Date:	September 29, 2023	**File:**	117085-4
To:	Ryan Tucker, Township of Woolwich,		
From:	Matt Scott, P.Eng.		
Project:	Middlebrook Place Bridges MCEA		
Subject:	Structure 180160, 2023 Review and Revised Cost Estimates		

TECHNICAL MEMO

This memo has been prepared to provide the Township of Woolwich (Woolwich) with additional information regarding Structure 180160 on Middlebrook Place (the single-span steel through-truss bridge over the Grand River) in response to the Township of Centre Wellington's (Centre Wellington) recent Council resolution regarding the Schedule B Municipal Class Environmental Assessment (MCEA) of the Middlebrook Place Bridges completed in February 2020. We understand that Woolwich will share information from this memo with Centre Wellington, as necessary.

BACKGROUND INFORMATION

Structure 180160 (Middlebrook Truss Bridge) is a ±47 m span, pin-connected Pratt camelback through-truss bridge over the Grand River. It was closed in 2013 due to structural deterioration. The truss superstructure itself is thought to have been built between 1910 and 1915 (known at that time as the Jackson's Bridge) at a different location and was moved to its current location in approximately 1946 to replace what is believed to have been a two-span timber bridge known as the Chambers (or Chamber's) Bridge. This bridge is a shared asset between Woolwich and Centre Wellington.

In 2017, Woolwich and Centre Wellington initiated a MCEA study to determine a long-term plan for this structure. The study was completed following the MCEA process for a Schedule B activity in February 2020. This study recommended that the preferred alternative for Structure 180160 was removal of the superstructure without replacement. This recommended preferred alternative was endorsed by both Woolwich and Centre Wellington Councils.

It is our understanding that Woolwich became aware of pedestrian and cyclist use of the bridge in summer 2020 and installed a steel barricade to prohibit further use of the structure by pedestrians and cyclists.

In 2022, a memo was provided to Woolwich and Centre Wellington with updated capital costs and lifecycle costing due to recent pricing increases in the construction industry.

In response to a recent Council resolution by Centre Wellington directing Centre Wellington staff to proceed with Alternative 7 from the MCEA study (removal and replacement with pedestrian bridge), Woolwich staff have requested the following information:

- Perform a site visit to review the current condition of the bridge and if the structure has degraded to a point where rehabilitation is not recommended.
- Review of the current abutment condition and recommendation for rehabilitation or replacement if a new superstructure is to be provided.
- Provide an appropriate budget for removal (not including construction of turnarounds).
- Provide an appropriate budget for a new single span pedestrian bridge structure on completely new foundations.

REVIEW OF EXISTING BRIDGE STRUCTURE

GM BluePlan Engineering Limited (GMBP) visited the site on September 8, 2023 to complete a visual review of the existing structure, primarily focusing on the existing truss superstructure. A full visual inspection meeting the requirements of O.Reg. 104/97 was not completed. Woolwich arranged for access to the bridge deck through the barricaded ends.

Refer to Figure 1 below for a glossary of terms used for the steel truss superstructure.

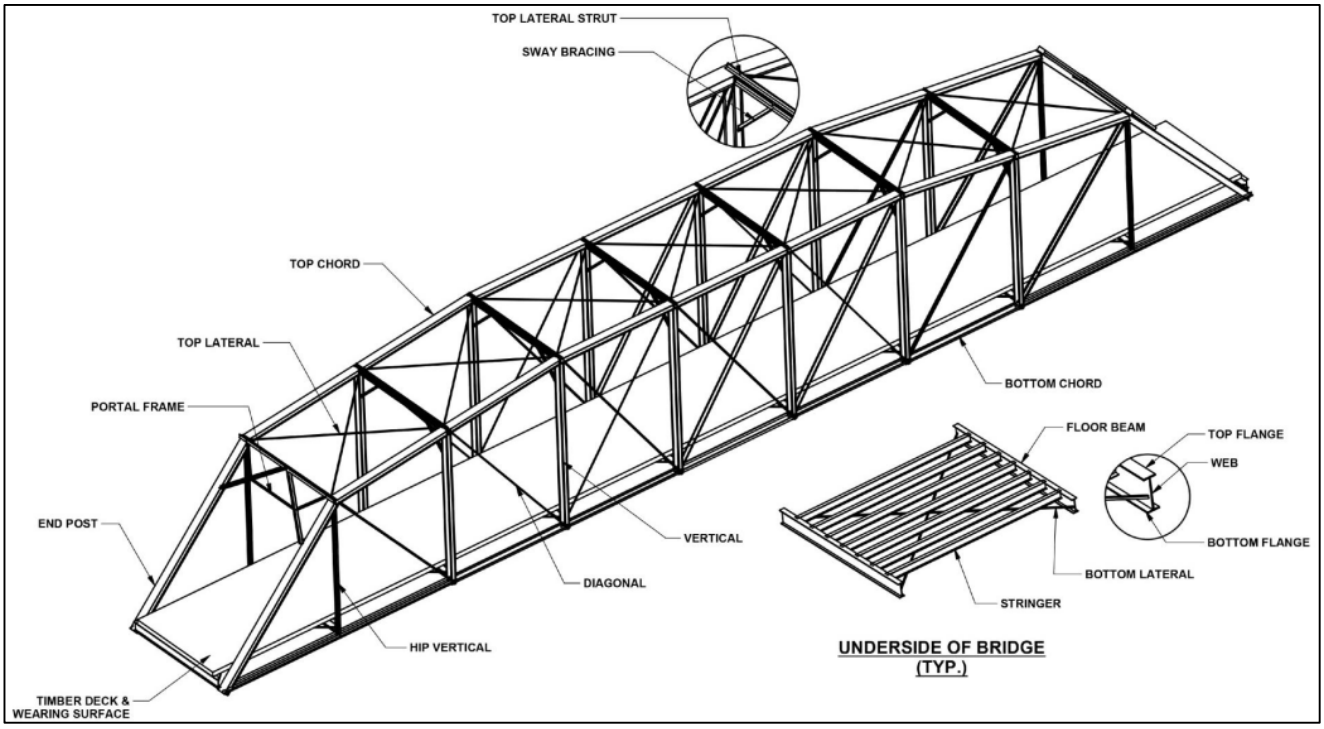


Figure 1: Glossary for steel truss superstructure

Refer to Figure 2 below for numbering and naming of bays, pin joints and substructure components.

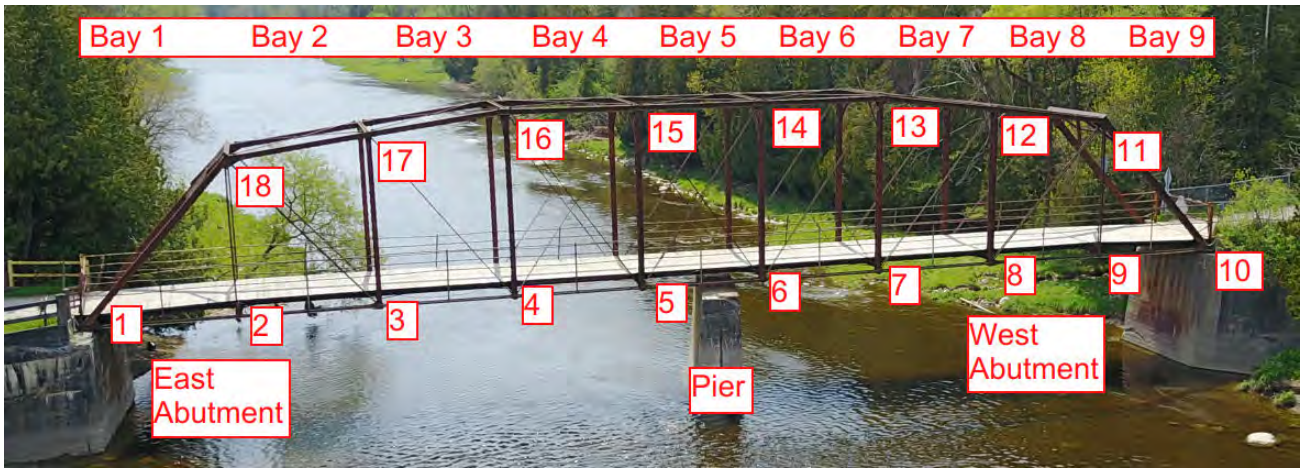


Figure 2: Numbering and naming of bays, pin joints and substructure components

Provided below is a summary of observations from our visual review. Relevant photographs are attached.

- The existing bridge deck shows moderate to severe weathering, checking, splitting and rot. Refer to Photograph 1.
- Steel stringers in the end bays (Bays 1 and 9) have completely failed and crushed at abutments, leading to settlements of the deck. Refer to Photographs 2, 3, 4 and 5. The wood deck has partially lost contact with the stringer top flanges near the east abutment.

- Steel stringer bearing support angles at floor beam locations are severely corroded. Refer to Photographs 6 and 7.
- Floor beams show medium to severe corrosion. Refer to Photograph 8.
- Bottom laterals show medium to severe corrosion at floor beam locations. Refer to Photographs 3, 5, 6 and 8.
- The southwest truss bearing roller pins have become dislodged. Refer to Photograph 9.
- The bottom chord pin joints show signs of light to severe section loss in the diagonal eye bars and vertical web plates, as well as isolated impact damage to the bottom chord eye bars. Refer to Photographs 10, 11 and 12. The exterior bottom chord at Joint 6 of the north truss appears to have a crack in the top face of the eye bar as shown in Photograph 10.
- The counter diagonal in the north truss, Bay 4 has a previous repair at the bottom chord connection. Refer to Photograph 13.
- The bottom chords in Bay 9 of each truss have a previous repair between the original bottom chord angles and lacing bars. Refer to Photograph 14.
- The west abutment and wingwalls show light to severe erosion, spalling and disintegration, specifically at the water line and truss bearing locations. Refer to Photograph 15.
- The east abutment and wingwalls show light to severe erosion, spalling and disintegration, and have wide vertical and horizontal cracks. A previous concrete repair to the northeast abutment footing was visible beneath the surface of the water. Refer to Photographs 16, 17 and 18.

Based on the information collected during our review, we believe that the bridge has continued to deteriorate since our 2017 enhanced OSIM and we maintain our recommendation that the structure remain closed to vehicle and pedestrian traffic.

Rehabilitation of the existing truss superstructure is not recommended from a structural and lifecycle cost perspective due to the number of truss elements requiring replacement, the limitations for equipment access to complete these repairs, and the limitations of pin-connected truss designs for longevity and required maintenance.

If Woolwich or Centre Wellington wishes to rehabilitate the existing truss superstructure for continued use as a pedestrian crossing, we recommend that the option to lift the truss bridge off the existing abutments and temporarily place on land using temporary foundations adjacent to the current location be explored for worker safety and constructability during the rehabilitation process. Based on our site review and historical knowledge, we anticipate the following superstructure elements to require rehabilitation or replacement as part of a proposed rehabilitation:

Element	Recommended Repairs / Replacements	Comments
Deck	Replace 205 m2 (all)	Existing deck is showing signs of severe weathering, checking, splitting and rot. Extensive deck removals are anticipated for replacement of other structural members. Full replacement of the deck is recommended.
Stringers	Replace 63 each (all)	All stringers should be replaced at the same time as the deck. Moderate to severe deterioration of top flanges of existing stringers is likely based on laminated wood deck construction. Investigate modifying stringer length to bear on top flange of floor beam instead of side-mounted stringer bearing support angles. This would require all stringers to be replaced and slightly lengthened, raising the approach road grade and raising the ballast walls.

Element	Recommended Repairs / Replacements	Comments
Stringer Bearing Support Angles	Replace 112 each (all)	Replacement of all stringer bearing support angles is recommended. Investigate removal of stringer bearing support angles without replacement and modification of stringer bearing configuration on floor beams (as discussed above).
Floor Beams	Replace 4 each	Replacement of first two floor beams adjacent to each abutment is recommended. All floor beams may require replacement or reinforcement if stringer bearing support is modified (as discussed above). Any original floor beams to remain should be cleaned and painted.
Bottom Laterals	Replace 8 each	Replacement of bays 1, 2, 8 and 9 bottom laterals is recommended (two laterals per bay).
Bottom Chords	Replace 18 each (all)	Count refers to bottom chord member (either double eye bar member or double angle with lacing bars member). Replacement of bottom chords in bays 1, 2, 8 and 9 is recommended due to corrosion of angles and lacing bars. Previous repairs do not appear to have been engineered. Welding of sign posts to inside bottom chords is not a supported practice, and replacement of all inside bottom chord eye bars is advisable (additional 14 bottom chord eye bar replacements). This would leave only 7 original eye bar members. Therefore, replacement of all bottom chords should be considered.
Verticals	Repair 12 each (all)	Severe corrosion and section loss noted around bottom chord pin connections. Reinforcing or partial replacement is recommended.
Diagonals	Replace 20 each	Count refers to diagonal member (some members are made of two diagonal bar elements). Severe corrosion and section loss noted around several diagonals at bottom chord pin connections. Some diagonals have been previously repaired, and previous repairs do not appear to have been engineered. Existing diagonals are not anticipated to be able to be re-tensioned due to corrosion / rust. “Loop bar” fabrication style can be problematic due to method of welding during original fabrication and is not advisable. Replacement of all diagonals is recommended.
Top Chords / End Posts	N/A	Some minor repairs or replacements may be required to facilitate rehabilitation and replacement of other members and/or lifting of bridge, such as partial removal and replacement of top plates, batten plates or lacing bars.
Top Laterals	N/A	Replacement of loose top laterals may be required. Further investigation is required.
Bearings	Replace 4 each	Roller bearings at west abutment have failed. Roller pins are visibly dislodged at southwest bearing. Replacement of fixed bearings at east abutment at same time as roller bearings is recommended.

Additional investigations to confirm the condition of existing truss elements to remain are recommended as part of the detailed design stage to confirm element condition and load carrying capacity of elements to remain.

Rehabilitation or replacement of substructure elements is discussed in the next section.

ABUTMENT CONDITION

The west abutment was constructed in approximately 1946. It is in serviceable condition and requires moderate repairs to extend its useful life. We estimate that the remaining service life of the west abutment is approximately 20-30 years.

The east abutment is believed to have been constructed in approximately 1905. It is in poor condition and requires extensive rehabilitation or replacement. Of specific concern are the wide vertical cracks in each wingwall near the abutment face, which suggest that the wingwalls may be moving and/or rotating independently of the abutment. A concrete footing repair appears to have been completed at the northeast corner, which may have been to address scour and erosion or undermining of the footing. We estimate that the remaining service life of the east abutment to be approximately 10-15 years without rehabilitation.

At the request of Woolwich, concrete cores for the east and west abutments were completed by Bridge Check Canada Ltd. (BCC). Refer to the attached Limited Condition Survey Report. This report suggests that the overall strength of concrete for the west and east abutments is approximately 30 – 50 MPa and 6 – 15 MPa, respectively. Additional cores and compressive strength tests would be required to obtain a representative sample size. The west abutment was determined to be constructed of reinforced concrete, which we believe to be consistent with a 1946 drawing provided by Woolwich. The east abutment was estimated to originally be approximately 1.2 m thick at a height of approximately 1.0 – 1.4 m above the water level at the time of the inspection. Newer reinforced concrete was noted on the buried (back) side of the abutment and wingwall, which is estimated to be approximately 0.6 m thick and increases the total abutment thickness to approximately 1.8 m at that elevation based on the full-depth abutment core.

We believe that the relatively low strength of concrete in the east abutment is problematic for a patch or refacing-type repair. Additionally, it appears as though a previous repair or retrofit to the buried face of the abutment and wingwalls was completed. We do not believe the scope or intent of this repair was documented.

Based on the cores and known information about the abutments and wingwalls, we believe that the west abutment could be repaired and repurposed as part of a new crossing to provide an additional approximately 30 years of service. We believe that the east abutment is not suitable for rehabilitation and reuse. This is primarily based on the vertical cracks present where the wingwalls meet the abutment, the relatively low strength of concrete, the previously undocumented repairs as well as the generally poor and deteriorated condition of the abutment concrete. From a lifecycle perspective, replacement of the east abutment is estimated to be more advantageous.

REMOVAL BUDGET

Woolwich has requested a standalone budget for complete removal of the existing bridge including the truss superstructure, abutments and pier. Previous estimates included the construction of a turnaround at the east approach, which has not been included in the estimate provided below.

Our pre-engineering estimate for removal of the existing bridge is $620,000 + HST. This includes for:

- Capital cost of construction
- Engineering (20%)
- Geotechnical investigation and chemical testing
- Contingency (15%)

As no design work has been completed, this cost estimate should be considered accurate to ± 40%.

NEW PEDESTRIAN BRIDGE BUDGET

Woolwich has requested a standalone budget for installation of a new single-span pedestrian bridge including new abutments and foundations. Previous estimates included for removal of the existing superstructure, abutments and pier as well as the construction of a turnaround at the east approach. These options have not been included in the estimate provided below.

Our pre-engineering estimate for a new single-span pedestrian bridge is $2,000,000 + HST. This includes for:

- Capital cost of construction
- Engineering (15%)
- Geotechnical investigation and chemical testing
- Contingency (15%)

As no design work has been completed, this cost estimate should be considered accurate to ± 40%.

A new pedestrian bridge with a clear span of 60 m was assumed for the structure. The existing bridge has a clear span of approximately 47 m; however, it is likely to be beneficial to construct the new abutments further up the existing embankments and away from normal water levels of the Grand River. This is anticipated to reduce future erosion / maintenance issues as well as material costs for the substructure components.

END OF TECHNICAL MEMO

Attachments: Select Photographs from 2023 Site Review
BCC Limited Condition Survey Report
Cost Estimates

Photograph 1: Deck at east abutment, north truss. Note weathering of deck and triangular daylight below steel barricade wall indicating settlement of deck towards north truss.

Photograph 2: Stringer in Bay 1 and east abutment, south bearing. Note complete loss of section in stringer web and loss of contact between wood deck and stringer top flange.

Photograph 3: Stringer in Bay 9 and west abutment, south bearing. Note complete loss of section in stringer bottom flange at stringer bearing seat, severe corrosion of bearing plates and severe corrosion of bottom lateral.

Photograph 4: Stringers in Bay 1 looking north. Note complete loss of section in stringer webs.

Photograph 5: Stringer in Bay 1 and east abutment, north bearing. Note complete loss of section in stringer web, corrosion in stringer top flange, severe corrosion of bottom lateral and loss of section of stringer flange at stringer bearing seat.

Photograph 6: Bay 9 stringer at east end showing bearing support angle severe corrosion, severe corrosion of floor beam and severe corrosion of bottom lateral.

Photograph 7: Bay 8 stringer at west end showing severe corrosion of floor beam and severe corrosion of stringer bearing support angle.

Photograph 8: Bay 8, east end showing severe corrosion of bottom lateral and floor beam.

Photograph 9: West abutment, south bearing showing dislodged bearing roller pin.

Photograph 10: North truss, Joint 6 showing light to severe corrosion of eye bars and vertical web plates as well as crack in bottom exterior chord.

Photograph 11: South truss, Joint 3 showing medium corrosion of vertical web plates and gouge in exterior bottom chord.

Photograph 12: North truss, Joint 4 showing section loss at diagonal eye bar and vertical web plate.

Photograph 13: North truss, Bay 4 counter diagonal showing previous repair of square bars welded to eye bar (date of repair unknown).

Photograph 14: North truss, Bay 9 bottom chord showing previous repair of angles welded between original bottom chord angles and lacing bars (date of repair unknown).

Photograph 15: West abutment showing light to severe erosion, spalling and disintegration.

Photograph 16: East abutment showing light to severe erosion, spalling and disintegration

Photograph 17: East abutment, south wingwall showing wide vertical crack at wingwall/abutment interface and wide horizontal crack at cold joint.

Photograph 18: East abutment, north wingwall showing wide vertical crack at wingwall/abutment interface. Footing repair visible below waterline.

BRIDGE CHECK CANADA

Your Bridge & Concrete Inspection Specialists

LIMITED CONDITION SURVEY REPORT

Site 180160, Middlebrook Truss
West Montrose, ON

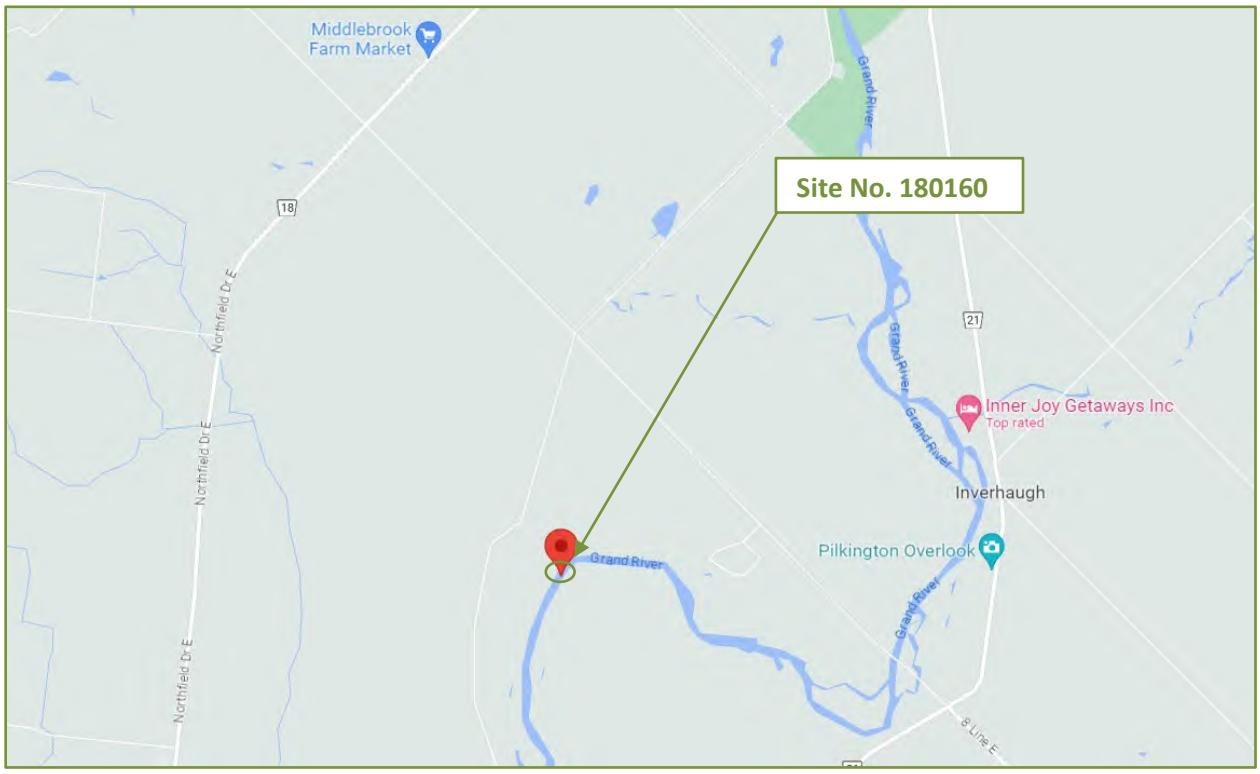
Prepared for: GM BluePlan Engineering Limited

BCC Project No.: BCC23071
Report Date: September 14, 2023

Bridge Check Canada Ltd.
200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
T 905-660-6608 F 905-660-6608
www.bridgecheckcanada.com

KEY PLAN

Site 180160, Middlebrook Truss
West Montrose, ON



200 Viceroy Road, Unit 4, Vaughan, ON L4K 3N8
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Tel: 905-660-6608 Fax: 905-660-6609
info@bridgecheckcanada.com

CORE LOG FOR EXPOSED CONCRETE

Site: **180160**

Core No.		**C-AB1**		**C-AB2**		**C-AB3**	
Location (between gridlines)		East Abutment		East Abutment		West Abutment	
Diameter, mm		100.0		100.0		100.0	
Length, mm		1800.0		1380.0		250.0	
Full Depth (yes/no)		Yes		No		No	
Defects in Concrete [1]		D		D		-	
Condition of Rebar [2]		G		LR		N/A	
Corrosion Potential							
Compressive Strength, MPa		15.0				49.4	
Chloride Content % Chloride by Weight of Concrete		Total	Corrected	Total	Corrected	Total	Corrected
	0-10 mm						
	20-30 mm						
	40-50 mm						
	60-70 mm						
	80-90 mm						
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY		BCC				BCC	
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**		20M-Rebar @ 1650mm (Horizontal). 20M-Rebar @ 1660mm (Horizontal). Delamination plane @ 1170mm. 1170mm original concrete and 630mm different concrete at the end of core sample. Core damaed upon removal.		Rebar imprint @ 1370mm (Vertical). Delamination plane @ 1120mm. 1120mm original concrete and 260mm different concrete at the end of core sample. Core damaed upon removal.			

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
2. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG FOR EXPOSED CONCRETE

Site: **180160**

Core No.		**C-AB4**		**C-AB5**		**C-WW1**	
Location (between gridlines)		West Abutment		West Abutment		NE Wingwall	
Diameter, mm		100.0		100.0		100.0	
Length, mm		200.0		65.0		850.0	
Full Depth (yes/no)		No		No		Yes	
Defects in Concrete [1]		-		-		D	
Condition of Rebar [2]		N/A		LR		N/A	
Corrosion Potential							
Compressive Strength, MPa						5.6	
Chloride Content % Chloride by Weight of Concrete	**0-10 mm**	Total	Corrected	Total	Corrected	Total	Corrected
	20-30 mm						
	40-50 mm						
	60-70 mm						
	80-90 mm						
AIR VOIDS	**Air Content,%**						
	Spec. Surf.,mm^2/mm^3						
	Spacing Factor, mm						
TEST LABORATORY						BCC	
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**				Rebar imprint @ 55mm (Horizontal). Rebar imprint @ 65mm (Vertical).		Delamination plane @ 400mm. Core damaed upon removal.	

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
2. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

CORE LOG FOR EXPOSED CONCRETE

Site: **180160**

Core No.		**C-WW2**				
Location (between gridlines)		SW Wingwall				
Diameter, mm		100.0				
Length, mm		270.0				
Full Depth (yes/no)		No				
Defects in Concrete [1]		-				
Condition of Rebar [2]		N/A				
Corrosion Potential						
Compressive Strength, MPa		30.7				
Chloride Content % Chloride by Weight of Concrete	**0-10 mm** **20-30 mm** **40-50 mm** **60-70 mm** **80-90 mm**	Total	Corrected			
AIR VOIDS	**Air Content,%** **Spec. Surf.,mm^2/mm^3** **Spacing Factor, mm**					
TEST LABORATORY		BCC				
REMARKS **- orientation of rebars and cover** **- presence of overlay, patch and thickness** **- other observed defects**						

1. Defects - C = Cracked, D = Delamination, R = Rough, Sc = Scaling, S = Spalling
2. Condition Rebar - G = Good, LR = Light Rust, SR = Severe Rust, N/A = No rebar exposed
   Condition of Epoxy Coating – ECG = Good, ECF = Fair, ECP = Poor-rusted & debonded areas

Photo P1 East Abutment

Photo P2 West Abutment

Photo P3 NE Wingwall

Photo P4 NW Wingwall

Photo P5 SE Wingwall

Photo P6 SW Wingwall

Photo P7 **Inside Core C-AB1** (full depth)

Photo P8 **Core Sample C-AB1** (full depth)

Photo P9 Core Sample C-AB1 (full depth)

Photo P10 Inside Core C-AB2

Photo P11 Core Sample C-AB2

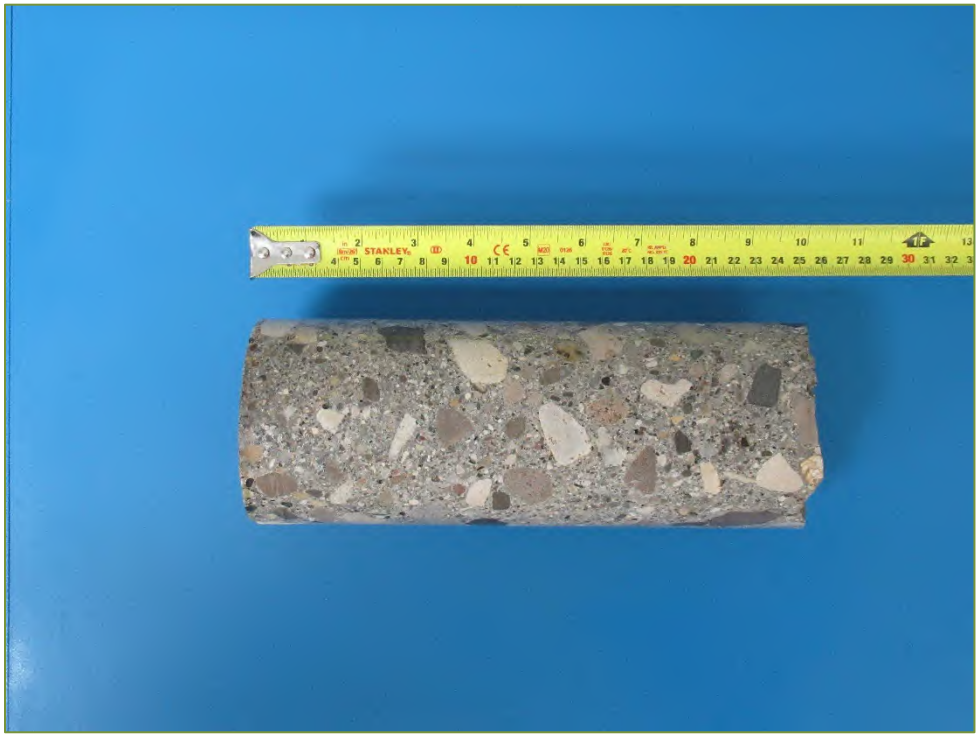

Photo P12 Inside Core C-AB3

Photo P13 Core Sample C-AB3

Photo P14 Inside Core C-AB4

Photo P15 Core Sample C-AB4

Photo P16 Inside Core C-AB5

Photo P17 Core Sample C-AB5

Photo P18 Inside Core C-WW1 (full depth)

Photo P19 Core Sample C-WW1 (full depth)

Photo P20 Core Sample C-WW1 (full depth)

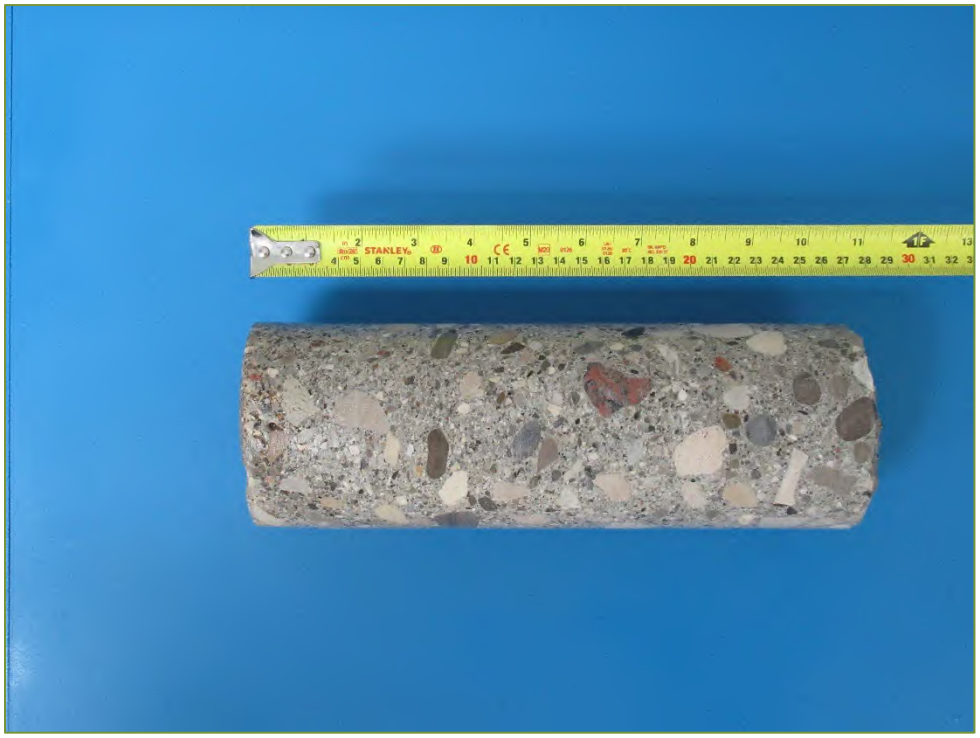

Photo P21 Inside Core C-WW2

Photo P22 Core Sample C-WW2

BRIDGE CHECK CANADA Ltd.
Your Bridge and Concrete Inspection Specialists

COMPRESSIVE STRENGTH OF CONCRETE CORES

(CSA A23.2-14C)

Project No.:	**BCC23071**
Site No.:	.: 180160
Location:	Middlebrook Truss

Core ID	C-AB1	C-AB3	C-WW1	C-WW2
Location	E-Abut	W-Abut	NE-WW	SW-WW
Lab No.	T23-1503	T23-1504	T23-1505	T23-1506
Date Cast	-	-	-	
Date Cored	Sept 11, 2023	Sept 11, 2023	Sept 11, 2023	Sept 11, 2023
Date Tested	Sept 14, 2023	Sept 14, 2023	Sept 14, 2023	Sept 14, 2023
Capped Height (mm)	180.0	174.0	175.0	180.0
Average Diameter (mm)	100.0	100.0	100.0	100.0
Density (kg/m^3)	2440	2384	2267	2311
Corrected Compressive Strength	15.0	49.4	5.6	30.7
* Direction of Loading	Perpendicular	Perpendicular	Perpendicular	Perpendicular
Moisture Content at Time of Test	Moist	Moist	Moist	Moist
Remarks	Original concrete tested.		Original concrete tested.	

*Relative to the direction of original placement.

Savio DeSouza, M.A.Sc., P.Eng.
Senior Principal Engineer

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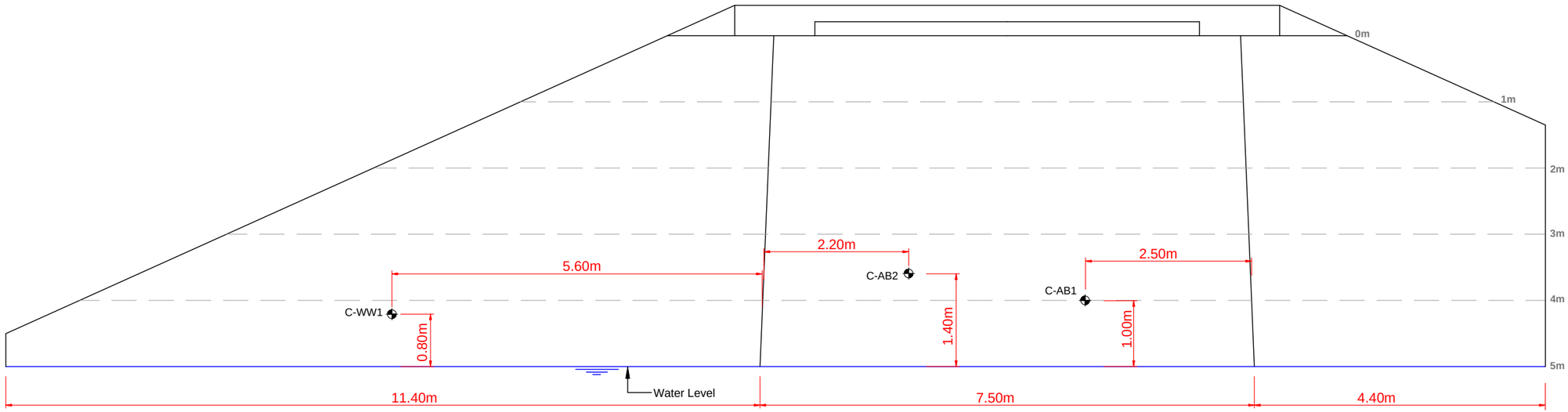

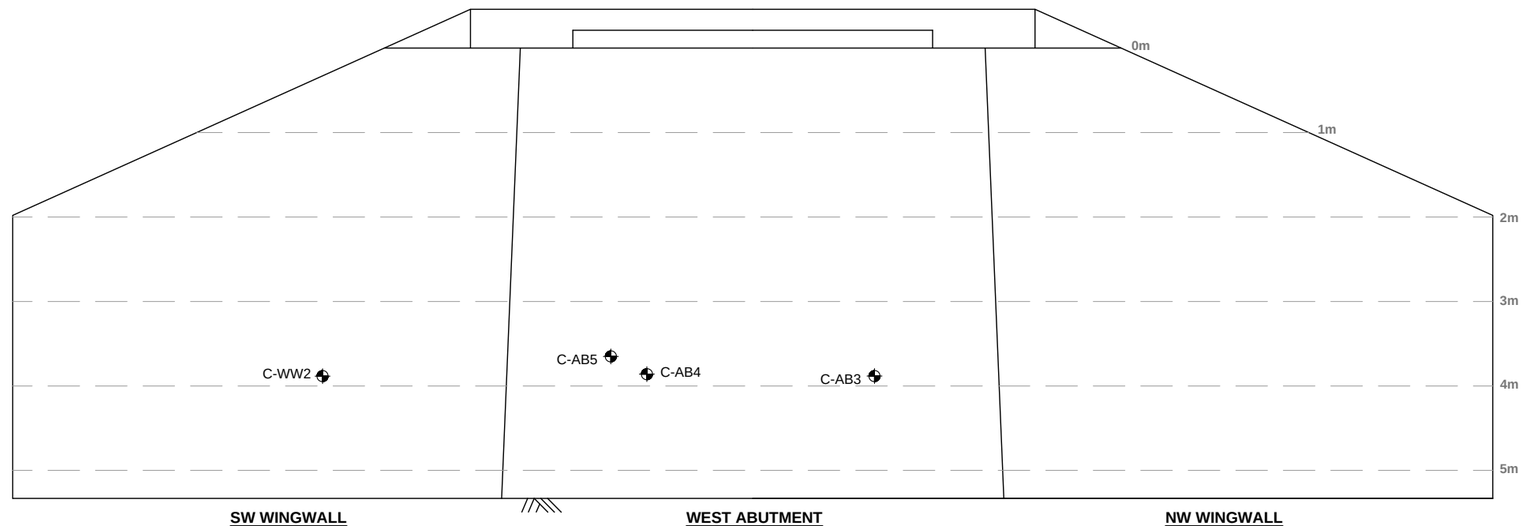

LEGEND:

- Drain
- C1 Core Sample Location

BRIDGE CHECK CANADA

200 Viceroy Road, Unit 4
Vaughan, ON L4K 3N8
T: 905-660-6608 F: 905-660-6609

PROJECT:

Middlebrook Place Truss Bridge
Site No. 180160
West Montrose, ON

TITLE:

SURFACE DETERIORATION OF ABUTMENTS AND WINGWALLS

Drawing No.:	1
Project No.:	BCC23071
Date:	September 2023
Scale:	1:75
Drawn by:	JL
Checked by:	MA

STRUCTURE 180160 MIDDLEBROOK PLACE (TRUSS BRIDGE)
Township of Woolwich & Township of Centre Wellington
Pre-Engineering Estimate - Bridge Removal
GMBP Project: 117085-4

Date: 2023-09-13

ITEM	SPEC.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
SECTION A - PREPARATION AND REMOVALS						
A1		Bonding and Insurance	LS	1	$ 10,000.00	$ 10,000.00
A2		Mobilization and Demobilization	LS	1	$ 40,000.00	$ 40,000.00
A3		Environmental Protection / Worksite Isolation	LS	1	$ 120,000.00	$ 120,000.00
A4		Clear and Grub Existing Trees and Vegetation	LS	1	$ 20,000.00	$ 20,000.00
A5		Removal of Deck and Truss Superstructure	LS	1	$ 60,000.00	$ 60,000.00
A6		Removal of Abutments and Wingwalls	LS	1	$ 50,000.00	$ 50,000.00
A7		Removal of Fencing and Portal Frames	LS	1	$ 10,000.00	$ 10,000.00
A8		Removal of Pier	LS	1	$ 30,000.00	$ 30,000.00
		Sub-total				**$ 340,000.00**
SECTION B - ROAD WORKS						
B1		Earth Excavation (offsite disposal)	LS	1	$ 60,000.00	$ 60,000.00
B2		Rip-rap on Geotextile	LS	1	$ 25,000.00	$ 25,000.00
B3		Signage	LS	1	$ 10,000.00	$ 10,000.00
B4		Site Restoration	LS	1	$ 10,000.00	$ 10,000.00
		Sub-total				**$ 105,000.00**
		Sub-total (all parts)				**$ 445,000.00**
		Engineering (20%)				$ 89,000.00
		Contingency (15%)				$ 66,750.00
		Geotechnical Investigation and Chemical Testing				$ 15,000.00
		TOTAL				**$ 615,750.00**
		TOTAL (rounded)				**$ 620,000.00**

STRUCTURE 180160 MIDDLEBROOK PLACE (TRUSS BRIDGE)
Township of Woolwich & Township of Centre Wellington
Pre-Engineering Estimate - New Pedestrian Bridge
GMBP Project: 117085-4

Date: 2023-09-13

ITEM	SPEC.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
SECTION A - PREPARATION						
A1		Bonding and Insurance	LS	1	$ 30,000.00	$ 30,000.00
A2		Mobilization and Demobilization	LS	1	$ 60,000.00	$ 60,000.00
A3		Worksite Isolation and Dewatering (Abutments)	LS	1	$ 50,000.00	$ 50,000.00
A4		Earth Excavation for Structures	LS	1	$ 50,000.00	$ 50,000.00
A5		Contractor Layout	LS	1	$ 5,000.00	$ 5,000.00
A6		Clear and Grub Existing Trees and Vegetation	LS	1	$ 8,000.00	$ 8,000.00
		Sub-total				**$ 203,000.00**
SECTION B - STRUCTURE WORKS						
B1		Concrete in Mud Slab (Abutments)	LS	1	$ 10,000.00	$ 10,000.00
B2		Helical Piles / Micro Piles	LS	1	$ 50,000.00	$ 50,000.00
B3		Concrete in Abutments and Wingwalls	LS	1	$ 100,000.00	$ 100,000.00
B4		Bearings	ea	4	$ 2,500.00	$ 10,000.00
B5		Prefabricated Steel Truss Pedestrian Bridge with Wood Deck (2.0m wide, 60m long)	LS	1	$ 900,000.00	$ 900,000.00
B6		Reinforcing Steel - Black Bar	t	15	$ 5,000.00	$ 75,000.00
		Sub-total				**$ 1,145,000.00**
SECTION C - ROAD WORKS						
C1		Pedestrian Barrier on Approaches	m	60	$ 300.00	$ 18,000.00
C4		Granular B Type 1 Backfill and Road Base	LS	1	$ 50,000.00	$ 50,000.00
C5		Granular A Road Base	LS	1	$ 10,000.00	$ 10,000.00
B5		Signage	LS	1	$ 10,000.00	$ 10,000.00
C14		Rip-Rap on Geotextile	LS	1	$ 20,000.00	$ 20,000.00
C15		Site Restoration	LS	1	$ 30,000.00	$ 30,000.00
		Sub-total				**$ 138,000.00**
		Sub-total (all parts)				**$ 1,486,000.00**
		Engineering (15%)				$ 222,900.00
		Geotechnical Investigation				$ 15,000.00
		Contingency (15%)				$ 222,900.00
		TOTAL				**$ 1,946,800.00**
		TOTAL (rounded)				**$ 2,000,000.00**