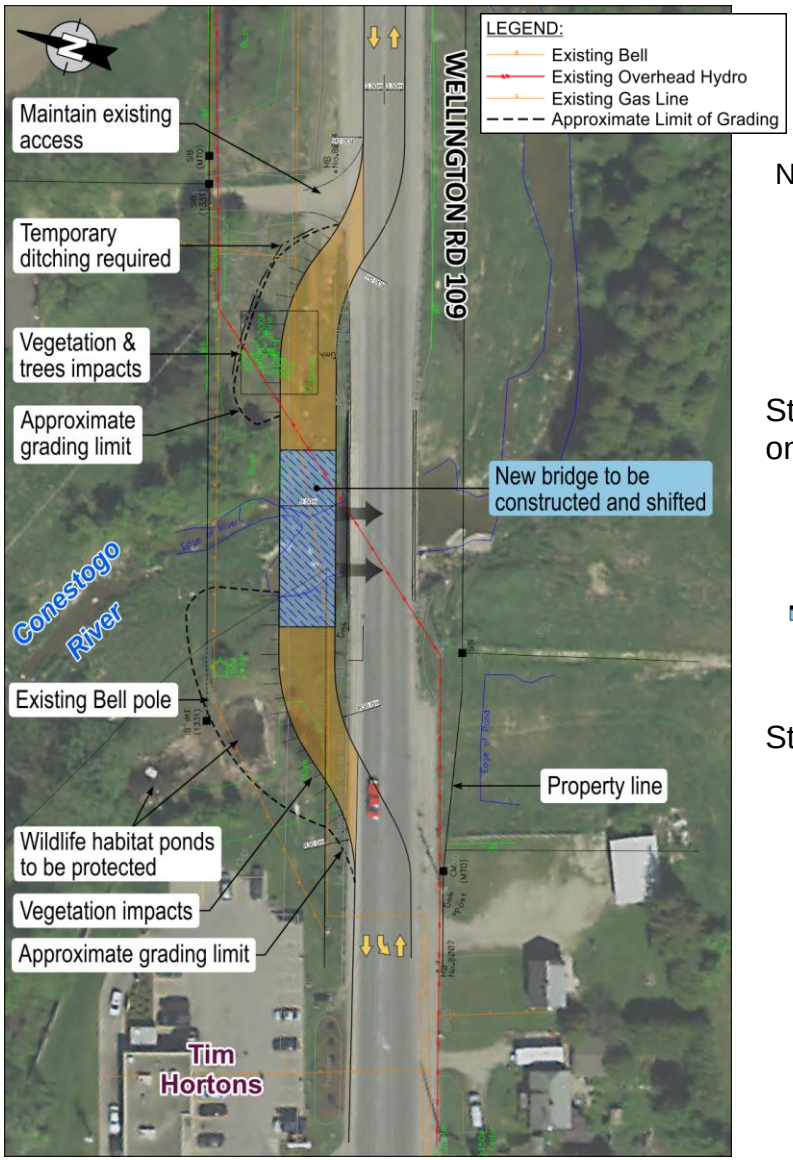
Construction Methods
Site-Specific Concepts

The next several slides illustrate the key components of the construction methods being considered at each of the four sites.

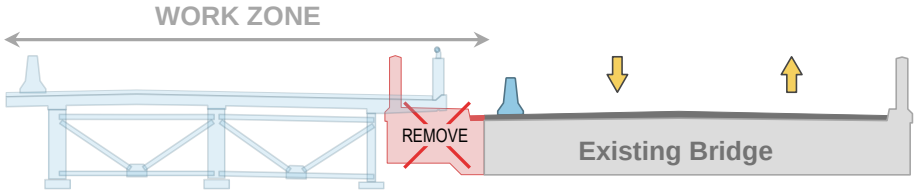


B109132 - Lateral Slide

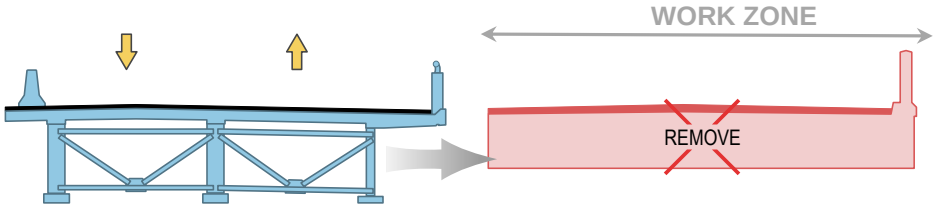




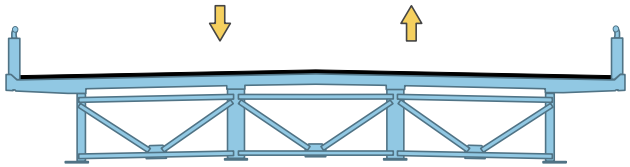
NORTH SOUTH



Stage 1 - Remove North Sidewalk and Construct Stage 1 New Bridge on Temporary Supports And Construct Temporary Approaches

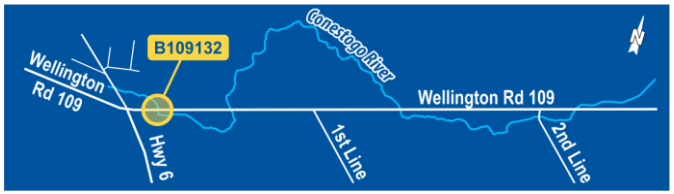


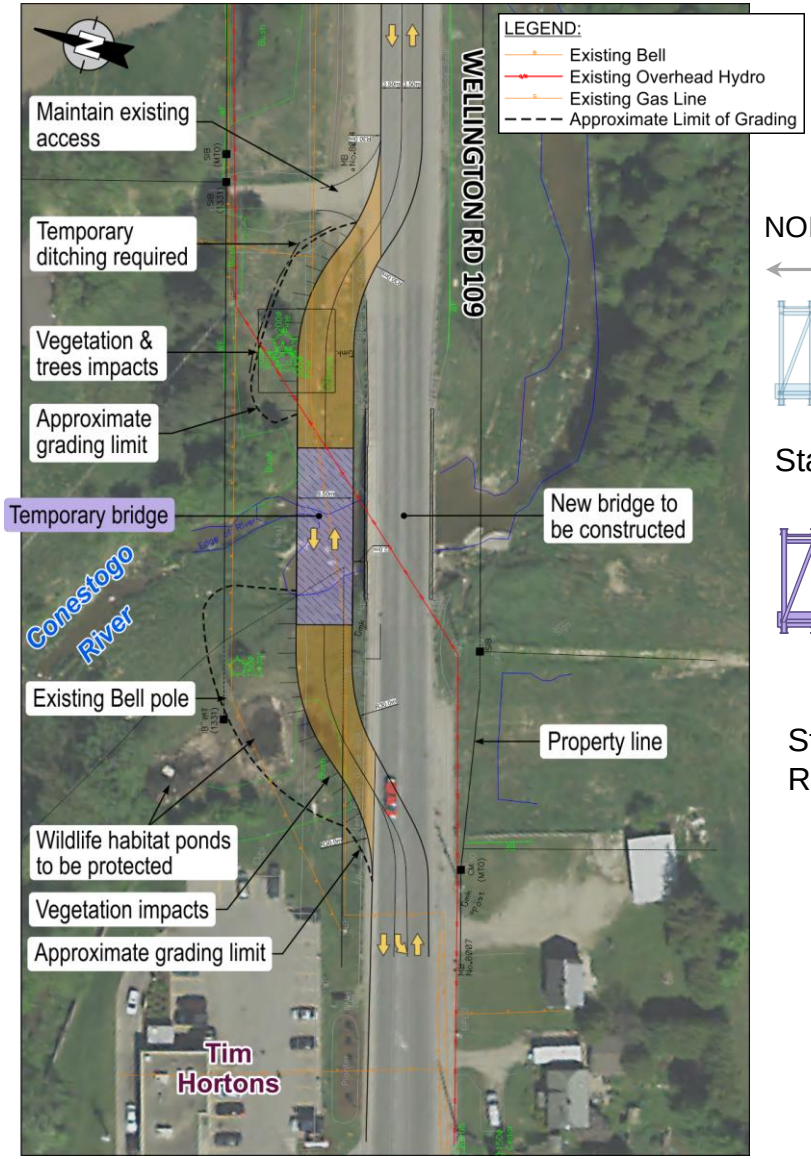
Stage 2 – Move Traffic onto New Bridge on Temporary Supports, Remove Existing Bridge and Construct New Abutments

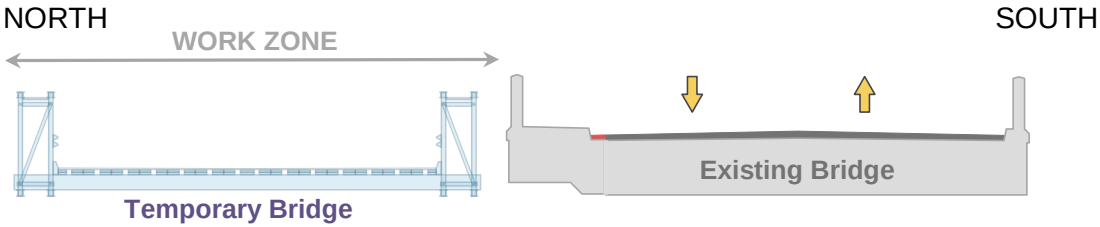


Proposed Bridge

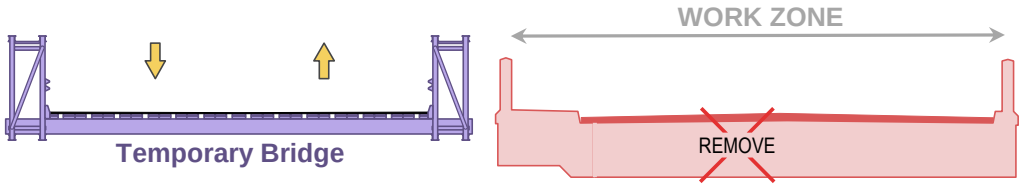
B109132 – Temporary Bridge



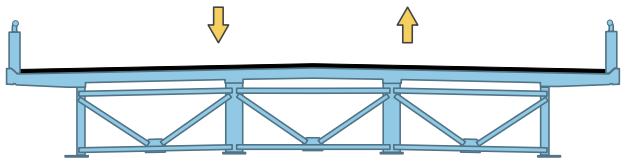




Stage 1 – Construct Temporary Bridge, Supports and Temporary Approaches

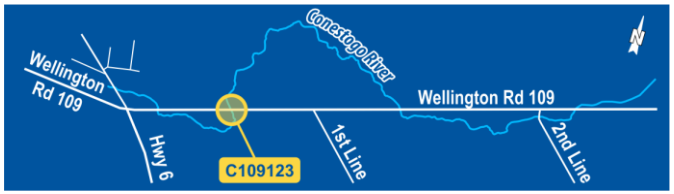


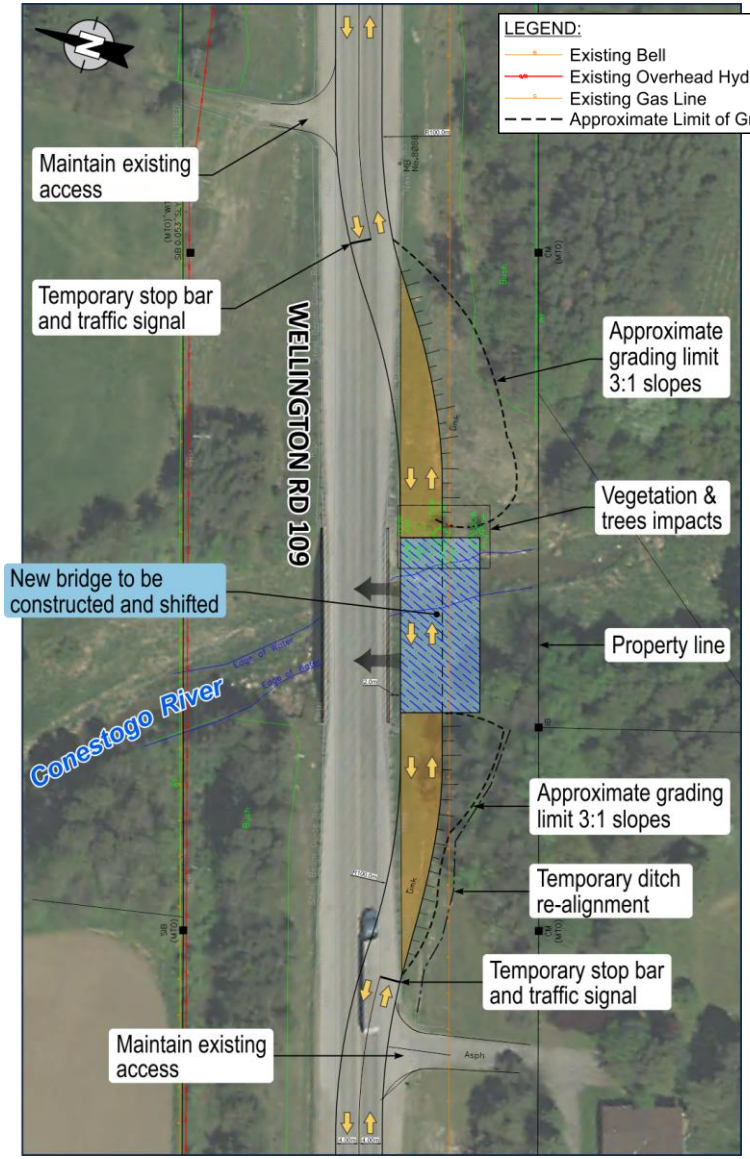
Stage 2 – Shift Traffic to Temporary Bridge,
Remove Existing Bridge and Construct New Bridge

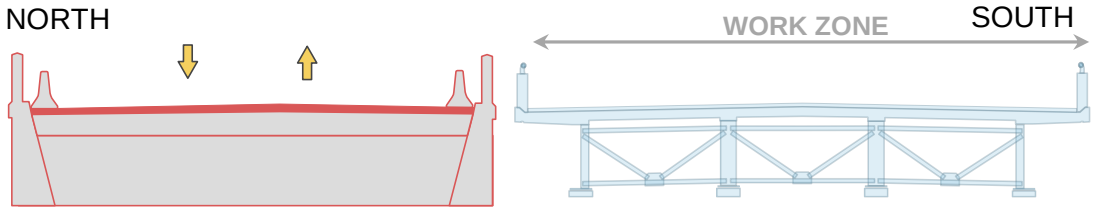


Proposed Bridge

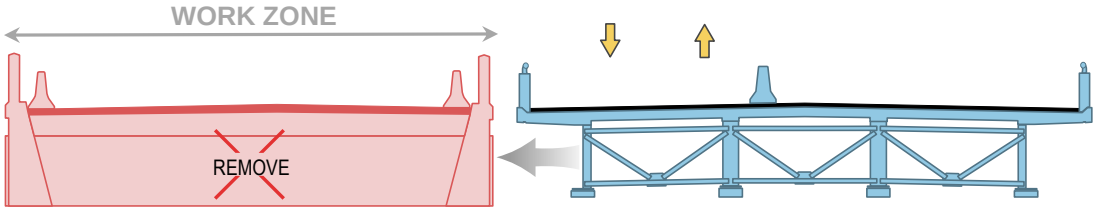
C109123 – Lateral Slide (Full)



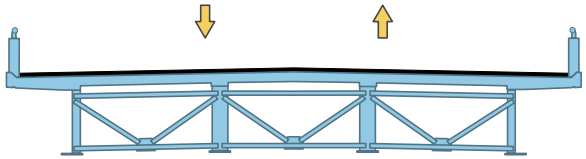




Stage 1 – Construct New Bridge, Temporary Supports and Approaches

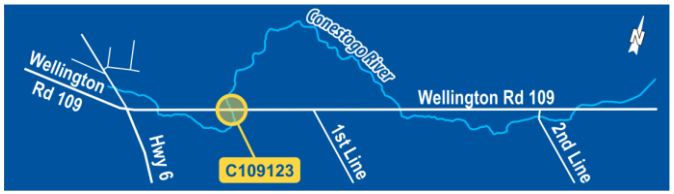


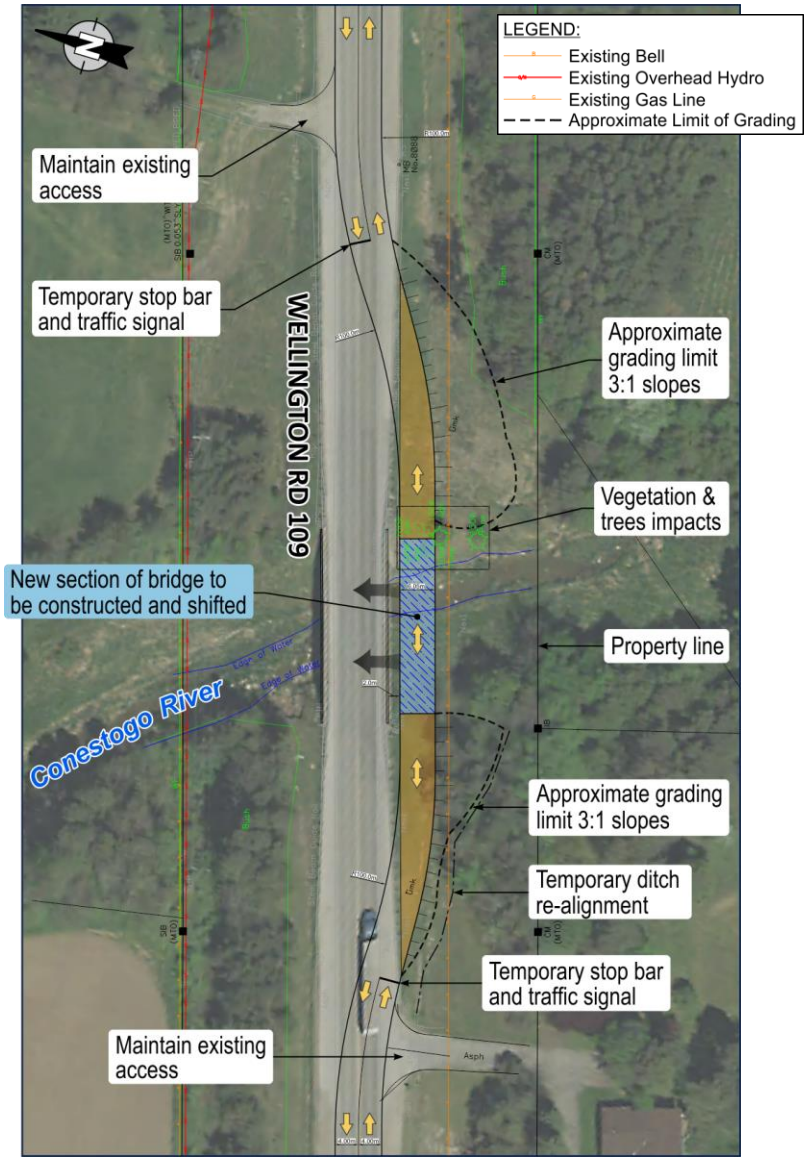
Stage 2 - Shift Traffic to New Deck on Temporary Supports, Remove Existing Bridge and Construct New Abutments then Slide New Bridge onto New Abutments



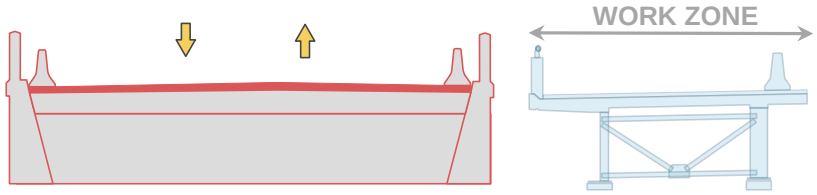
Proposed Bridge

C109123 – Lateral Slide (Half)

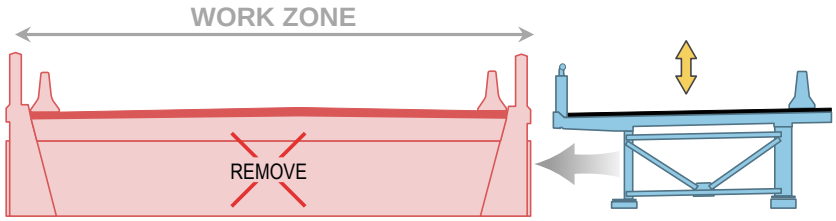




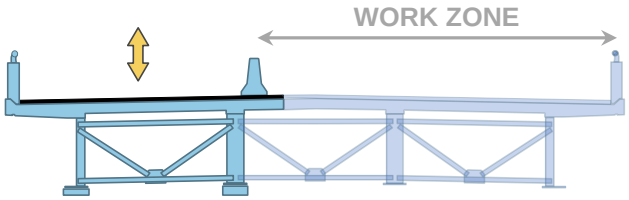
NORTH SOUTH



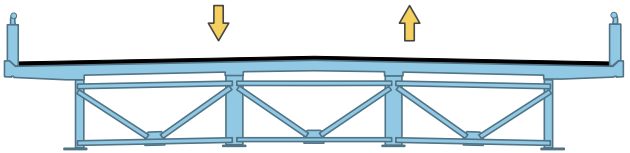
Stage 1 – Construct Portion of New Deck On Temporary Supports



Stage 2 – Shift Traffic to New Deck on Temporary Supports, Remove Existing Bridge and Construct New Abutments

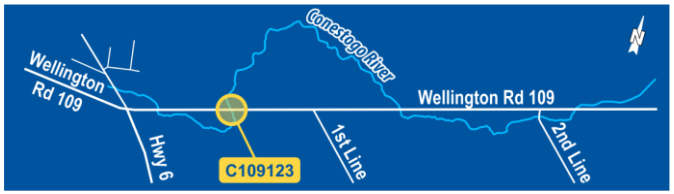


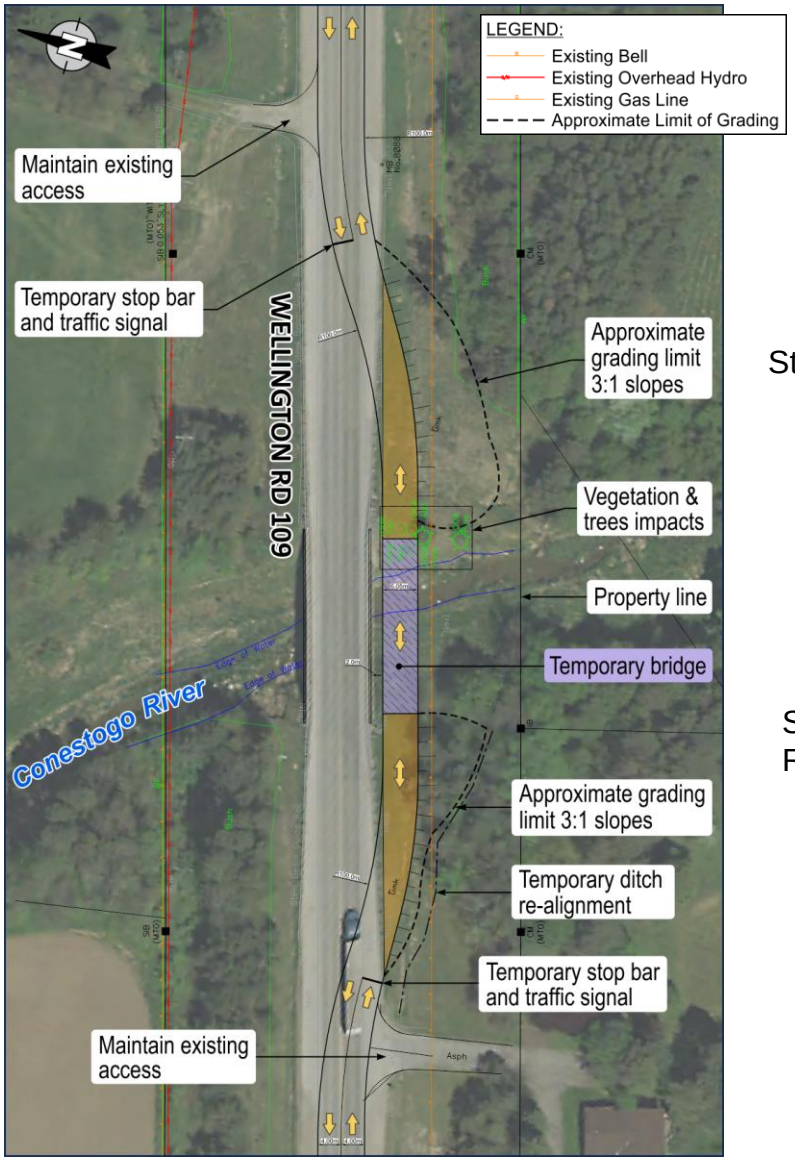
Stage 3 – Slide New Deck Onto New Abutment, Shift Traffic and Construct Remainder of New Deck



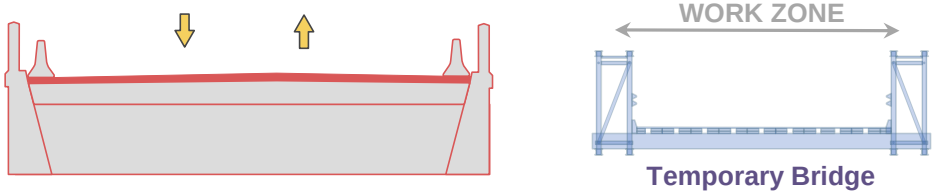
Proposed Bridge

C109123 – Temporary Bridge

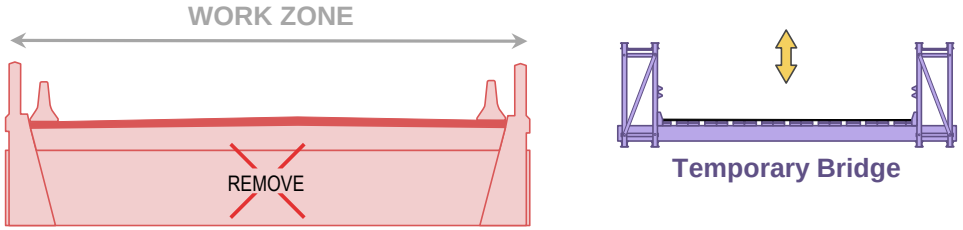




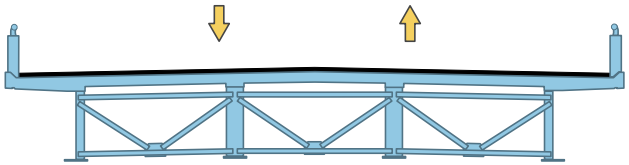
NORTH SOUTH



Stage 1 – Construct Temporary Bridge, Supports and Temporary Approaches

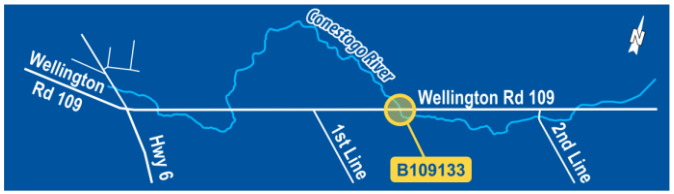


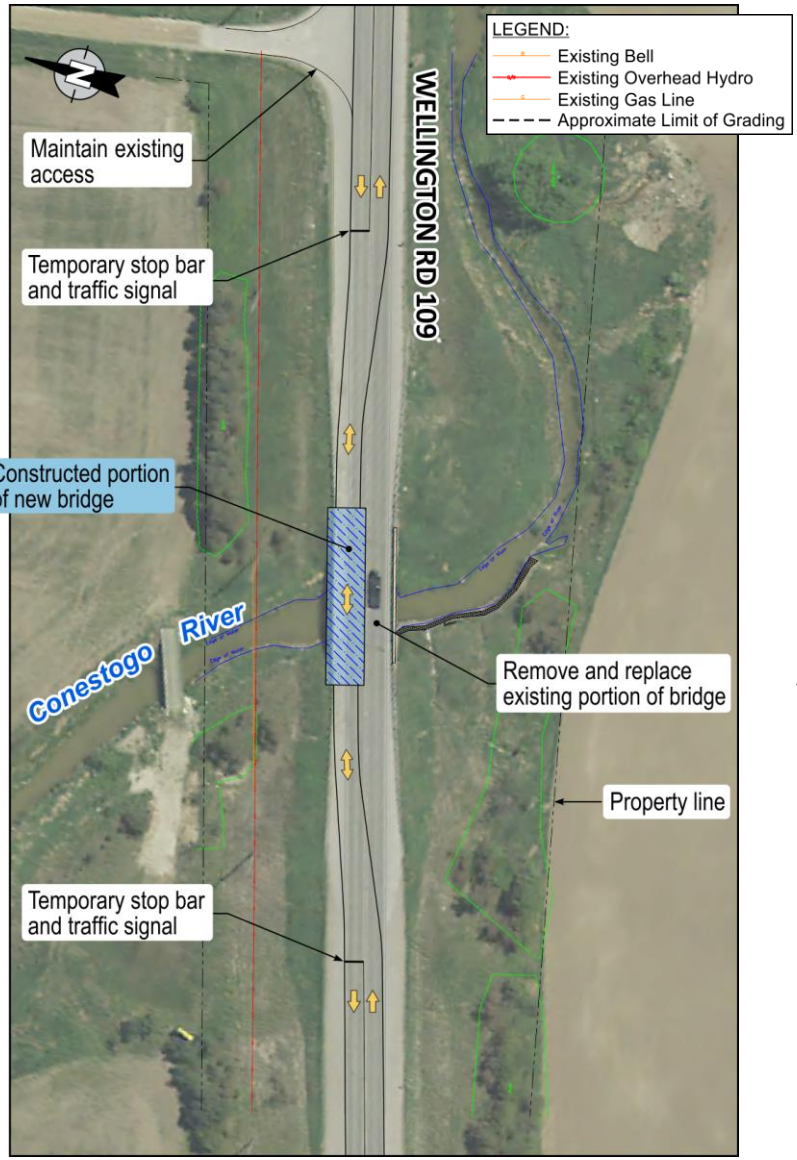
Stage 2 – Shift Traffic onto Temporary Bridge,
Remove Existing Bridge and Construct New Bridge

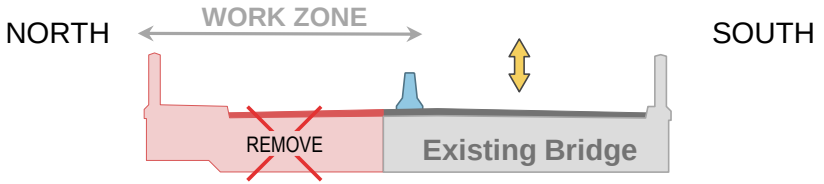


Proposed Bridge

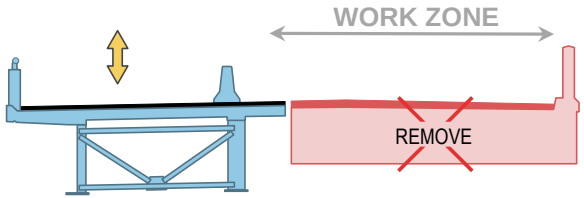
B109133 – Traditional Staging



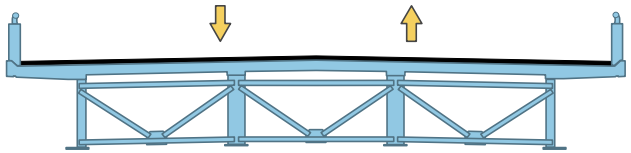




Stage 1 – Shift Traffic to South, Remove and Replace North Side of Bridge

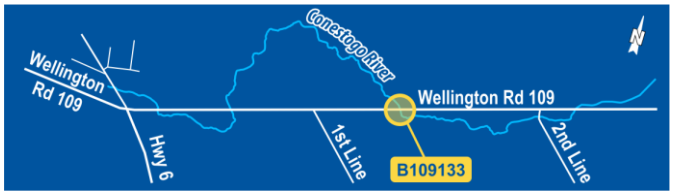


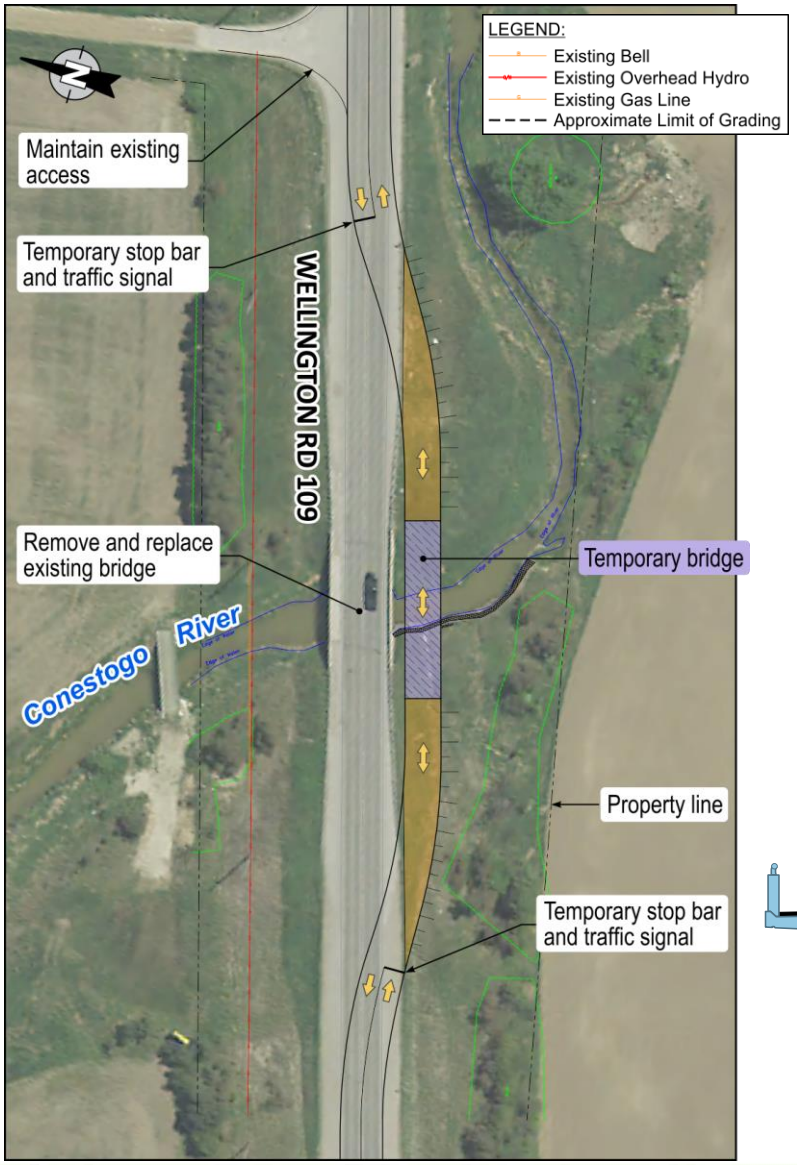
Stage 2 – Shift Traffic to North, Remove and Replace South Side of Bridge



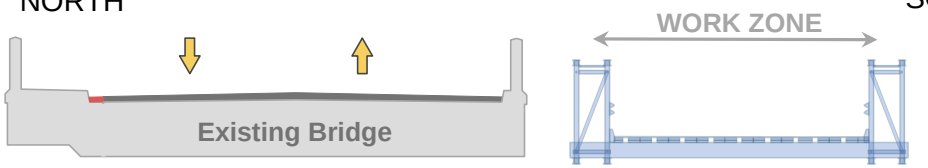
Proposed Bridge

B109133 – Temporary Bridge

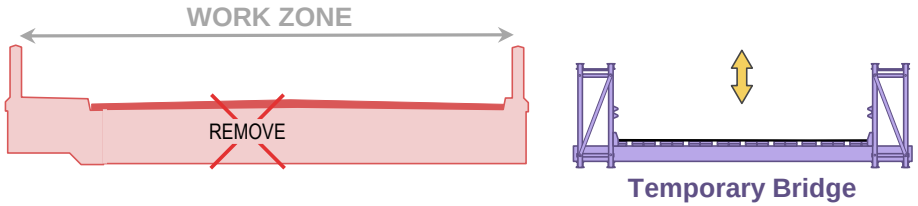




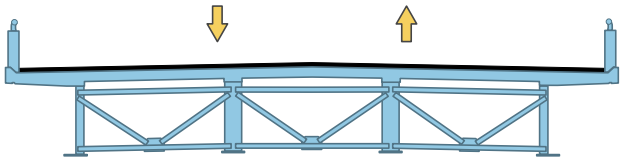
NORTH SOUTH



Stage 1 – Construct Temporary Bridge, Supports and Temporary Approaches

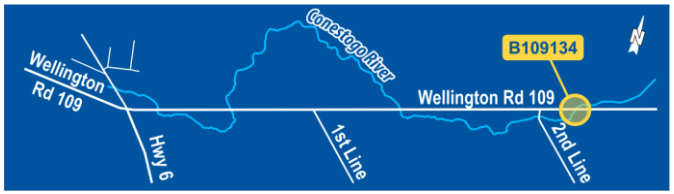


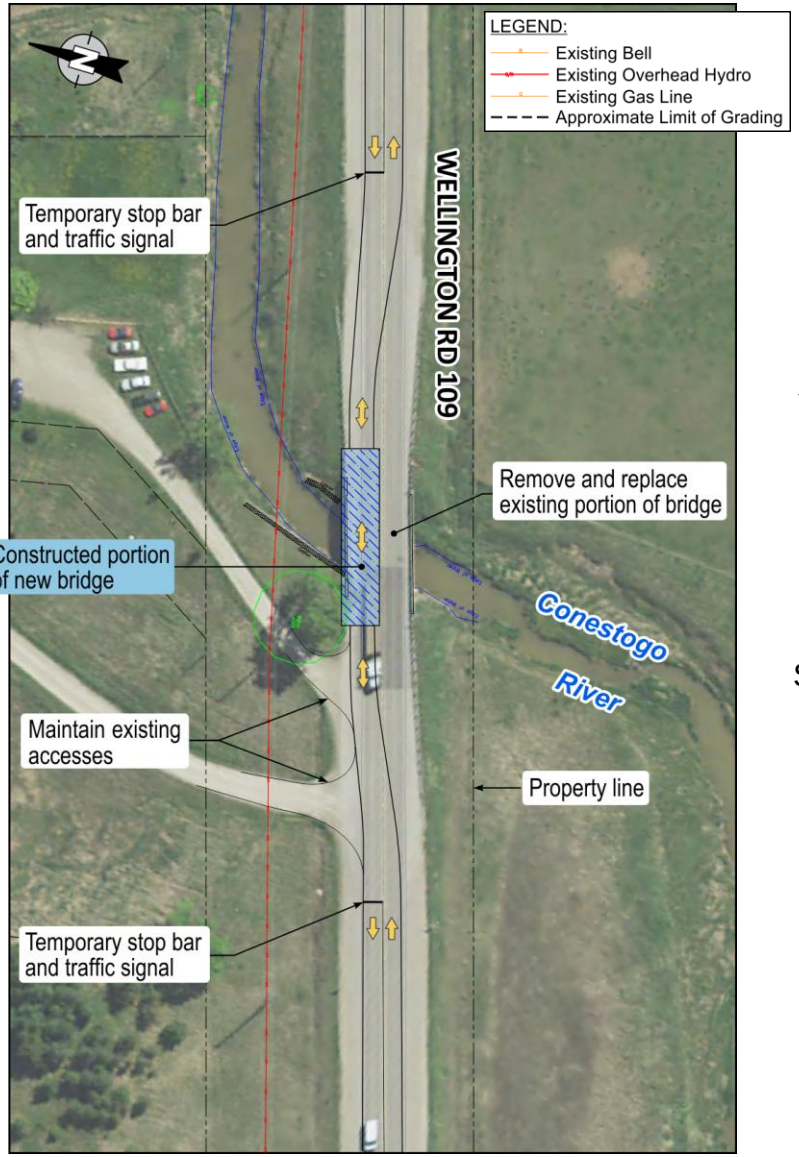
Stage 2 – Shift Traffic to Temporary Bridge, Remove Existing and Construct New Bridge

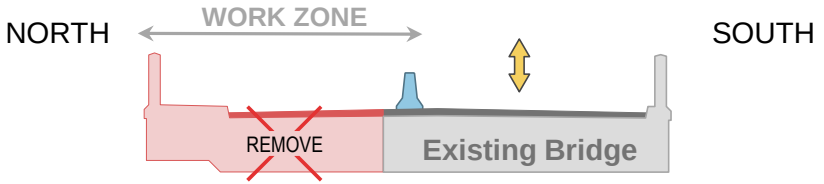


Proposed Bridge

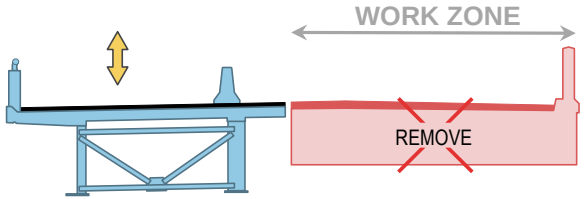
B109134 – Traditional Staging



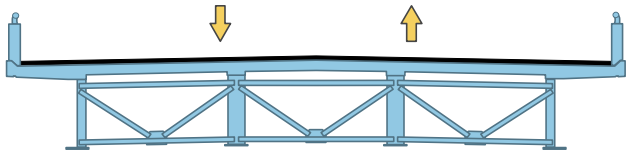




Stage 1 – Shift Traffic to South, Remove and Replace North Side of Bridge

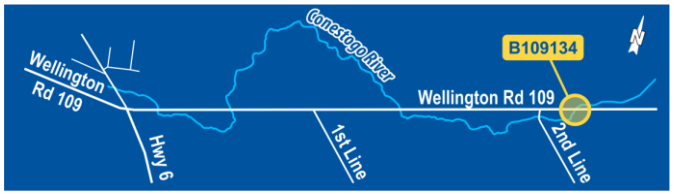


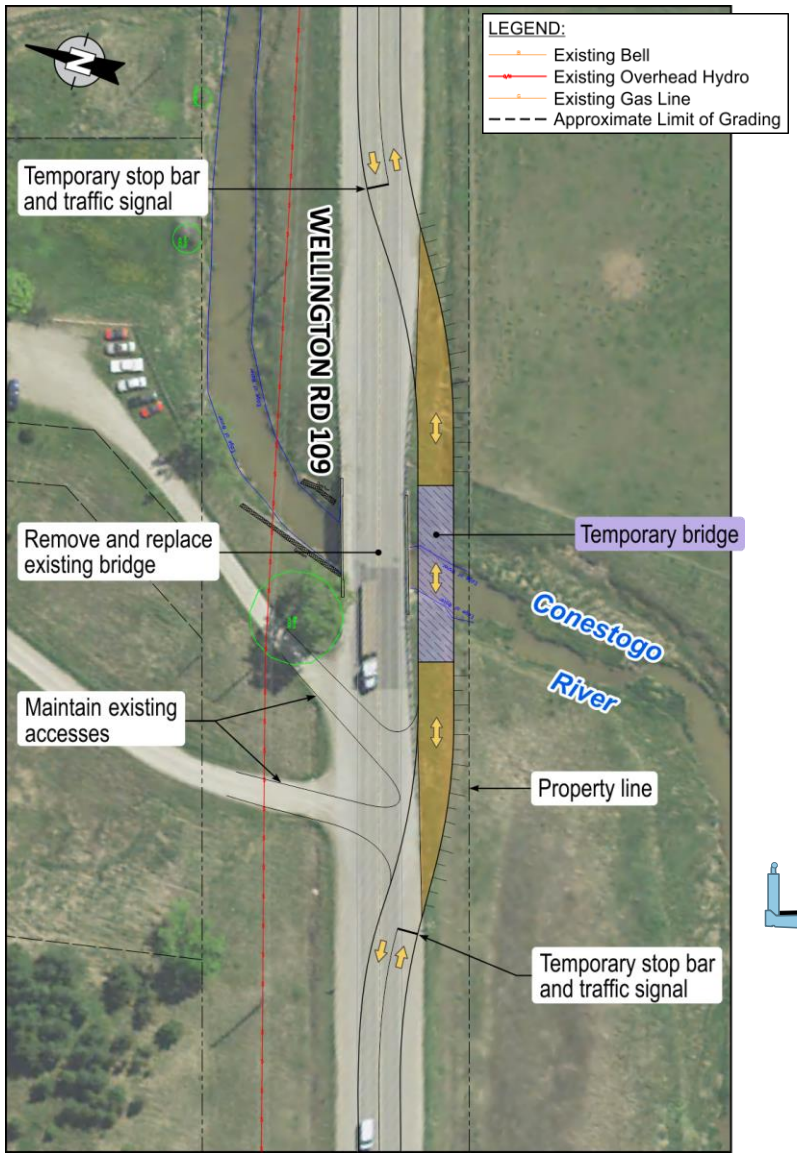
Stage 2 – Shift Traffic to North, Remove and Replace South Side of Bridge



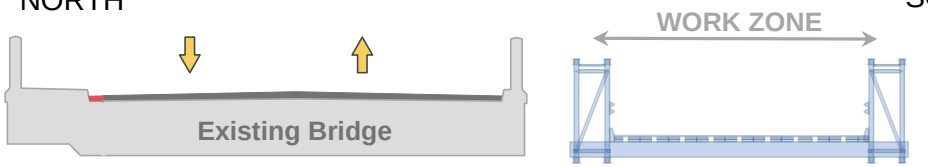
Proposed Bridge

B109134 – Temporary Bridge

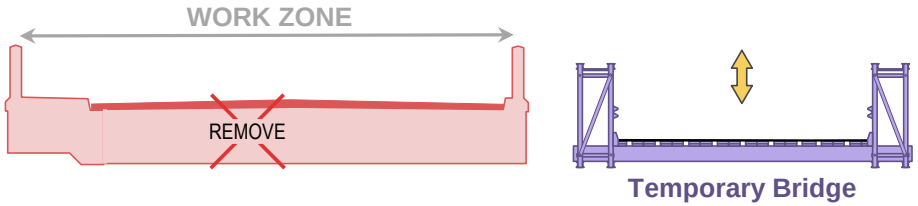




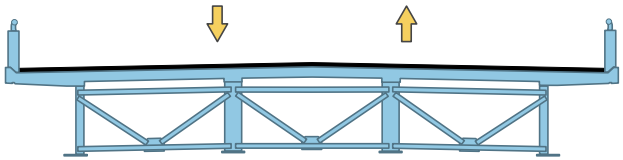
NORTH SOUTH



Stage 1 – Construct Temporary Bridge, Supports and Temporary Approaches



Stage 2 – Shift Traffic to Temporary Bridge, Remove Existing and Construct New Bridge



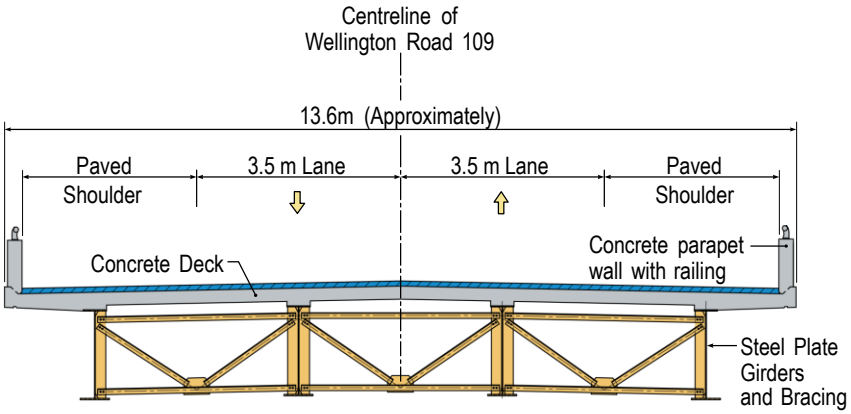
Proposed Bridge

Construction Methods
Evaluation Summary

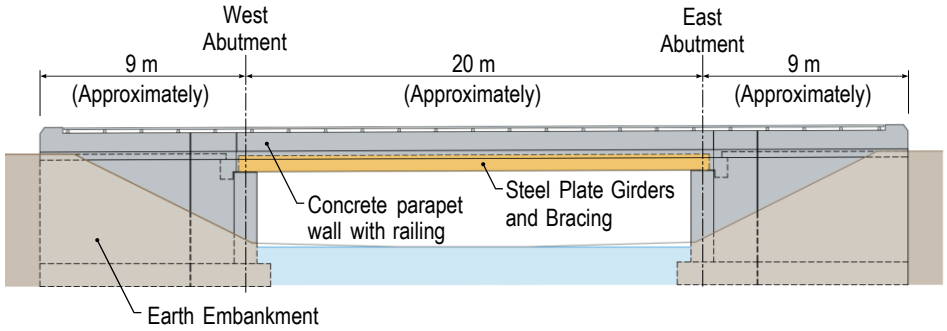
Structure Number	Traditional Staging	Temporary Bridge	Lateral Slide
B109132	Not feasible due to traffic queue lengths, impacts to adjacent business and property access.	**Maintains traffic at all times, facilitates continuous bridge replacement using traditional construction methods, re-useable temporary modular bridge can be reconfigured for various spans/widths and has residual value after construction.**	Similar premium cost, impacts to property, utilities and natural environment as temporary bridge; however, more challenging due to river skew.
C109123	Not preferred due condition of existing structure (rotation of retaining walls) and temporary shoring requirements above concrete arch.		Similar impacts to property, utilities and natural environment as temporary bridge; however, less economical because costs cannot be amortized over multiple sites.
B109133	**Preferred due to lower cost, and opportunity to avoid/minimize impacts to natural environment, properties and utilities.**	**If temporary bridge is purchased and utilized at B109132 and C109123, it is feasible to utilize at these sites as well, depending on construction staging.**	Not recommended due to additional cost and increased impacts on property, utilities and natural environment.
B109134			

Structure Design Alternatives
Four Basic Bridge Types Considered

Option 1: Welded Plate Girder Bridge

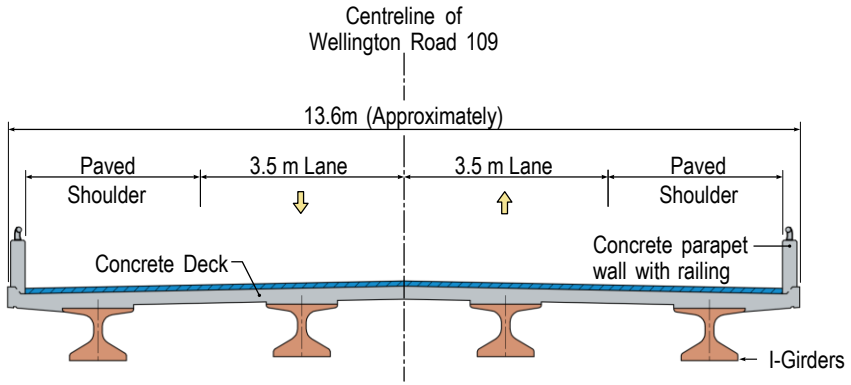


Cross-Section

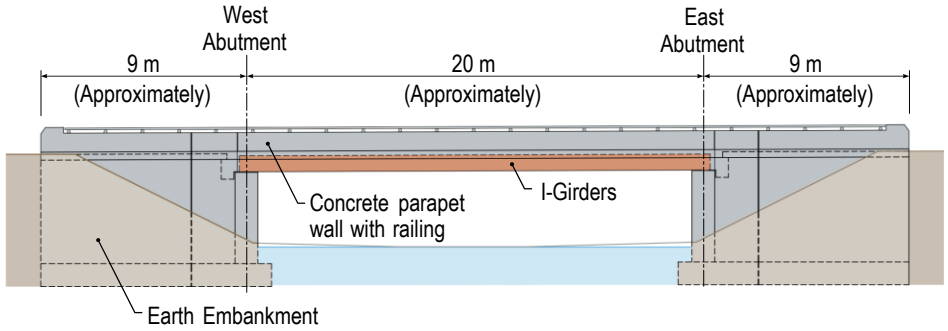


Elevation

Option 2: I-Girder Bridge



Cross-Section

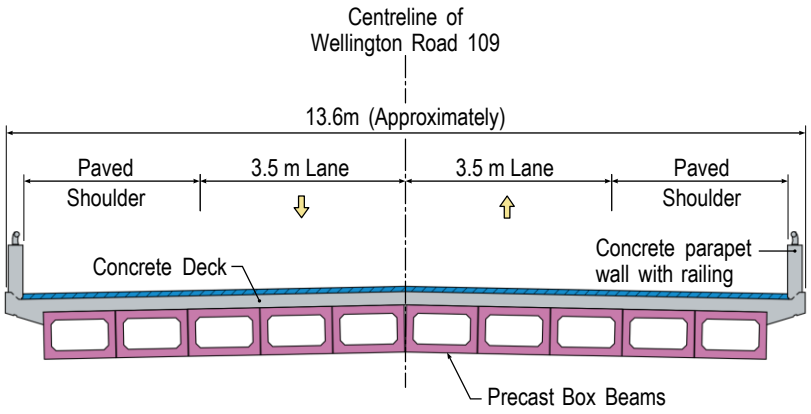


Elevation

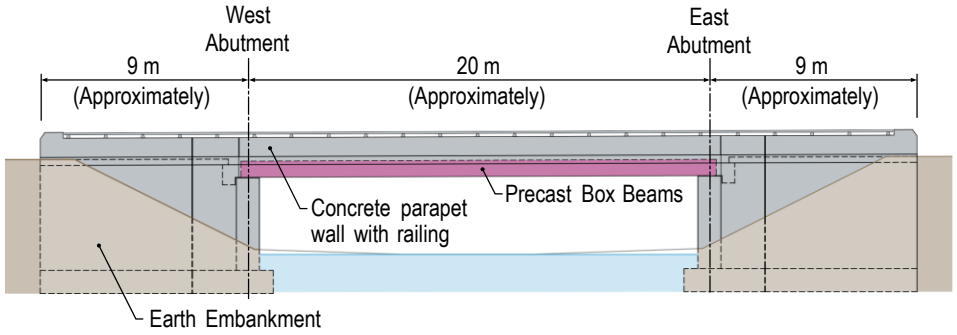
Not to scale. Some dimensions may be subject to change through the design process.

Structure Design Alternatives
Four Basic Bridge Types Considered

Option 3: Concrete Box Girder Bridge

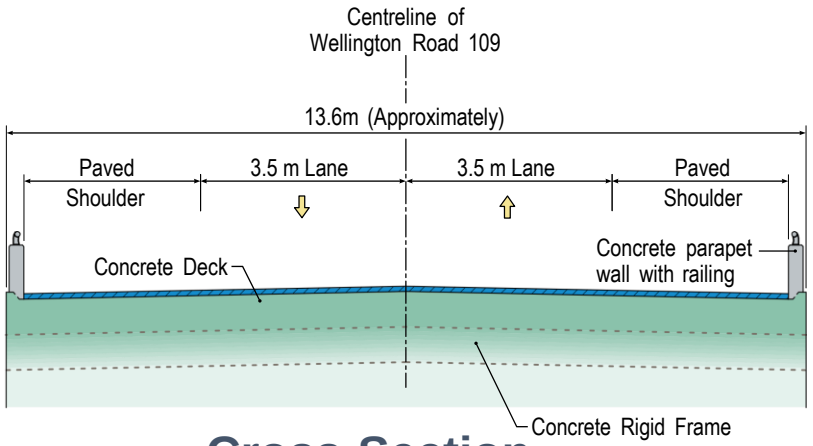


Cross-Section

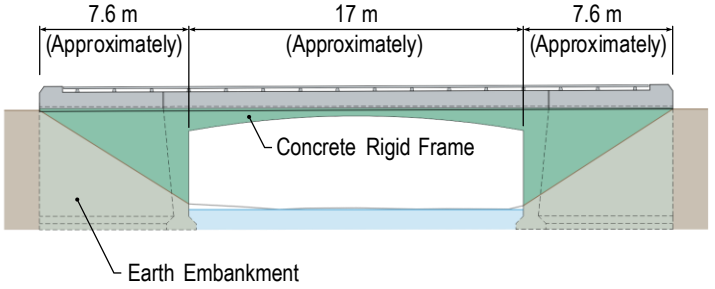


Elevation

Option 4: Concrete Rigid Frame Bridge



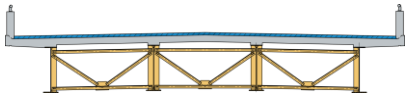
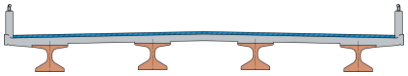
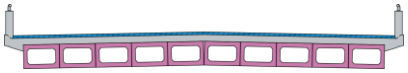
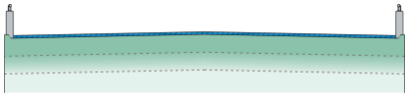
Cross-Section



Elevation

Not to scale. Some dimensions may be subject to change through the design process.

Structure Design Alternatives
Evaluation Summary

	Option 1 Welded Plate Girder	Option 2 Concrete I-Girder	Option 3 Concrete Box Girder	Option 4 Concrete Rigid Frame
				
Benefits	• Lower cost • Low construction complexity • Easiest girder erection due to light weight • Ideal for Lateral Slide • Accommodates potential future widening • Reduced fabrication lead time	• Lower cost • Low construction complexity	• Low construction complexity • Accelerates construction by eliminating deck formwork for deck slab • Higher hydraulic capacity	• Low construction complexity • Matches existing hydraulic performance • Most durable and stable • Least maintenance required among alternatives • Higher hydraulic capacity
Challenges	• Longer construction duration • Requires more maintenance as steel girder is more prone to corrosion and requires coating • More susceptible to damages from ice and/or floating debris during storm events • Reduced hydraulic capacity (marginal) • Subject to fluctuating commodity (steel) prices	• Long fabrication lead time • Heavier equipment/cranes for girder transportation and erection • More susceptible to damage from ice and/or floating debris during storm events • Reduced hydraulic capacity (marginal) • Longest construction duration	• Longest fabrication lead time • Heavier equipment/cranes for girder transportation and erection • Higher cost	• Cast-in-place concrete potential for reduced quality • Heavy deck not practical for rapid replacement method • Temporary shoring below bridge will reduce capacity of watercourse • Higher cost

Structure Design Alternatives
Preliminary Cost Estimates

The preliminary cost estimates:

- Reflect initial capital costs (2021 dollars)
- Do not include property or utility relocations
- All costs include initial capital cost plus 20% contingency and allowances for Design and Contract Administration.

Structure Number	Option 1 Welded Plate Girder	Option 2 Concrete I-Girder	Option 3 Concrete Box Girder	Option 4 Concrete Rigid Frame	Additional Cost* for ABC Methods
B109132	$3.0 Million	$3.0 Million	$3.7 Million	$3.5 Million	$1.48 Million
C109123	$3.2 Million	$3.2 Million	$3.8 Million	$4.0 Million	$0.55 Million
B109133	$2.7 Million	$2.7 Million	$3.2 Million	$3.3 Million	$0.34 Million
B109134	$2.8 Million	$2.8 Million	$3.4 Million	$3.4 Million	$0.34 Million

* Estimated premium cost associated with Accelerated Bridge Construction techniques assuming initial purchase of TMB for B109132 only and subsequent re-use.

Summary of Recommendations

Structure Number	Construction Type	Structure Type	Traffic Management	Preliminary Cost Estimate
B109132	Temporary Bridge or Lateral Slide required in order to provide for two-way traffic. Temporary Bridge recommended on the basis of future savings.	Welded Plate Girder or I-Girder Bridge	Two-way traffic to be maintained due to close proximity to the Highway 6 intersection.	**$4.5 Million***
C109123	Temporary Bridge recommended due to poor condition of the structure and temporary shoring requirements. Lateral slide is feasible but more challenging due to river skew.	Welded Plate Girder or I-Girder Bridge	One-way traffic to be maintained through temporary traffic signals. Potential to maintain two-way traffic depending on final construction plan.	**$3.7 Million***
B109133	Traditional staged construction recommended due to lower cost, and opportunity to avoid/minimize impacts to natural environment, properties and utilities	Welded Plate Girder or I-Girder Bridge	One-way traffic to be maintained through temporary traffic signals. Potential to use ABC methods to reduce duration of work.	**$2.7 Million**
B109134		Welded Plate Girder or I-Girder Bridge	One-way traffic to be maintained through temporary traffic signals. Potential to use ABC methods to reduce duration of work.	**$2.8 Million**

* Includes additional ABC costs

Traffic Management

Structure B109132

- B109132 is located in close proximity to the Highway 6 intersection therefore, two-way traffic must be maintained to ensure potential impacts to intersection operations are minimized.

Structure C109123

- C109123 is likely to be constructed in a manner that involves either temporary bridge or lateral slide methods.
- One-way traffic will be staged on a singe lane and controlled by temporary traffic signals.
- There is potential to maintain two-way traffic depending on final construction plan.

Posted speed limits will be reduced through and adjacent to construction zones.

Structures B109133 and B109134 (east)

- One-way traffic will be staged on a singe lane and controlled by temporary traffic signals. The staging and signal timing will follow the Ontario Traffic Manual.
- Traffic operations for the single-lane work zone were modeled to understand expected traffic delays. Traffic volumes were forecasted to 2025 and no detours were considered, as a conservative approach.

Direction	Peak Hour Volumes (4:45 to 5:45 pm	Truck Percentages	
		Medium	Heavy
Eastbound	316 vehicles	5%	9%
Westbound	355 vehicles	9%	7%

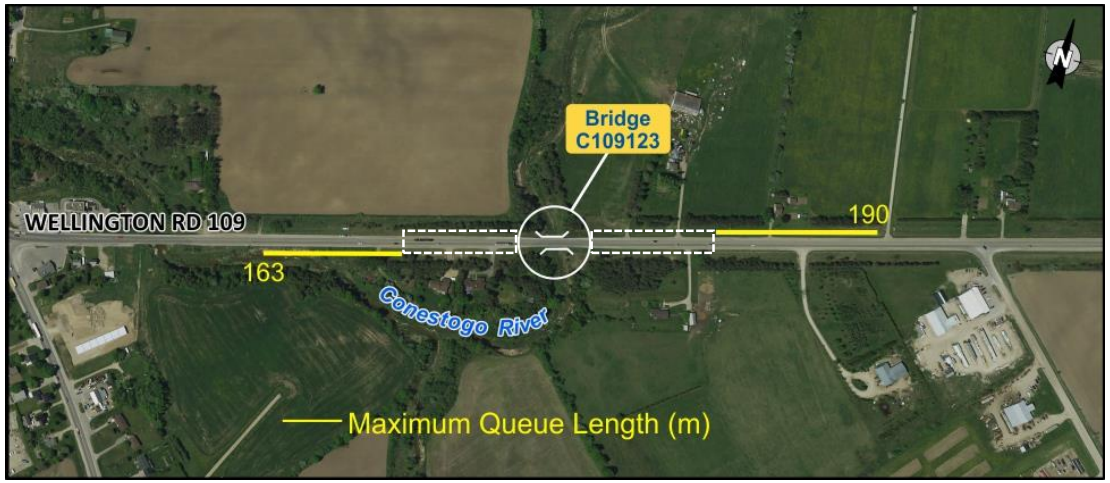
- Based on the analysis, it is expected that eastbound and westbound traffic will operate with an average delay of approximately one minute.
- The maximum traffic queue lengths for the eastbound and westbound directions are 163 metres and 190 metres, respectively.

Traffic Management
Potential Queues at C109123

This illustration depicts the maximum traffic lengths that could be expected at the second structure from the west.

For **C109123**:

- Four driveways and at least one farm entrance are located within the estimated work zone.
- The eastbound and westbound maximum queues are not expected to extend to the upstream roadways but may interfere with a farm entrance and several driveways.



Access to properties will be maintained throughout construction.

Traffic Management
Potential Queues at B109133 and B109134

These illustrations depict the maximum traffic lengths that could be expected at the easterly structures.

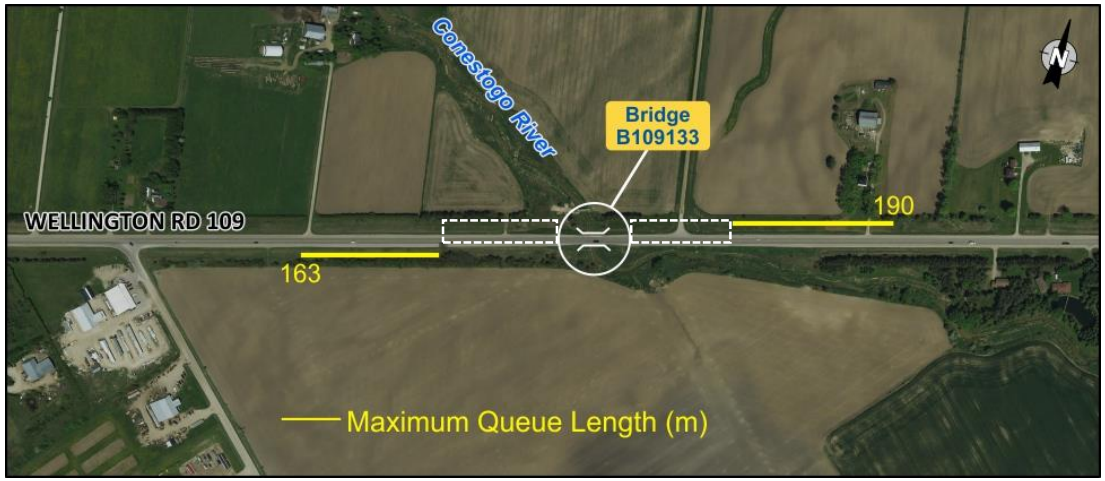
For **B109133**:

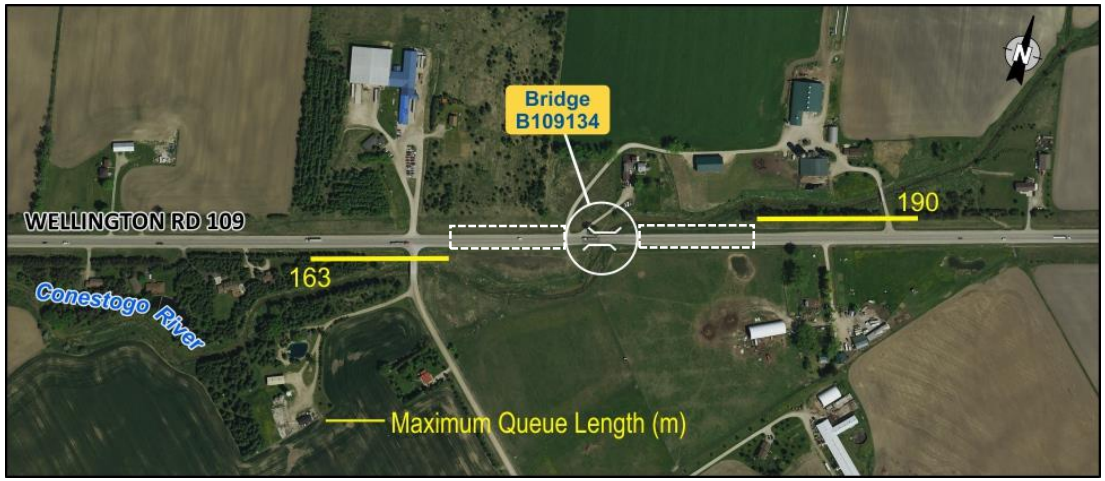
- One driveway and at least one farm entrance are located within the estimated work zone.
- The eastbound and westbound maximum queues are not expected to extend to the upstream roadways but may interfere with a driveway and farm entrances.

For **B109134**

- One driveway is located within the work zone
- The eastbound maximum queue is expected to extend to Second Line. In addition, there is potential for traffic queues to interfere with nearby driveways.

Access to properties will be maintained throughout construction.





Preliminary Mitigation Measures

- Vegetation protection, mitigation and restoration measures will be included in contract documents to manage impacts within affected areas and protect adjacent areas.
- Refine grading limits and protect adjacent sensitive natural features and habitats by avoiding or minimizing intrusion
- In-water activity is restricted between March 15 and June 30 of any year to protect fish and aquatic habitat during sensitive life stages.
- In-water activity is restricted between September 1 and April 30 to protect turtle hibernation activity, unless the aquatic construction zone is isolated prior to September 1 of any year.
- Migratory birds and their nests will be protected by:
  - avoiding vegetation clearing between April 1 and August 31; and/or
  - Excluding or inhibiting nesting on the structures through exclusion netting or other appropriate means.
- Erosion and sediment control measures will protect the Conestogo River adjacent from construction activities.

Commitments to Further Work

- Permanent and temporary property requirements at each bridge site will be confirmed based on further design work in the next few months (early summer 2021).
- The County will actively consult with adjacent and potentially impacted property owners, residents and businesses.
- First Nations will be engaged for the Stage 2 archaeological assessment.
- Protect sensitive habitats (e.g. floodplain pools at B109132)
- The County will demonstrate to the Grand River Conservation Authority (GRCA) that the new bridges provide the required flood conveyance.
- The County will obtain all necessary permits and approvals prior to construction.
- The County will consult with utility companies to identify appropriate mitigation or relocation strategies.
- County to present the final design and traffic staging to the public prior to Tender

What Are The Next Steps?

Preliminary Design

The Project Team will complete the preliminary design for each bridge site, which will typically include:

- Bridge design drawings and preliminary construction staging plan
- Preliminary traffic management plan, including potential detour routes
- Identifying utilities, potential conflicts and relocations
- Confirm work zone requirements and preliminary property impacts – both permanent and temporary (easements)
- Meet with individual property owners (residents and business owners) to discuss preliminary design, potential impacts and mitigation

Class EA Process

- Collect all public comments and carry feedback into developing the design and mitigation
- Consult with property owners, agencies, utilities and First Nations
- Complete supporting technical studies including:
  - Stage 2 Archaeological Assessment
  - Natural Environment Impact Assessment
  - Drainage Report
- Prepare the Environmental Study Report (ESR)
- Issue Notice of Study Completion and make ESR available for 30-day public review

Statement of Flexibility

- The purpose of identifying the recommended construction methods and structure types during the Class EA study is to clearly demonstrate the County's objectives to achieve a cost-conscious and efficient construction process that seeks to minimize disruption to property, residents, businesses and road users.

- The Environmental Study Report will document a Statement of Flexibility that will allow minor modifications to be made through the final bridge design.

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Alternate formats available upon request