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Figures

Bridge

Ecological Land Classification

Study Area

ELC Descriptions
OAG: Open Agriculture
FODM7: Fresh - Moist Lowland Deciduous Forest
MEGM3-5: Smooth Brome Graminoid Meadow
OAO: Open Aquatic
TAGM5: Fencerow

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

Disclaimer:

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This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983 CSRS	
Coord. System: NAD 1983 CSRS UTM Zone 17N	
Projection: Transverse Mercator	
Central Meridian: 81°0'0.00"W	
False Easting: 500,000m	False Northing: 0m
Page Orientation: 0°	Scale Factor: 0.99960

N
Grid North

0 20 40 60 80
Metres

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Client
TOWNSHIP OF CENTRE WELLINGTON

Figure Title
CENTRE WELLINGTON MCEA FOR 3 BRIDGES
ECOLOGICAL LAND CLASSIFICATION
21-WG

Drawn	Checked	Date	Figure No.
HN	SY	2025/08/29	2
Scale		Project No.	
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Bridge

Ecological Land Classification

Ecological Land Classification - Inclusion

Study Area

ELC Descriptions

CVR: Residential
ME: Meadow
MEMM3: Dry - Fresh Mixed Meadow
MEMM4: Fresh - Moist Mixed Meadow
OAG: Open Agriculture
OAO: Open Aquatic
SAS_1: Submerged Shallow Aquatic
SWTM2: Dogwood Mineral Deciduous Thicket Swamp
TAGM5: Fencerow
THDM3-2: Native Shrub Deciduous Hedgerow Thicket

Sources:

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Client

TOWNSHIP OF CENTRE WELLINGTON

Figure Title

CENTRE WELLINGTON MCEA FOR 3 BRIDGES

ECOLOGICAL LAND CLASSIFICATION
29-WG

Drawn	Checked	Date	Figure No.
HN	SY	2025/08/29	3
Scale		Project No.	
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Bridge

Wetland

Ecological Land Classification

Ecological Land Classification - Inclusion

Study Area

ELC Descriptions

FOCM4-1: Fresh - Moist White Cedar Coniferous Forest
FOCM6: Naturalized Coniferous Plantation
MAM: Meadow Marsh
ME: Meadow
MEGM3: Dry - Fresh Graminoid Meadow
OAO: Open Aquatic
SWCM1-2: White Cedar - Conifer Mineral Coniferous Swamp
SWDM4: Mineral Deciduous Swamp
SWTM2-1: Red-osier Dogwood Mineral Deciduous Thicket Swamp
TAGM1: Coniferous Plantation
TAGM5: Fencerow
WODM4-1: Hawthorn / Apple Deciduous Woodland

Sources:

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Grid North

0 20 40 60 80
Metres

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Client

TOWNSHIP OF CENTRE WELLINGTON

Figure Title

CENTRE WELLINGTON MCEA FOR 3 BRIDGES

ECOLOGICAL LAND CLASSIFICATION 30-WG

Drawn	Checked	Date	Figure No.
HN	SY	2025/07/28	4
Scale		Project No.	
H 1:1,000		300059832	

File Path: Z:\059832\0000\08-GIS\059832 Centre Wellington MCEA\059832 Centre Wellington MCEA aprx Print Date: 2025/07/28 Time: 03:22 PM

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Appendix A

Environmental Land Classification Table

ELC Code 2008 (1998)	ELC Name	Description	Photo
Bridge 21-WG			
MEGM3-5 (CUM1)	Smooth Brome Graminoid Meadow Type	This community is present on the north side of bridge 21-WG. This community lacks and distinct canopy, subcanopy, or understory. Young willows and Basswood regeneration occurs rarely within this community. The groundcover is graminoid dominant and is comprised primarily of Smooth Brome (*Bromus inermis*) with lesser associates of Reed Canary Grass (*Phalaris arundinacea*), Quackgrass (*Elymus repens*), and Goldenrod (*Solidago spp.*)	 

ELC Code 2008 (1998)	ELC Name	Description	Photo
FODM7 (FOD7)	Fresh – Moist Lowland Deciduous Forest Ecosite	This community is present on the north and south sides of Bridge 21-WG, immediately abutting Irvine Creek. This community slopes steeply towards the watercourse. Standing Ash snags occur occasionally, and edge effects are prominent. The canopy layer of this community consists of White Willow (*Salix alba*), Basswood (*Tilia americana*), and White Cedar (*Thuja occidentalis*). The subcanopy is poorly defined and is dominated by White Cedar with lesser associates of Manitoba Maple (*Acer negundo*), and Basswood. The understory is dense and is comprised of regenerating Manitoba Maple, Alternate-leaved Dogwood (*Cornus alternifolia*), Hawthorn (*Crataegus spp.*) and Black Raspberry (*Rubus occidentalis*). Dominant groundcover species include Dame's Rocket (*Hesperis matronalis*), Garlic Mustard (*Alliaria petiolata*), Yellow Avens (*Geum aleppicum*), Ostrich Fern (*Matteuccia struthiopteris var. pensylvanica*), and Purple Meadow Rue (*Thalictrum dasycarpum*).	
OAG	Agricultural	This community is present north and south of Bridge 21-WG. This community is comprised of row crops.	
TAGM5	Fencerow	This community is present along the ROW of 1st Line. This community consists of Sugar Maples and common meadow species.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
OAO	Open Water	This community occurs in association with Irvine Creek. Submerged and emergent aquatic macrophytes are present within this community along the banks of Irvine Creek but do not exceed 25% cover. Species present include Softstem Bulrush (*Schoenoplectus tabernaemontani*), Coontail (*Ceratophyllum demersum*), *Potomogeton spp.*, and Arrowhead (*Sagittaria latifolia*).	

ELC Code 2008 (1998)	ELC Name	Description	Photo
Bridge 29-WG			
MEMM4 (CUM1)	Fresh - Moist Mixed Meadow Ecosite	This community is present northeast of the structure and is dominated by Smooth Brome with lesser associates of Goldenrod and other common species such as Bull Thistle and Sneezeweed. Facultative wetland species such as Tall Meadow Rue (*Thalictrum pubescens*) and Reed Canary Grass are present but do not provide >50% cover. A Dogwood Mineral Deciduous Thicket Swamp Ecosite (SWTM2) inclusion is present in association with this community.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
THDM3-2	Native Shrub Deciduous Hedgerow Thicket Type	This community is present along the northern margin of Irvine Creek west of the structure and was identified from the ROW from a distance. Species present include Willows, Ash regeneration and Manitoba Maple regeneration.	
TAGM5a	Fencerow	This community represents the narrow band of trees along the southern margins of Irvine Creek. Species present include White Willow, White Cedar, and Manitoba Maple.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
TAGM5b	Fencerow	This community represents the narrow band of trees along the norther margins of Irvine Creek. Species present include Eastern Cottonwood and Norway Spruce.	
OAG	Agricultural	This community consists of row crops and Rye.	
CVR	Residential	This community is located on privately owned lands and was identified through air photo interpretation.	
ME	Meadow	This community is located on privately owned lands and was identified through air photo interpretation.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
OAO	Open Water	This community represents Irvine Creek. A submerged shallow aquatic ecosite (SAS_1) inclusion is present in association with this community. Submerged and emergent aquatic macrophytes are present within this community along the banks of Irvine Creek but do not exceed 25% cover. Species present include Softstem Bulrush, *Elodea spp.*, *Potamogeton spp.*, and Arrowhead.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
Bridge 30-WG			
MEGM3 (CUM1)	Dry - Fresh Graminoid Meadow Ecosite	This community is present northwest, southwest, and southeast of the structure. Informal trails are present in the southeastern MEGM3 community. This community is dominated by Smooth Brome with lesser associates of Reed Canary Grass, Tall Goldenrod, and Garlic Mustard. Facultative wetland and obligate wetland species such as Jewelweed, Angelica, Cow Parsnip, and Canada Anemone are present along the margins of this community near the interface with Irvine Creek. One inclusion, a Mixed Mineral Meadow Marsh Type (MAMM3) is present in association with this community southwest of bridge 30-WG. This inclusion consists of Reed Canary Grass with lesser associates of Jewelweed, Tall Goldenrod, and Fringed Sedge (*Carex crinita*).	 

ELC Code 2008 (1998)	ELC Name	Description	Photo
WODM4-1 (CUW1)	Hawthorn / Apple Deciduous Woodland Type	This community is present northeast of the structure. This community acks a distinct canopy and subcanopy. The understory is dominated by mid-aged Hawthorn (*Crataegus spp.*) with lesser associates of Apple, Balsam Poplar, and Alternate-leaved Dogwood. The groundcover layer is consistent with the MEGM3 community. A Dry – Fresh Coniferous Woodland Ecosite (WOCM1) inclusion is present in association with this community which consists of several rows of young Red Pine.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
FOCM4-1	Fresh-Moist White Cedar Coniferous Forest Ecosite	The canopy is dominated by mature White Cedar with lesser associates of White Willow, White Spruce, and Balsam Poplar. The subcanopy layer is poorly developed but is dominated by White Cedar, White Spruce, and Manitoba Maple. A distinct understory and groundcover layer is absent due to the density of the White Cedar growth.	
FOCM6	Naturalized Coniferous Plantation	This community consists of planted White Spruce and is located adjacent to Irvine Creek.	

ELC Code 2008 (1998)	ELC Name	Description	Photo
TAGM1	Plantation	This community was identified from air photo interpretation and is located well beyond the structure.	
TAGM5	fencerow	This community consists of planted Norway Maples.	
MAM	Meadow Marsh	This community was identified from air photo interpretation and is located well beyond the structure.	
SWCM1-2	White Cedar – Conifer Mineral Coniferous Swamp Type	This community occurs on the southeast side of the structure. The canopy is dominated by mature white Cedar with lesser associates of White Willow, trembling Aspen and Tamarack. The subcanopy is poorly defined and is dominated by White Cedar with lesser associates of Trembling Aspen, and Yellow Birch. Due to the density of the canopy, a distinct understory is absent with the exception of the margins of this community. Similarly, the groundcover layer is poorly developed and consists of Sensitive Fern (*Onoclea sensibilis*) and Canada Aenome. An SWTM2-1 (Red-Osier Dogwood Mineral Deciduous Thicket Swamp) inclusion is present in association with this community.	
SWDM4 (SWD4)	Mineral Deciduous swamp ecosite	This community was identified from air photo interpretation and GRCA mapping and is located well beyond the structure. Identifiable canopy species visible from the ROW includes White Willow.	

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Appendix B

Significant Wildlife Habitat

Significant Wildlife Habitat Screening – Ecoregion 6E Criteria (2015)

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Table 1.1: Seasonal Concentration Areas of Animals					
Waterfowl Stopover & Staging Areas (Terrestrial) **Rationale:** Habitat important to migrating waterfowl.	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these ecosites.	Fields with sheet water during Spring (mid-March to May). • Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl. • Agriculftural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available.	American Black Duck Wood Duck Green-winged Teal Blue-winged Teal Mallard Northern Pintail Northern Shoveler American Wigeon Gadwall	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects. • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300 m radius area, dependent on local site conditions and adjacent land use is the SWH. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). • **SWHMiST Index #7** provides development effects and mitigation measures.	No potential within the Study Area. The upland meadow and thicket community are not extenstive in size.
Waterfowl Stopover & Staging Areas (Aquatic) **Rationale:** Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district.	MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	• Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and SWM ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify. • These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water).	Canada Goose Cackling Goose Snow Goose American Black Duck Northern Pintail Northern Shoveler American Wigeon Gadwall Green-winged Teal Blue-winged Teal Hooded Merganser Common Merganser Lesser Scaup Greater Scaup Long-tailed Duck Surf Scoter White-winged Scoter Black Scoter Ring-necked duck Common Goldeneye Bufflehead Redhead Ruddy Duck	**Studies carried out & verified presence of:** • Aggregations of 100 or more of listed species for 7 days, results in >700 waterfowl use days. • Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH. • The combined area of the Ecological Land Classification (ELC) ecosites and a 100 m radius area is the SWH. • Wetland area and shorelines associated with sites identified within the SWHTG Appendix K are SWH. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded). • **SWHMiST Index #7** provides development effects and mitigation measures.	Moderate potential. May but supported along the reaches of Irvine Creek.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
			Red-breasted Merganser Brant Canvasback Ruddy Duck		
Shorebird Migratory Stopover Area **Rationale**: High quality shorebird stopover habitat is extremely rare and typically has a long history of use.	BBO1 BBO2 BBS1 BBS2 BBT1 BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	• Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. • Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. • Sewage treatment ponds and storm water ponds do not qualify as a SWH.	Greater Yellowlegs Lesser Yellowlegs Marbled Godwit Hudsonian Godwit Black-bellied Plover American Golden-Plover Semipalmated Plover Solitary Sandpiper Spotted Sandpiper Semipalmated Sandpiper Pectoral Sandpiper White-rumped Sandpiper Baird's Sandpiper Least Sandpiper Purple Sandpiper Stilt Sandpiper Short-billed Dowitcher Red-necked Phalarope Whimbrel Ruddy Turnstone Sanderling Dunlin	**Studies confirming:** • Presence of 3 or more of listed species and >1000 shorebird use days during spring or fall migration period (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period). • Whimbrel stop briefly (<24 hrs.) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant. • The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100 m radius area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #8** provides development effects and mitigation measures.	No potential within the Study Area. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat is not present.
Raptor Wintering Area **Rationale**: Sites used by multiple species, a high number of individuals and used annually are most significant.	Hawks/Owls: Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC.	• The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors. • Raptor wintering sites (hawk/owl) need to be **>** 20 ha, with a combination of forest and upland. • Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands. • Field area of the habitat is to be wind swept with limited snow depth or accumulation. • Eagle sites have open water, large trees and snags available for roosting.	Rough-legged Hawk Red-tailed Hawk Northern Harrier American Kestrel Snowy Owl **Special Concern:** Short-eared Owl Bald Eagle	**Studies confirm the use of these habitats by:** • One or more Short-eared Owls or; One or more Bald Eagle or; At least 10 individuals and two of the listed hawk/owl species. • To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds. • The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects."	Moderate potential within the Study Area in association with bridge 30-WG. A number of upland communities occur in association wis extensive forest / swamp communities.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	Upland: CUM; CUT; CUS; CUW. Bald Eagle: Forest community Series: FOD, FOM, FOC, SWD, SWM or SWC on shoreline areas adjacent to large rivers or adjacent to lakes with open water (hunting area).			• **SWHMiST Index #10 and #11** provides development effects and mitigation measures.	
Bat Hibernacula **Rationale:** Bat hibernacula are rare habitats in all Ontario landscapes.	**Bat Hibernacula may be found in these ecosites:** CCR1 CCR2 CCA1 CCA2 (Note: buildings are not considered to be SWH)	• Hibernacula may be found in caves, mine shafts, underground foundations and Karsts. • Active mine sites should not be considered as SWH. • The locations of bat hibernacula are relatively poorly known.	Big Brown Bat Tri-coloured Bat	• All sites with confirmed hibernating bats are SWH. • The habitat area includes a 200 m radius around the entrance of the hibernaculum for most development types and 1000 m for wind farms. • Studies are to be conducted during the peak swarming period (August to September). Surveys should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #1** provides development effects and mitigation measures.	No potential within the Study Area. The ecosites are not present and the habitat criteria for Significant Wildlife Habitat is not present.
Bat Maternity Colonies **Rationale:** Known locations of forested bat	Maternity colonies considered SWH are found in forested ecosites.	• Maternity colonies can be found in tree cavities, vegetation and often in buildings (buildings are not considered to be SWH). • Maternity roosts are not found in caves and mines in Ontario.	Big Brown Bat Silver-haired Bat	• Maternity Colonies with confirmed use by: – >10 Big Brown Bats – >5 Adult Female Silver- haired Bats	Moderate potential to be supported within the Study Area. Candidate habitat present within the wooded ecosites within the Study Area,

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
maternity colonies are extremely rare in all Ontario landscapes.	**All ELC ecosites in ELC Community Series:** FOD FOM SWD SWM	• Maternity colonies located in Mature deciduous or mixed forest stands with >10/ha large diameter (>25 cm dbh) wildlife trees. • Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3 or class 1 or 2. • Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred.		• The area of the habitat includes the entire woodland, or a forest stand ELC ecosite or an ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects”. • SWHMiST Index #12 provides development effects and mitigation measures.	
Turtle Wintering Areas **Rationale:** Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	Snapping and Midland Painted Turtles. **ELC Community Classes:** SW, MA, OA and SA **ELC Community Series:** FEO and BOO For Northern Map Turtle: Open water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat.	• For most turtles, wintering areas are in the same general area as their core habitat. Water must be deep enough not to freeze and have soft mud substrates. • Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen. • Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.	Midland Painted Turtle **Special Concern:** Northern Map Turtle Snapping Turtle	• Presence of 5 over-wintering Midland Painted Turtles is significant. • One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant. • The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH. • Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (September–October) or spring (March–May). • Congregation of turtles is more common where wintering areas are limited and therefore significant. • **SWHMiST Index #28** provides development effects and mitigation measures for turtle wintering habitat.	No potential within the immediate vicinity of the bridges. Substrates in the immediate vicinity yof all structures consist of gravel, cobble, and sand. Soft mud substrates are absent. Suitable overwintering habitatmay occur in association with pools of Irvine Creek well beyond the structure.
Reptile Hibernaculum	For all snakes, habitat may be found in any ecosite other	• For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural or naturalized locations. The existence of	**Snakes**: Eastern Gartersnake Northern Watersnake	**Studies confirming:**	No potential in the immediate vicinity of bridges 21-WG, 29-WG, and 30-WG. No candidate hibernacula were encountered within the ROW or immediate vicinity,

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Rationale: Generally, sites are the only known sites in the area. Sites with the highest number of individuals are most significant.	than very wet ones. Talus, Rock Barren, Crevice, Cave, and Alvar sites may be directly related to these habitats. Observations or congregations of snakes on sunny warm days in the spring or fall is a good indicator. For Five-lined Skink, ELC Community Series of FOD and FOM and ecosites: FOC1 and FOC3.	features that go below frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH. • Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line. • Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock groundcover. • Five-lined Skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures.	Northern Red-bellied Snake Northern Brownsnake Smooth Green Snake Northern Ring-necked Snake **Special Concern:** Milksnake Eastern Ribbonsnake **Lizard: Special Concern:** (Southern Shield population): Five-lined Skink	• Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. • Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (e.g., foundation or rocky slope) on sunny warm days in Spring (April/May) and Fall (September/October). • **Note**: If there are Special Concern Species present, then site is SWH. • **Note:** Sites for hibernation possess specific habitat parameters (e.g., temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population (i.e., strong hibernation site fidelity). Other critical life processes (e.g., mating) often take place near hibernacula. The feature in which the hibernacula is located plus a 30 m radius area is the SWH. • **SWHMiST Index #13** provides development effects and mitigation measures for snake hibernacula. • Presence of any active hibernaculum for Skink is significant. • SWHMiST Index #37 provides development effects and mitigation measures for five-lined Skink wintering habitat.	Hibernacula features may be supported well beyond the ROW.
Colonially - Nesting Bird Breeding Habitat (Bank & Cliff) **Rationale:** Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow population are	Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles. Cliff faces, bridge abutments, silos, barns. **Habitat found in the following ecosites:** CUM1 CUT1 CUS1 BLO1 BLS1	• Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed permitted aggregate area. • Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles. • Does not include a licensed/permitted Mineral Aggregate Operation.	Cliff Swallow Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies)	**Studies confirming:** • Presence of 1 or more nesting sites with 8 or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season. • A colony identified as SWH will include a 50 m radius habitat area from the peripheral nests. • Field surveys to observe and count swallow nests are to be completed during the breeding season. Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #4** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
declining in Ontario.	BLT1 CLO1 CLS1 CLT1				
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs) **Rationale:** Large colonies are important to local bird population, typically sites are only known colony in area and are used annually.	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	• Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used. • Most nests in trees are 11 to 15 m from ground, near the top of the tree.	Great Blue Heron Black-crowned Night-Heron Great Egret Green Heron	**Studies confirming:** • Presence of 2 or more active nests of Great Blue Heron or other listed species. • The habitat extends from the edge of the colony and a minimum 300 m radius or extent of the Forest ecosite containing the colony or any island <15.0 ha with a colony is the SWH. • Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells. • **SWHMiST Index #5** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present
Colonially - Nesting Bird Breeding Habitat (Ground) **Rationale;** Colonies are important to local bird population, typically sites are only known colony in area and are used annually.	Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1;50,000 NTS map). Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird). MAM1 – 6 MAS1 – 3 CUM CUT	• Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas. • Brewers Blackbird colonies are found loosely on the ground in low bushes in close proximity to streams and irrigation ditches within farmlands.	Herring Gull Great Black-backed Gull Little Gull Ring-billed Gull Common Tern Caspian Tern Brewer's Blackbird	**Studies confirming:** • Presence of > 25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern. • Presence of 5 or more pairs for Brewer's Blackbird. • Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant. • The edge of the colony and a minimum 150 m radius area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0 ha with a colony is the SWH. • Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #6** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present. Breeding records for Brewer's Blackbird are mainly restricted to the north shore of Lake Huron and Georgian Bay, as well as Sudbury/Manitoulin Island and NW Ontario; no breeding records currently exist for Southern and Eastern Ontario.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	CUS				
Migratory Butterfly Stopover Areas **Rationale:** Butterfly stopover areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter.	Combination of ELC Community Series; need to have present one Community Series from each land class. <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate site for butterfly stopover will have a history of butterflies being observed.	• A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present and will be located within 5 km of Lake Erie or Ontario. • The habitat is typically a combination of field and forest and provides the butterflies with a location to rest prior to their long migration south. • The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat. • Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes.	Painted Lady Red Admiral <u>Special Concern</u> Monarch	**Studies confirm:** • The presence of Monarch Use Days (MUD) during fall migration (August/October). MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day, significant variation can occur between years and multiple years of sampling should occur. • Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD. • MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant. • **SWHMiST Index #16** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present. The subject lands are greater than 5 km from Lake Ontario.
Landbird Migratory Stopover Areas **Rationale:** Sites with a high diversity of species as well as high numbers are most significant.	**All ecosites associated with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Woodlots >10 ha in size and within 5 km of Lake Ontario. • If woodlands are rare in an area of shoreline, woodland fragments 2-5 ha can be considered for this habitat. • If multiple woodlands are located along the shoreline those Woodlands <2 km from Lake Ontario are more significant. • Sites have a variety of habitats; forest, grassland and wetland complexes. • The largest sites are more significant. • Woodlots and forest fragments are important habitats to migrating birds, these features located along the shore and located within 5 km of Lake Ontario are Candidate SWH.	All migratory songbirds. Canadian Wildlife Service Ontario website: http://www.ec.gc.ca/nature/default.asp?lang=En&n=421B7A9D-1 All migrant raptors species: *Ontario Ministry of Natural Resources: Fish and Wildlife Conservation Act, 1997.* Schedule 7: Specially Protected Birds (Raptors)	**Studies confirm:** • Use of the habitat by >200 birds/day and with >35 spp with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant. • Studies should be completed during spring (April/May) and fall (August/October) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #9** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present. The subject lands are greater than 5 km from Lake Ontario.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Deer Yarding Areas **<u>Rationale:</u>** Winter habitat for deer is considered to be the main limiting factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range.	**Note:** MNRF to determine this habitat. **ELC Community Series** providing a thermal cover component for a deer yard would include: FOM FOC SWM SWC **Or these ELC ecosites:** CUP2 CUP3 FOD3 CUT	• Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20 cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30 cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter. • The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%. • MNRF determines deer yards following methods outlined in "Selected Wildlife and Habitat Features: Inventory Manual". • Woodlots with high densities of deer due to artificial feeding are not significant.	White-tailed Deer	**No Studies Required:** • Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40 cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH. • Deer Yards are mapped by MNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by MNRF will be available at local MNRF offices or via Land Information Ontario (LIO). • Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area, then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • SWHMiST Index #2 provides development effects and mitigation measures.	Confirmed present. Stratum 2 overwintering habitat confirmed present in associatopm with Bridge 30-WG east of Sideroad 15. Deer overwintering habitat has not been identified in association with bridges 21-WG and 29-WG.
Deer Winter Congregation Areas **Rationale:** Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in	**All Forested ecosites with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Woodlots will typically be >100 ha in size. Woodlots <100 ha may be considered as significant based on MNRF studies or assessment. • Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands. • If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule. • Large woodlots > 100 ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha. • Woodlots with high densities of deer due to artificial feeding are not significant.	White-tailed Deer	**Studies confirm:** • Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF. • Use of the woodlot by white- tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNRF. • Studies should be completed during winter (January/February) when >20 cm of snow is on the ground using aerial survey techniques, ground or road surveys. or a pellet count deer density survey. • If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding	Confirmed present. Stratum 2 overwintering habitat confirmed present in associatopm with Bridge 30-WG east of Sideroad 15. Swamp and forested communities that occur in association with Irvine Creek span >100ha. Deer overwintering habitat have not been identified in association with bridges 21-WG and 29-WG.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions.	Conifer plantations much smaller than 50 ha may also be used.			area, then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • **SWHMiST Index #2** provides development effects and mitigation measures.	
Table 1.2.1: Rare Vegetation Communities					
Cliffs and Talus Slopes **Rationale:** Cliffs and Talus Slopes are extremely rare habitats in Ontario.	**Any ELC ecosite within Community Series:** TAO CLO TAS CLS TAT CLT	• A Cliff is vertical to near vertical bedrock >3 m in height. • A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris.		• Most cliff and talus slopes occur along the Niagara Escarpment. • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes. • **SWHMiST Index #21** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present. The Niagara Escarpment is not present in the EIS study area.
Sand Barren **Rationale;** Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry.	**ELC ecosites:** SBO1 SBS1 SBT1 Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always ≤ 60%.	• Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered, but less than 60%.		• A sand barren area >0.5 ha in size. • Confirm any ELC Vegetation Type for Sand Barrens. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #20** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present.
Alvar **Rationale;** Alvars are extremely rare	ALO1 ALS1 ALT1 FOC1 FOC2	• An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss		**Field studies that identify:** • An Alvar site > 0.5 ha in size. • Four of the five Alvar Indicator Species at a Candidate Alvar site is Significant.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
habitats in Ecoregion 6E.	CUM2 CUS2 CUT2-1 CUW2 **Five Alvar Indicator Species:** *Carex crawei* *Panicum philadelphicum* *Eleocharis compressa* *Scutellaria parvula* *Trichostema brachiatum* These indicator species are very specific to Alvars within Ecoregion 6E.	associations to grasslands and shrublands and comprising a number of characteristic or indicator plants. Undisturbed alvars can be phyto- and zoogeographically diverse, supporting many uncommon or are relict plant and animal species. Vegetation cover varies from patchy to barren with a less than 60% tree cover. • Alvar is particularly rare in Ecoregion 6E where the only known sites are found in the western islands of Lake Erie.		• Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses. • **SWHMiST Index #17** provides development effects and mitigation measures.	
Old Growth Forest **Rationale;** Due to historic logging practices and land clearance for agriculture, old growth forest is rare in the Ecoregion 6E.	**Forest Community Series:** FOD FOC FOM SWD SWC SWM	Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris.		**Field Studies will determine:** • If dominant trees species are >140 years old, then the area containing these trees is SWH. • The forested area containing the old growth characteristics will have experienced no recognizable forestry activities (cut stumps will not be present). • The area of forest ecosites combined or an eco-element within an ecosite that contains the old growth characteristics is the SWH. • Determine ELC vegetation types for the forest area containing the old growth characteristics. • **SWHMiST Index #23** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present.
Savannah **Rationale:**	TPS1 TPS2 TPW1	A Savannah is a tallgrass prairie habitat that has tree cover between 25–60%.		**Field studies confirm:**	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Savannahs are extremely rare habitats in Ontario.	TPW2 CUS2			• No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH. • One or more of the Savannah indicator species listed in Appendix N should be present. **Note**: Savannah plant spp. list from Ecoregion 6E should be used. • Area of the ELC ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #18** provides development effects and mitigation measures.	
Tallgrass Prairie **Rationale:** Tallgrass Prairies are extremely rare habitats in Ontario.	TPO1 TPO2	• No minimum size to site. Site must be restored or a natural site. Remnant sites such as railway Right of Ways (ROW) are not considered to be SWH. • A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover.		**Field studies confirm:** • One or more of the Prairie indicator species listed in Appendix N should be present. **Note:** Prairie plant spp. list from Ecoregion 6E should be used. • Area of the ELC ecosite is the SWH. • Site must not be dominated by exotic or introduced species (<50% vegetative cover is exotic sp.). • **SWHMiST Index #19** provides development effects and mitigation measures.	No potential within the Study Area. The habitat criteria for Significant Wildlife Habitat is not present.
Other Rare Vegetation Communities **Rationale:** Plant communities that often contain rare species which depend on the habitat for survival.	• Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG. • Any ELC ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH.	Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps.		• ELC ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in Appendix M. • The MNRF/Natural Heritage Information Centre (NHIC) will have up to date listing for rare vegetation communities. **Field studies should confirm:** • If an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG. • Area of the ELC Vegetation Type polygon is the SWH. • **SWHMiST Index #37** provides development effects and mitigation measures.	No potential within the Study Area. No rare vegetation communities were identified during ELC field surveys.

Table 1.2.2: Specialized Habitats for Wildlife considered Significant Wildlife Habitat

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Waterfowl Nesting Area **Rationale;** Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant.	**All upland habitats located adjacent to these wetland ELC ecosites are Candidate SWH:** MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SWT1 SWT2 SWD1 SWD2 SWD3 SWD4 Note: includes adjacency to Provincially Significant Wetlands (PSW).	• A waterfowl nesting area extends 120 m from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120 m or a cluster of 3 or more small (<0.5 ha) wetlands within 120 m of each individual wetland where waterfowl nesting is known to occur. • Upland areas should be at least 120 m wide so that predators such as racoons, skunks, and foxes have difficulty finding nests. • Wood Ducks and Hooded Mergansers utilize large diameter trees (>40 cm dbh) in woodlands for cavity nest sites.	American Black Duck Northern Pintail Northern Shoveler Gadwall Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Mallard	**Studies confirmed:** • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. • **SWHMiST Index #25** provides development effects and mitigation measures.	No potential within the Study Area. The ecosite codes are not present and the habitat criteria for Significant Wildlife Habitat is not present.
Bald Eagle & Osprey Nesting, Foraging & Perching Habitat **Rationale;** Nest sites are fairly uncommon in Eco-region 6E and are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and	**ELC Forest Community Series:** FOD FOM FOC SWD SWM and SWC (directly adjacent to riparian areas – rivers, lakes, ponds and wetlands.	• Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water. • Osprey nests are usually at the top of a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree’s canopy. • Nests located on man-made objects are not to be included as SWH (e.g., telephone poles and constructed nesting platforms).	Osprey **Special Concern** Bald Eagle	**Studies confirm the use of these nests by**: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800 m is dependent on-site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant.	Moderate potential. The forest and swamp communities that occur in association with bridge 30-WG and the FODM7 community in association with bridge 29-WG may support Bald Eagle & Osprey Nesting, Foraging & Perching Habitat. Neither Bald Eagle or Osprey were recorded during either of Burnside’s site visits.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
scarcity of habitat.				• Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid-March to mid-August. • Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects". • **SWHMiST Index #26** provides development effects and mitigation measures.	
Woodland Raptor Nesting Habitat **Rationale:** Nests sites for these species are rarely identified; these are area sensitive habitats and are often used annually by these species.	May be found in all forested ELC ecosites. **May also be found in:** SWC SWM SWD and CUP3	• All natural or conifer plantation woodland/forest stands >30 ha with >10ha of interior habitat. Interior habitat determined with a 200 m buffer. • Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Coopers Hawk nest along forest edges sometimes on peninsulas or small off-shore islands. • In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.	Northern Goshawk Cooper's Hawk Sharp-shinned Hawk Red-shouldered Hawk Barred Owl Broad-winged Hawk	**Studies confirm:** • Presence of 1 or more active nests from species list is considered significant. • Red-shouldered Hawk and Northern Goshawk – A 400 m radius around the nest or 28 ha area of habitat is the SWH (the 28 ha habitat area would be applied where optimal habitat is irregularly shaped around the nest). • Barred Owl – A 200 m radius around the nest is the SWH. • Broad-winged Hawk and Coopers Hawk– A 100 m radius around the nest is the SWH. • Sharp-Shinned Hawk – A 50 m radius around the nest is the SWH. • Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area. • **SWHMiST Index #27** provides development effects and mitigation measures.	Interior forest habitat is not supported within the Study Area. The forest and swamp communities that occur in association with bridge 30-WG may contribute to contiguous treed lands beyond the Study Area that support interior forest habitat.
Turtle Nesting Areas **Rationale;** These habitats are rare and when identified will often be the only breeding site for local populations of turtles.	**Exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within the following ELC ecosites:** MAS1 MAS2 MAS3 SAS1 SAM1	• Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals. • For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH. • Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.	Midland Painted Turtle <u>Special Concern Species:</u> Northern Map Turtle Snapping Turtle	**Studies confirm:** • Presence of 5 or more nesting Midland Painted Turtles. • One or more Northern Map Turtle or Snapping Turtle nesting is a SWH. • The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100 m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH. • Travel routes from wetland to nesting area are to be considered within the SWH as part of the 30-100 m area of habitat.	No potential on the Study Area . The habitat criteria for Significant Wildlife Habitat is not present at any of the three bridges.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	SAF1 BOO1 FEO1			• Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method. • **SWHMiST Index #28** provides development effects and mitigation measures for turtle nesting habitat.	
Seeps and Springs **Rationale:** Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams.	Seeps/Springs are areas where ground water comes to the surface. Often, they are found within headwater areas within forested habitats. Any forested ecosite within the headwater areas of a stream could have seeps/springs.	• Any forested area (with <25% meadow/field/ pasture) within the headwaters of a stream or river system. • Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species.	Wild Turkey Ruffed Grouse Spruce Grouse White-tailed Deer Salamander spp.	**Field Studies confirm:** • Presence of a site with 2 or more seeps/springs should be considered SWH. • The area of a ELC forest ecosite or an ecoelement within ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat. • **SWHMiST Index #30** provides development effects and mitigation measures.	Moderate potential to be supported in association with the swamp communities present in association with the swamp communities of bridge 30-WG.
Amphibian Breeding Habitat (Woodland) **Rationale:** These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations.	All ecosites associated with these ELC Community Series: FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to	• Presence of a wetland, pond or woodland pool (including vernal pools) >500 m^2 (about 25 m diameter) within or adjacent (within 120 m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat.	Eastern Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper Western Chorus Frog Wood Frog	**Studies confirm:** • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Codes of 3. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230 m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. • **SWHMiST Index #14** provides development effects and mitigation measures.	Moderate potential to be supported in association with the swamp communities present in association with the swamp communities of bridge 30-WG.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
	migrating amphibians.				
Amphibian Breeding Habitat (Wetlands) **Rationale;** Wetlands supporting breeding for these amphibian species are extremely important and fairly rare within Central Ontario landscapes.	**ELC Community Classes:** SW MA FE BO OA and SA. Typically, these wetland ecosites will be isolated (>120 m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g., Bull Frog) may be adjacent to woodlands.	• Wetlands >500 m^2 (about 25 m diameter), supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats. • Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators. • Bullfrogs require permanent water bodies with abundant emergent vegetation.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	**Studies confirm:** • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3 or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. • If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule. • **SWHMiST Index #15** provides development effects and mitigation measures.	No potential within the Study Area. Suitable wetland communities are not suitably large to meet the criteria for SWH.
Woodland Area-Sensitive Bird Breeding Habitat **Rationale:** Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior	**All ecosites associated with these ELC Community Series:** FOC FOM FOD SWC SWM SWD	• Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs. old) forest stands or woodlots >30 ha. • Interior forest habitat is at least 200 m from forest edge habitat.	Yellow-bellied Sapsucker Red-breasted Nuthatch Veery Blue-headed Vireo Northern Parula Black-throated Green Warbler Blackburnian Warbler Black-throated Blue Warbler Ovenbird Scarlet Tanager Winter Wren **Special Concern:** Cerulean Warbler Canada Warbler	**Studies confirm:** • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species. • **Note**: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH. • Conduct field investigations in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #34** provides development effects and mitigation measures.	Interior forest habitat is not supported within the Study Area. The forest and swamp communities that occur in association with bridge 30-WG may contribute to contiguous treed lands beyond the Study Area that support interior forest habitat. The following indicator species were incidentally encountered during Burnside’s site visit at Structure 30-WG: • Black-and-White Warbler • Black-throated Green Warbler

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
forest song birds.					
Table 1.3: Habitat for Species of Conservation Concern considered Significant Wildlife Habitat					
Marsh Breeding Bird Habitat **Rationale;** Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes.	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 **For Green Heron:** All SW, MA and CUM1 sites	• Nesting occurs in wetlands. • All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present. • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.	American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe Marsh Wren Sedge Wren Common Loon Sandhill Crane Green Heron Trumpeter Swan **Special Concern:** Black Tern Yellow Rail	**Studies confirm:** • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes breeding by any combination of 5 or more of the listed species. • **Note**: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #35** provides development effects and mitigation measures.	Moderate potential. May be supported in association with the MAM community within the Study Area associated with bridge 30-WG.
Open Country Bird Breeding Habitat **Rationale;** This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records.	CUM1 CUM2	• Large grassland areas (includes natural and cultural fields and meadows) >30 ha. • Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e., no row cropping or intensive hay or livestock pasturing in the last 5 years). • Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older. • The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.	Upland Sandpiper Grasshopper Sparrow Vesper Sparrow Northern Harrier Savannah Sparrow **Special Concern** Short-eared Owl	**Field Studies confirm:** • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST Index #32** provides development effects and mitigation measures.	No potential within the Study Area. The ecosites and the habitat criteria for Significant Wildlife Habitat are not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Shrub/Early Successional Bird Breeding Habitat **Rationale;** This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records.	CUT1 CUT2 CUS1 CUS2 CUW1 CUW2 Patches of shrub ecosites can be complexed into a larger habitat for some bird species.	• Large field areas succeeding to shrub and thicket habitats >10 ha in size. • Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e., no row-cropping, haying or live-stock pasturing in the last 5 years). • Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species. • Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.	**Indicator Spp:** Brown Thrasher Clay-coloured Sparrow **Common Spp.** Field Sparrow Black-billed Cuckoo Eastern Towhee Willow Flycatcher **Special Concern:** Yellow-breasted Chat Golden-winged Warbler	**Field Studies confirm:** • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as SWH. • The area of the SWH is the contiguous ELC ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • **SWHMiST cxlix Index #33** provides development effects and mitigation measures.	No potential within the Study Area. The ecosites and the habitat criteria for Significant Wildlife Habitat are not present.
Terrestrial Crayfish **Rationale:** Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SWD SWT SWM CUM1 with inclusions of above meadow marsh or swamp ecosites can be used by terrestrial crayfish.	• Wet meadow and edges of shallow marshes (no minimum size) should be surveyed for Terrestrial Crayfish. • Constructs burrows in marshes, mudflats, meadows, the ground can’t be too moist. Can often be found far from water. • Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.	Chimney or Digger Crayfish (*Fallicambarus fodiens*) Devil Crayfish or Meadow Crayfish (*Cambarus diogenes*)	**Studies Confirm:** • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. **Note** the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. • **SWHMiST Index #36** provides development effects and mitigation measures.	Confirmed asbent within the Study Area in the immediate vicinity of the bridges. May be supported in the following communities well beyond Bridge 30-WG: • SWDM4 • MAM
Special Concern and	All plant and animal Element	When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal	**Studies Confirm:**	Candidate Habitat for the following: • Monarch (SC)

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
Rare Wildlife Species **Rationale:** These species are quite rare or have experienced significant population declines in Ontario.	Occurrences (EO) within a 1 or 10 km grid. Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy.	species; linking candidate habitat on the site needs to be completed to ELC ecosites.	species. Lists of these species are tracked by the NHIC.	• Assessment/inventory of the site for the identified Special Concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g., specific nesting habitat or foraging habitat. • **SWHMiST Index #37** provides development effects and mitigation measures.	• Canada Warbler (SC) • Eastern Wood-pewee (SC) • Wood Thrush (SC) • Snapping Turtle (SC) Confirmed present within the Study Area • Snapping Turtle (SC) in association with Bridge 30-WG
Table 1.4.1: Animal Movement Corridors					
Amphibian Movement Corridors **Rationale;** Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations.	Corridors may be found in all ecosites associated with water. Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1.	• Movement corridors between breeding habitat and summer habitat. • Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat–Wetland) of this Schedule.	Eastern Newt American Toad Spotted Salamander Four-toed Salamander Blue-spotted Salamander Gray Treefrog Western Chorus Frog Northern Leopard Frog Pickerel Frog Green Frog Mink Frog Bullfrog	• Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites. • Corridors should consist of native vegetation, with several layers of vegetation. • Corridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant. • Corridors should have at least 15 m of vegetation on both sides of waterway or be up to 200 m wide of woodland habitat and with gaps <20 m. • Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat. • **SWHMiST Index #40** provides development effects and mitigation measures.	No potential within the Study Area, Amphibian Breeding Habitat (wetland) is absent.
Deer Movement Corridors **Rationale:** Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for	Corridors may be found in all forested ecosites. A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors.	Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule. • A deer wintering habitat identified by the MNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion. • Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).	White-tailed Deer	• Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas. • Corridors that lead to a deer wintering habitat should be unbroken by roads and residential areas. • Corridors should be at least 200 m wide with gaps <20 m and if following riparian area with at least 15 m of vegetation on both sides of waterway. • Shorter corridors are more significant than longer corridors, SWHMiST Index #39 provides development effects and mitigation measures.	High potential. Movement corridors may occur in association with Irvine Creek. Stratum 2 overwintering habitat confirmed present in associatopm with Bridge 30-WG east of Sideroad 15.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	**Habitat Criteria**	**Wildlife Species**	**Defining Criteria**	**Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?**
dispersing individuals by minimizing their vulnerability while travelling.					
Table 1.5.1: Significant Wildlife Habitat Exceptions for Ecodistricts within EcoRegion 6E					
6E-14 **Mast Producing Areas** **Rationale:** The Bruce Peninsula has an isolated and distinct population of black bears. Maintenance of large woodland tracts with mast-producing tree species is important for bear.	**All Forested habitat represented by ELC Community Series**: FOM FOD	• Woodland ecosites >30 ha with mast-producing tree species, either soft (cherry) or hard (oak and beech). • Black bears require forested habitat that provides cover, winter hibernation sites, and mast- producing tree species. Forested habitats need to be large enough to provide cover and protection for black bears.	Black Bear	**All woodlands >30 ha with a 50% composition of these ELC Vegetation Types are considered significant:** FOM1-1 FOM2-1 FOM3-1 FOD1-1 FOD1-2 FOD2-1 FOD2-2 FOD2-3 FOD2-4 FOD4-1 FOD5-2 FOD5-3 FOD5-7 FOD6-5 SWHMiST Index #3 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat is not present.
6E- 17 **Lek** **Rationale:** Sharp-tailed grouse only occur on Manitoulin Island in Ecoregion 6E, Leks are an important habitat to maintain their /*population.	CUM CUS CUT	• The Lek or dancing ground consists of bare, grassy or sparse shrubland. There is often a hill or rise in topography. • Leks are typically a grassy field/meadow >15 ha with adjacent shrublands and >30 ha with adjacent deciduous woodland. Conifer trees within 500 m are not tolerated. • Grasslands (field/meadow) are to be >15 ha when adjacent to shrubland and >30 ha when adjacent to deciduous woodland. • Grasslands are to be undisturbed with low intensities of agriculture (light grazing or late haying).	Sharp-tailed Grouse	• Studies confirming Lek habitat are to be completed from late March to June. • Any site confirmed with sharp-tailed grouse courtship activities is considered significant. • The field/meadow ELC ecosites plus a 200 m radius area with shrub or deciduous woodland is the Lek habitat. • SWHMiST cxlix Index #32 provides development effects and mitigation measures.	No potential on the subject lands or adjacent lands. The habitat criteria for Significant Wildlife Habitat is not present.

Habitat	CANDIDATE - Significant Wildlife Habitat		CONFIRMED - Significant Wildlife Habitat		
	Ecological Land Classification Ecosite Codes	Habitat Criteria	Wildlife Species	Defining Criteria	Presence of Candidate or Confirmed Habitat on the Subject Lands and/or Adjacent Lands?
		• Leks will be used annually if not destroyed by cultivation or invasion by woody plants or tree planting.			

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Appendix C

Photos

Structure 21-WG

Photo 1:Landscape surrounding the upstream reach. Facing north.

Photo 2: Upstream west riverbank. Facing northwest.

Photo 3: Upstream east riverbank. Facing east.

Photo 4: The upstream's east bank. Facing north.

Structure 21-WG

Photo 5 Outlet of bridge. Facing north.

Photo 6 Downstream west riverbank. Facing south.

Photo 7: Downstream emergent vegetation. Facing south.

Photo 8: Downstream east riverbank. Facing south.

Structure 29-WG

Photo 9: Upstream section. Facing east.

Photo 10: The north bank of the upstream area. Facing east.

Photo 11: The south bank of the upstream area. Facing south.

Photo: 12 Upstream section. Facing south.

Structure 29-WG

Photo 13: Downstream section. Facing west.

Photo 14: The north bank of the downstream area. Facing northwest.

Photo 15: The outlet of the structure. Facing northeast.

Photo 16: The south bank of the downstream area. Facing west.

Structure 30-WG

Photo 17: Upstream section. Facing west.

Photo 18: Upstream section. Facing southwest.

Photo 19: The south bank of the upstream area. Facing west.

Photo 20: Underneath the structure. Facing south

Structure 30-WG

Photo 21: Downstream section. Facing east.

Photo 22: The south bank of the downstream area. Facing southeast.

Photo 23: Inlet of the structure. Facing west.

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A.6 Cultural Heritage Evaluation Report

Peninsula Heritage Ltd.
Archaeology & Built Heritage

Cultural Heritage Evaluation Report, Bridges 21-WG, 29-WG and 30-WG, Township of Centre Wellington, Ontario

Project Number: 2025-0014

Date: June 12, 2025

Prepared For: RJ Burnside & Associates Ltd.
Client Contact: Andrew Dawson
Client Address: 3 Ronell Crescent, Collingwood, Ontario, L9Y 4J6

1.0 Executive Summary

Peninsula Heritage Ltd. (PHL) was retained by R.J. Burnside & Associates Ltd. (RJB) to undertake three Cultural Heritage Evaluation Reports (CHER), on behalf of the Township of Centre Wellington (the Proponent). The bridges are all associated with Irvine Creek, with Bridge 21-WG being located on First Line, and Bridges 29- WG and 30- WG being located on Sideroad 15. At the time of this assessment, 21- WG and 30- WG have been closed to vehicular traffic. Bridge 29- WG remains open to vehicular traffic but has a weight limit and height restriction in place. The Proponent is undertaking the CHER assessment as part of the Township of Centre Wellington Request for Proposal (RFP) #16-25. The Proponent is exploring options for the potential rehabilitation, replacement, or closure and removal of the specified bridges under the Municipal Class Environmental Assessment (MCEA) process.

The purpose of this assessment is to evaluate the Cultural Heritage Value or Interest (CHVI) of the bridges under Ontario Regulation 9/06 (as amended by O. Reg. 569/22) and provide recommendations as to next steps. A site visit was conducted on April 22, 2025, to document the bridges and surrounding landscapes.

Evaluation of the bridge against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified each of the three bridges to meet at least two criteria and to therefore meet the requirement for consideration for Listing under Part IV, Section 27 of the *Ontario Heritage Act* (OHA) or consideration for Designation under Part IV, Section 29 of the OHA.

This assessment also utilized the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (OHBG). The OHBG was developed in 1993 by the Ministry of Transportation (MTO); the current version of the document was revised in 2008 (MTO 2008). While the bridges are not provincially owned, the established assessment guidelines provide a proven methodology by which to assess the potential CHVI of municipally owned and operated bridges. The scoring system requires an overall score of 60 to be achieved before a bridge can be considered to exhibit CHVI. None of the bridges met the MTO bridge assessment threshold for heritage value. Bridges WG-21 and WG-29 each scored 42. Bridge 30-WG scored 47.

Based on the findings of this report it is recommended that the Township of Centre Wellington be presented with this report and that the Township, as representatives of the local community, decide if it wishes to pursue further heritage recognition of the bridge(s) by way of Listing on a municipal heritage register or Designation by municipal By-law, as per the terms of the OHA.

As all three bridges were found to exhibit CHVI and the proposed alterations are being conducted under the MCEA process, the structures will require a Heritage Impact Assessment (HIA) prior to the commencement of alterations.

It is recommended this report be deposited with local archives as a record of the structures.

The *Provincial Planning Statement* (2024) notes that CHVI is identified for cultural heritage resources by communities. Thus, the system by which heritage is administered in Ontario places emphasis on the decision-making of local municipalities regarding matters of heritage. It is hoped that the information presented in this report will be useful in decisions pertaining to the bridge.

2.0 Table of Contents

Figures

Appendices

3.0 Personnel

Christopher Lemon, B.Sc., Dip. Heritage, CAHP	Senior Cultural Heritage Consultant
Jamie Lemon, M.A.	Project Manager, Cultural Heritage Consultant

Acknowledgements

Andrew Dawson	R.J. Burnside & Associates Ltd.
Adam Dickieson	Township of Centre Wellington
Iain Hankinson	MTO Structures Office

4.0 Project Context

Peninsula Heritage Ltd. (PHL) was retained by R.J. Burnside & Associates Ltd. (RJB) to undertake three Cultural Heritage Evaluation Reports (CHER), on behalf of the Township of Centre Wellington (the Proponent). The bridges are all associated with Irvine Creek, with Bridge 21-WG being located on First Line, and Bridges 29- WG and 30- WG being located on Sideroad 15. At the time of this assessment, 21- WG and 30- WG have been closed to vehicular traffic. Bridge 29- WG remains open to vehicular traffic but has a weight limit and height restriction in place. The Proponent is undertaking the CHER assessment as part of the Township of Centre Wellington Request for Proposal (RFP) #16-25. The Proponent is exploring options for the potential rehabilitation, replacement, or closure and removal of the specified bridges under the Municipal Class Environmental Assessment (MCEA) process.

The purpose of this assessment is to evaluate the Cultural Heritage Value or Interest (CHVI) of the bridges under Ontario Regulation 9/06 (as amended by O. Reg. 569/22) and provide recommendations as to next steps. The bridges are not currently Listed or Designated on the Township of Centre Wellington's heritage register. Nor were they identified to be part of Cultural Heritage Landscapes within the Township of Centre Wellington (ASI et al 2021). The three bridges were not previously identified as heritage bridges in the Grand River Watershed heritage bridge inventory (HRC 2013).

This assessment also utilized the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (OHBG). The OHBG was developed in 1993 by the Ministry of Transportation (MTO); the current version of the document was revised in 2008 (MTO 2008). While the bridges are not provincially owned, the established assessment guidelines provide a proven methodology by which to assess the potential CHVI of municipally owned and operated bridges. The MTO evaluation utilizes an evaluative scoring system derived from the criteria outlined in O. Reg. 9/06 (as amended by O. Reg. 569/22) and has been calibrated by the MTO (MTO 2008). The scoring system requires an overall score of 60 to be achieved before a bridge can be considered to exhibit CHVI.

A site visit was conducted on April 22, 2025, to document the bridges and surrounding landscapes. Documentation took the form of high-resolution photographs using a Nikon D5300 DSLR camera and the collection of field notes. The site visit consisted of visual inspection of the bridges from publicly accessible areas. The assessment strategy was derived from the *Canadian Inventory of Historic Buildings* (Parks Canada 1980), *Well Preserved: The Ontario Heritage Foundation Manual on the Principles and Practice of Architectural Conservation* (Fram 2003), the *Guide to Field Documentation* (HABS 2011), and the *Standards and Guidelines for the Conservation of Historic Places in Canada* (Parks Canada 2010).

4.1 Client Contact Information

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Map 1: Location of Bridges

Cultural Heritage Evaluation Report - Bridges 21-WG, 29-WG, 30-WG, Centre Wellington

Peninsula Heritage Ltd.
Archaeology & Built Heritage

Map 2: Location of Bridges on Aerial Image

Peninsula Heritage Ltd.
Archaeology & Built Heritage

5.0 Legislative and Policy Framework

The following provides a review of provincial and municipal legislation and policies designed to protect cultural heritage resources within Ontario and the Township of Centre Wellington. This CHER has been prepared to meet industry best practices, the OHA, the *Planning Act*, and the *Provincial Planning Statement* (2024).

5.1 Provincial Legislation and Policy

5.1.1 Ontario Heritage Act (OHA), Revised July 1, 2024

The OHA was first enacted in 1975, with the current version being Revised Statutes of Ontario (RSO) 1990, and prescribes the legal requirements of regulatory bodies to address, protect and administer heritage within their jurisdiction. The OHA prescribes the criteria by which cultural heritage value of interest is assessed by way of O. Reg. 9/06 (as amended by O. Reg. 569/22).

Under Section 27 of the OHA, the municipal clerk is required to keep a current register of properties of cultural heritage value or interest within the municipality, including properties Designated under Part IV, Section 29 of the OHA. Heritage protections within the OHA fall into the following categories:

- Listed Properties (Part IV, Section 27), minimal protection (60 days interim protection from demolition), potentially candidates for Designation
- Designated Properties (Part IV, Section 29), protection under Municipal By-law
- Heritage Conservation Districts (Part V), protection under Municipal By-law

5.1.2 Planning Act, Revised July 1, 2024

The Planning Act (1990) provides the legislative framework for land use planning in Ontario. Part 1, Section 2 (d) and (r) of the Act identifies matters of provincial interest.

Part I, Section 2

The Minister, the council of a municipality, a local board, a planning board and the Tribunal, in carrying out their responsibilities under this Act, shall have regard to, among other matters, matters of provincial interest such as,

(d) the conservation of features of significant architectural, cultural, historical, archaeological or scientific interest;

(e) the promotion of built form that,

(i) is well-designed,

(ii) encourages a sense of place, and

(iii) provides for public spaces that are of high quality, safe, accessible, attractive and vibrant.

5.1.3 Provincial Planning Statement

The Provincial Policy Statement (PPS), issued under Section 3 of the Planning Act, came into effect on October 20, 2024. The PPS provides policy direction on matters of provincial interest related to land use planning and development and replaced the Provincial Policy Statement (2020) and A Place to Grow: Growth Plan for the Greater Golder Horseshoe (2019). The PPS provides direction for the appropriate regulation for land use and development while protecting resources of provincial interest, and the quality of the natural and built environment, which includes cultural heritage and archaeological resources. These policies are specifically addressed in Section 4.6:

1. Protected heritage property, which may contain built heritage resources or cultural heritage landscapes, shall be conserved.

2. Planning authorities shall not permit development and site alteration on lands containing archaeological resources or areas of archaeological potential unless the significant archaeological resources have been conserved.

3. Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property unless the heritage attributes of the protected heritage property will be conserved.

4. Planning authorities are encouraged to develop and implement:

a) archaeological management plans for conserving archaeological resources; and

b) proactive strategies for conserving significant built heritage resources and cultural heritage landscapes.

5. Planning authorities shall engage early with Indigenous communities and ensure their interests are considered when identifying, protecting and managing archaeological resources, built heritage resources and cultural heritage landscapes.

The Provincial Planning Statement provides the following definitions:

Built heritage resource: means a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community.

Conserved: means the identification, protection, management and use of built heritage resources, cultural heritage landscapes and archaeological resources in a manner that ensures their cultural heritage value or interest is retained. This may be achieved by the implementation of recommendations set out in a conservation plan, archaeological assessment, and/or heritage impact assessment that has been approved, accepted or adopted by the relevant planning authority and/or decision-maker. Mitigative measures and/or alternative development approaches should be included in these plans and assessments.

Cultural heritage landscape: means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings,

structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association.

Heritage attributes: means, as defined under the Ontario Heritage Act, in relation to real property, and to the buildings and structures on the real property, the attributes of the property, buildings and structures that contribute to their cultural heritage value or interest.

Protected heritage property: means property designated under Part IV or VI of the Ontario Heritage Act; property included in an area designated as a heritage conservation district under Part V of the Ontario Heritage Act; property subject to a heritage conservation easement or covenant under Part II or IV of the Ontario Heritage Act; property identified by a provincial ministry or a prescribed public body as a property having cultural heritage value or interest under the Standards and Guidelines for the Conservation of Provincial Heritage Properties; property protected under federal heritage legislation; and UNESCO World Heritage Sites.

Significant: means e) in regard to cultural heritage and archaeology, resources that have been determined to have cultural heritage value or interest. Processes and criteria for determining cultural heritage value or interest are established by the Province under the authority of the Ontario Heritage Act.

5.1.4 Ontario Heritage Bridge Guidelines for Provincially Owned Bridges

The *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (OHBG) were developed in 1993 by the MTO; the current version of the document was revised in 2008 (MTO 2008). While the bridges are not provincially owned, the established assessment guidelines provide a proven methodology by which to assess the potential CHVI of municipally owned and operated bridges. The MTO evaluation utilizes an evaluative scoring system derived from the criteria outlined in O. Reg. 9/06 (as amended by O. Reg. 569/22) and has been calibrated by the MTO (MTO 2008). The scoring system requires an overall score of 60 to be achieved before a bridge can be considered to exhibit CHVI. Appendix B provides the scoring of the bridge.

5.1.5 Municipal Class Environmental Assessment (MCEA) Manual (2023)

The following are relevant excerpts from the MCEA Manual (2023).

“Cultural environment” refers to archaeological resources, built heritage resources and cultural heritage resources in the environment. Areas of archaeological potential must be identified in accordance with the *Ontario Heritage Act*. Relevant terms can be found in the glossary.

Significant cultural heritage resources must be conserved. Where significant cultural heritage resources cannot be avoided, adverse impacts are to be mitigated in accordance with provincial and municipal policies, procedures, best practices and guidelines.

Relevant glossary terms are as follows:

Archaeological resources includes artifacts, archaeological sites and marine archaeological sites, as defined under the *Ontario Heritage Act*. The identification and evaluation of such resources are based upon archaeological fieldwork undertaken in accordance with the *Ontario Heritage Act.*

Areas of archaeological potential Means areas with the likelihood to contain archaeological resources. Criteria to identify archaeological potential are established by the Province. The *Ontario Heritage Act* requires archaeological potential to be confirmed by a licensed archaeologist.

Built heritage resources means a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous Community. Built heritage resources are located on property that may be designated under Parts IV or V of the *Ontario Heritage Act,* or that may be included on local, provincial, federal and/or international registers.

Cultural heritage landscape means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous Community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under *the Ontario Heritage Act*, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.

Cultural heritage resources include built heritage, cultural heritage landscapes, and marine and other archaeological sites. The Minister of Citizenship and Multiculturalism (MCM) is responsible for the administration of the *Ontario Heritage Act* and is responsible for determining policies, priorities and programs for the conservation, protection and preservation of Ontario's heritage, which includes cultural heritage landscapes, built heritage and archaeological resources. MCM has released a series of resource guides on the *Ontario Heritage Act,* entitled the Ontario Heritage Tool Kit.

5.2 Municipal Policies

5.2.1 Township of Centre Wellington Official Plan

Section C.2 of the Official Plan (OP) of the Township of Centre Wellington (consolidated February 2024) outlines four Goals and Objectives to the management of Cultural Heritage Resources:

- *To protect the Township's heritage resources from neglect, deterioration, demolition, alteration, redevelopment or changes in use which threaten their existence or integrity*
- *To encourage and support the functional and economic use of heritage buildings*
- *To identify, and protect and enhance natural areas*
- *To encourage public awareness and appreciation of the heritage resources of the Township and the value of protecting these resources to both residents and visitors*

5.2.2 County of Wellington Official Plan

Section 4.1 of the County of Wellington Official Plan deals with cultural heritage and archaeological resources:

Cultural heritage and archaeological resources form an important and in many cases highly visible part of the community fabric. These resources are a source of civic pride for the residents, a benefit to the local economy through tourism, and are important to our understanding of the settlement of the County. The policies of this Plan, in conjunction with the Ontario Heritage Act, provide a framework for the protection and enhancement of cultural heritage resources in Wellington.

Built Heritage

Wellington has a rich history reflected in many buildings and structures, either individually or in groups, which are considered to be architecturally or historically significant to the community, county, province or country.

Cultural Heritage Landscapes

A cultural heritage landscape is a defined geographical area of heritage significance which has been modified by human activities and is valued by a community. It involves a grouping(s) of individual heritage features such as structures, spaces, archaeological sites and natural elements, which together form a significant type of heritage form, distinctive from that of its constituent elements or parts. Examples may include, but are not limited to, heritage conservation districts designated under the Ontario Heritage Act, and villages, parks, gardens, battlefields, mainstreets and neighbourhoods, cemeteries, trailways and industrial complexes of cultural heritage value.

For cultural heritage landscapes to be significant, they must be valued for the important contribution they make to our understanding of a place, an event, or a people.

Section 4.1.5 provides policy direction related to cultural heritage resources:

a) significant built heritage resources and significant cultural heritage landscapes shall be conserved. Conserved means the identification, protection, use and/or management of heritage and archeological resources in such a way that their heritage values, attributes and integrity are retained. This may be addressed through a conservation plan or heritage impact assessment in accordance with Section 4.6.7.

b) The need for a Heritage Impact Assessment and/or Conservation plan will be based on the heritage attributes or reasons for which the resource is identified as significant, and will normally be identified in pre-consultation on development applications.

c) Wellington County will work with its local municipalities to identify significant cultural heritage landscapes. The identification of significant cultural heritage landscapes shall be implemented through at least one of the following options:

> *i. Added to an Official Plan through an Amendment that shows the resource as an overlay designation on the Schedule, and adds site-specific policies where needed;*

ii. included in the municipal register of properties that Council considers to be of cultural heritage value or interest but have been designated;

iii. Designated under the Ontario Heritage Act.

d) The need for a Heritage Impact Assessment.

e) Wellington will encourage the conservation of significant built heritage resources through heritage designations and planning policies which protect these resources.

f) The re-use of heritage buildings is often a valid means of ensuring their restoration, enhancement or future maintenance. Projects to re-use heritage buildings may be given favourable consideration if the overall results are to ensure the long term protection of a heritage resource and the project is compatible with surrounding land uses and represents an appropriate use of land.

g) Where a property has been identified as a protected heritage property, development and site alteration may be permitted on adjacent lands where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved. Mitigative measures and/or alternative development approaches may be required in order to conserve the heritage attributes of the protected heritage property affected by the adjacent development or site alteration.

h) The County recognizes the important cultural significance of the Grand River as a Canadian Heritage River, and the need to conserve its inherent values.

6.0 Historic Context

6.1 Historic Bridge Building In Ontario

The following summary provides an introduction to historic bridge building in Ontario (Golder 2012:3-4)

> *Bridges over water courses that formed boundaries between townships were always assumed by the County. However, arguments began in the early 19th century – sometimes acrimonious – over the responsibility for building and maintaining bridges over rivers located entirely within a township. The 1866 Municipal Institutions Act stated that county councils were responsible for all bridges over 200 feet long within the county. An 1871 amendment to the Act increased this length to a remarkable 500 feet. Building such large structures was far beyond most townships financial resources. Needless to say, large bridges were relatively rare to the detriment of efficient road travel. The few major bridges constructed in this era were built by the provincial government. Fortunately, at least for townships, by 1883 the defining length of bridges had been reduced to 100 feet.*
>
> *The responsibility for bridge financing became an issue again in the early 20th century. This time it was driven by the cost for building stronger bridges – not longer ones. The economic value to rural communities of good roads, and by extension good bridges, was becoming evident. Nineteenth-century wooden bridges could not carry the weight of heavier wagon and farm equipment coming into use. By the First World War, motor vehicles were becoming increasingly common and the provincial government began to provide grant programs and technical advice on bridge building. At the same time, counties began to create county-wide road networks by assuming the ownership of key township roads and bridges….*
>
> *The technical evolution of bridge designs ran parallel to the economic need for good roads. In southern Ontario most 19th century bridge were built of timber. Very short ones were beam structures; longer spans employed simple trusses, such as King and Queen Post trusses. A few iron truss bridges were built in the 1870s-1880s but were generally too costly to be widely used. Inexpensive steel trusses came into use in the 1890s and the designs were commonly used into the 1930s. The Warren pony truss was a work-horse design for short span, low traffic situations. The Pratt through-truss and the Warren truss dominated in the early 20th century. Somewhat less common was the double-intersection Warren truss. Unusual trusses were used for special bridging needs such as requiring a long single span. Due to the demand for steel trusses, several specialized, local bridge companies came into existence including the Hamilton Bridge Works, Sarnia Bridge Company and the Hunter Bridge and Boiler Company, Kincardine.*
>
> *Instead of building new bridges, structures were sometimes recycled as an inexpensive alternative to new construction…Concrete began to be accepted as a bridge material by the 1920s…In the 1930s the concrete rigid frame became one of the most widely used designs…Concrete is the most common bridging material used today in southern Ontario and employed in a variety of designs including rigid frame and as a composite in pre-stressed and post-tensioned concrete beams.*

In addition to the bridge companies noted above, Charles Mattaini was a well-known local bridge builder who worked in Caledon, Clifford, Fergus, Orangeville, Palmerston, the townships

of Arthur, Erin, Eramosa, Minto, Nichol, West Garafraxa, and the County of Wellington. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini developed the bowstring design for area bridges but utilized other bridge designs as well.

As early as 1911, engineering articles began to provide commentary on the need to improve the aesthetics of bridge design. In an article in The Canadian Engineer in 1939, Victor Murray, an assistant engineer with the Ontario Department of Highways stated “a departure from the strictly functional is no longer considered a sign of weakness…a beautifully designed bridge has a certain value to a community which cannot easily be expressed in dollars, but which pays in the pride that it creates in a community” (Cuming 1983). This observation is relevant today for those who value the cultural heritage value of an aesthetically appealing bridge.

6.2 Design and Construction: Bowstring Arch Concrete Bridges

Bowstring arch bridges, also known as, ‘rainbow arch bridges’, became a defining feature of Wellington County’s early 20th-century infrastructure. These bridges were popular for their elegant, curved design and structural efficiency, particularly in rural areas where moderate-span crossings were needed. The name “rainbow arch” comes from the characteristic arching form of the main support structure, which resembles a rainbow spanning the road below. This style was part of a broader trend in North America in the early 1900s, as reinforced concrete began to replace timber and steel in smaller bridge construction. In Wellington County, the adoption of these bridges was part of a larger modernization effort in transportation infrastructure.

One of the key figures in the development and proliferation of bowstring arch bridges in Wellington County was Charles Mattaini, an Italian-born engineer who worked for the Department of Roads in the early 20th century. Mattaini was instrumental in designing and overseeing the construction of many of the county’s concrete bowstring bridges between the 1920s and 1940s. His designs were both structurally sound and aesthetically pleasing, emphasizing clean lines, graceful curves, and the use of local materials. Mattaini’s contributions left a lasting legacy in the region, with many of his bridges still standing today, serving both functional and heritage roles. Bridge drawings for Bridges 21-WG and 29-WG were produced by A.W. Connor & Co. Engineers of Toronto, Ontario (Appendix C). Although not involved in the specific engineering for Bridges 21-WG and 29-WG, the bowstring arch design reflects the work of Charles Mattaini, who introduced and popularized the bowstring arch design in Ontario.

The typical bowstring arch bridge designed by Mattaini in Wellington County consisted of a reinforced concrete arch that rises above the deck, with vertical hangers or suspenders connecting the arch to the roadway below. This load-bearing configuration is highly efficient, allowing the weight of traffic to be transferred through the vertical members into the arch, and from there to the foundations. These bridges usually have a narrow deck, often just a single lane wide, with simple concrete guardrails. The arch itself is parabolic or elliptical in shape and often includes formwork impressions or minimal decorative elements that reflect Mattaini's eye for subtle design.

Bowstring arch bridges are easily identified by way of their distinctive features. The most obvious being the prominent symmetrical concrete arch that rises gracefully above the road surface. The deck is typically low-slung, lying between the arch bases rather than above or on top of them. Today, bowstring arch bridges are appreciated not only for their engineering ingenuity but also as elegant symbols of early 20th-century rural infrastructure.

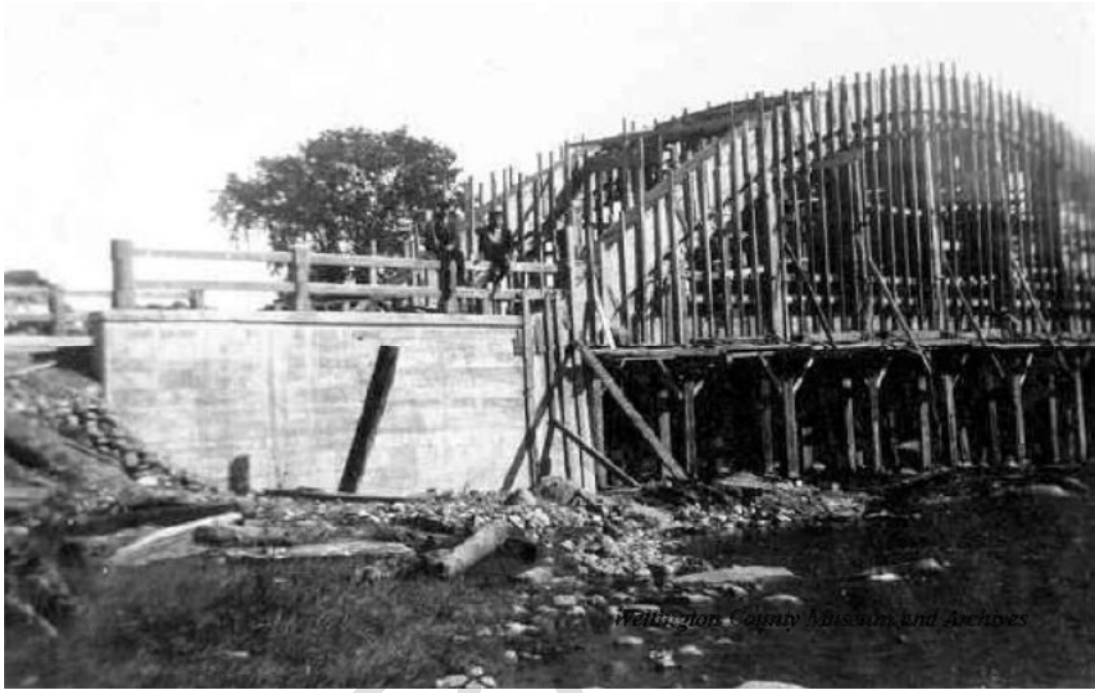

Figure 3: Undated historic image of the construction of a bowstring arch bridge, image 3032 of the Mattaini Fond on file with Wellington County Museum and Archives

Bridge 21-WG and Bridge 29-WG are examples of bowstring arch bridges.

6.3 Design and Construction: Through-Truss Bridges

A through-truss bridge is a type of truss bridge in which the deck, or roadway, passes through the structure of the truss itself, with the main load-bearing trusses positioned on either side of the deck and connected overhead by cross-bracing. This creates a tunnel-like effect, allowing traffic to travel between the vertical truss walls while being enclosed above by a horizontal system of bracing. The design allows for efficient distribution of both vertical and horizontal loads, making it suitable for longer spans and heavier weights, such as those required by railways and major roadways. The open framework of the trusses provides strength while using relatively little material. Through-truss bridges were an economical and practical solution for many civil engineering challenges during the 19th and early 20th centuries.

Through-truss bridges emerged as a pivotal innovation in civil engineering during the 19th century and played a significant role in the expansion of railroads and road networks across the industrialized world. Their origins trace back to the early use of timber trusses, but with the advent of the Industrial Revolution, engineers began experimenting with wrought and cast iron. These materials provided the necessary strength and durability to span longer distances and support heavier loads than wood. The first iron truss bridges appeared in the early 1800s, with

notable examples such as the Iron Bridge in England paving the way for widespread adoption. By the mid-19th century, through-truss designs were commonly used for both railroad and highway bridges across Europe and North America.

The defining characteristic of a through-truss bridge is its structure: the trusses rise above the deck and are connected at the top by lateral bracing, creating a tunnel-like passage for vehicles or trains. This configuration provides excellent load distribution and allows for high clearance beneath the bridge deck, which is essential for accommodating tall vehicles and railcars. The vertical and diagonal members of the truss work together to efficiently transfer loads from the deck to the supports. Iron, being strong in compression and tension (depending on the type), made it an ideal material for these critical structural components.

Iron through-truss bridges typically utilized either cast iron for compression members or wrought iron for tension members, due to their respective mechanical properties. Cast iron is brittle but stronger under compression, while wrought iron is more ductile and performs better under tensile stress. Engineers often combined these two types of iron to optimize performance. Popular truss configurations used in iron bridge construction included the Pratt, Warren, and Howe trusses, each differing in the arrangement and purpose of their diagonal and vertical members. The choice of truss type depended on the span length, the type of loads expected, and the available materials.

By the late 19th and early 20th centuries, steel began to replace iron in bridge construction due to its superior strength and ductility. However, many iron through-truss bridges remain in use or preserved as historic landmarks. Their design represents a significant period in engineering history, reflecting a time when new materials and structural theories were being tested and implemented on a grand scale. These bridges not only embody the ingenuity of 19th-century engineers but also serve as lasting monuments to the early industrial era and the expansion of modern infrastructure.

Bridge 30-WG is an example of a six-panel rivet-connected fixed Pratt through-truss. "Pratt" refers to the truss design, characterized by diagonal members that slope toward the center of the span and are under tension, while vertical members are in compression. This design, first patented in 1844 by Caleb and Thomas Pratt, became one of the most widely used truss types for its efficient handling of loads. The term "6-panel" indicates that the truss is divided into six distinct sections or panels between the end supports. "Rivet-connected" refers to the use of rivets — round-headed metal pins — to fasten the steel members together, a common method of joining structural components before the widespread use of welding. "Fixed" signifies that the bridge is non-movable, unlike swing, lift, or drawbridges, and is anchored in place to support static and dynamic loads.

7.0 Bridge Documentation

7.1 Bridge 21-WG

7.1.1 Setting

Bridge 21-WG is a bowstring arch bridge located northeast of Fergus on First Line, north of Sideroad 15. The bridge crosses the Irvine River and has been closed to vehicular traffic since February 6, 2024. The lands surrounding the bridge are gently rolling and dominated by agricultural use. The bridge blends into its surroundings and contributes to the rural character of the area.

Figure 4: Bridge 21-WG as seen from the intersection of First Line and Sideroad 15, looking north

Figure 5: View of Irvine River from Bridge 21-WG, looking east

Figure 6: View of Irvine River from Bridge 21-WG, looking west

7.1.2 Documentation

Figure 7: West side of Bridge 21-WG, looking east

Figure 8: East side of Bridge 21-WG, looking northwest

Figure 9: Northern approach to Bridge 21-WG, looking south

Figure 10: Southern approach to Bridge 21-WG, looking north

Figure 11: Western arch of Bridge 21-WG

Figure 12: Eastern arch of Bridge 21-WG

Figure 13: Underside of road deck of Bridge 21-WG and southern abutment

Figure 14: Underside of road deck of Bridge 21-WG and northern abutment

Figure 15: Typical example of abutment wing, note visible impressions of planking used in the forming process and the separations between lifts of concrete

Figure 16: Close up of detail cast into arch and associated supports and guardrail, west side

Figure 17: Close up of detail cast into arch and associated supports and guardrail, exterior of east side

Figure 18: Retrofit steel 'I' Beam used to replace original upper cord tie

Figure 19: Close up of typical recessed 'floret' cast into guard rail supports

Figure 20: Example of concrete spalling revealing underlying steel reinforcement material

Figure 21: Example of smooth round reinforcement bar used in construction of guardrails

Figure 22: Example of smooth square reinforcement bar used in vertical support members

7.2 29-WG

7.2.1 Setting

Bridge 29-WG is a bowstring arch bridge located northeast of Fergus on Sideroad 15. The bridge provided egress across the Irvine River. The bridge's location results in a curve in Sideroad 15 which is otherwise straight. The bridge is located within a small valley and is largely obscured from view from any distance. At the time of assessment, the bridge remained open to vehicular traffic but was subject to load and height restrictions. The lands surrounding the bridge are gently rolling and dominated by agricultural use. The bridge blends into its surroundings and contributes to the rural character of the area.

Figure 23: Eastern approach to Bridge 29-WG, looking east

Figure 24: Western approach to Bridge 29-WG, looking west

Figure 25: View of Irvine River from north side of bridge, looking north

Figure 26: View of Irvine River from south side of bridge, looking south

7.2.2 Documentation

Figure 27: North side of Bridge 29-WG

Figure 28: Southside of Bridge 29-WG

Figure 29: West approach to Bridge 29-WG

Figure 30: Underside of Bridge 29-WG, note presence of imprints of original wood forms

Figure 31: Bridge deck

Figure 32: Example of connection between Bridge 29-WG abutments and superstructure

Figure 33: West bridge abutment

Figure 34: Original cast concrete tie beam

Figure 35: Typical example of the details present in the original guard rail and support structure

Figure 36: Focus on detail cast into arch and associated supports and guardrail, exterior of north side

Figure 37: Example of exfoliated concrete exposing underlying smooth steel reinforcement

Figure 38: Two names carved into the concrete, census records suggest both were labourers involved in the construction of Bridge 29-WG

7.3 Bridge 30-WG

7.3.1 Setting

Bridge 30- WG is a six-panel rivet-connected fixed Pratt through-truss bridge located northeast of Fergus on Sideroad 15. The bridge provides egress over the Irvine River. The bridge is located within a valley and is clearly visible from the rim of the valley. At the time of assessment, the bridge was closed to vehicular traffic. Communication with a local resident indicated the bridge has been closed for an extended period of time since it was damaged following a collision with piece of heavy equipment that was being trailered. The lands surrounding the bridge are tree covered and were swampy at that time of assessment. The bridge blends into its surroundings and contributes to the rural character of the area.

Figure 39: View of Bridge 30-WG from break in slope on Sideroad 15, facing east

Figure 40: Eastern approach to Bridge 30-WG

7.3.2 Documentation

Figure 41: South side of Bridge 30-WG

Figure 42: North side of Bridge 30-WG

Figure 43: Eastern end of bridge which has been subject to previous restoration, with major structural components having been replaced and fastened with bolts and nuts

Figure 44: Western approach to bridge which exhibits deformation due to past collision with heavy equipment

Figure 45: Side view of west end damage

Figure 46: Condition of road surface

Figure 47: Underside of bridge deck, multiple signs of past repairs as evident by the use of modern bolt and not fasteners

Figure 48: Example of typical deterioration of structural steel

Figure 49:Example of original riveted construction

Figure 50: Example of past repair as seen on northwest corner of bridge

Figure 51: Non-original guard rail installed using modern welding techniques

Figure 52: Example of superstructure as seen on northeast corner of bridge

Figure 53: Example of original riveted construction and later bolt and nut repair

Figure 54 Maker's mark identifying original steel to be a product of ' Carnegie USA'

Carnegie Steel Company, often stylized historically as "Carnegie Steel USA," was one of the most influential and powerful steel companies in American history. Founded by industrialist Andrew Carnegie in the late 19th century, the company played a pivotal role in the rapid industrialization of the United States. Carnegie Steel revolutionized steel production by adopting the Bessemer process, which allowed for the mass production of high-quality steel at a much lower cost. This innovation helped fuel the construction of railroads, bridges, and skyscrapers during the Gilded Age. Based in Pittsburgh, Pennsylvania, the company became a cornerstone of the American steel industry and one of the largest manufacturing enterprises of its time. In 1901, Carnegie sold the company to financier J.P. Morgan, who merged it into U.S. Steel, the first billion-dollar corporation in the world. Carnegie Steel's legacy is deeply embedded in American industrial history, both for its contributions to infrastructure and for its role in shaping labour relations and corporate capitalism.

Figure 55: Maker's mark identifying original steel to be a product of 'INLAND'

The Inland Steel Company was a major American steel producer based in East Chicago, Indiana, and played a significant role in the development of the U.S. steel industry throughout the 20th century. Founded in 1893, Inland Steel grew rapidly during the industrial boom of the early 1900s, becoming known for its innovation, quality, and vertically integrated operations, which included mining, transportation, and steel manufacturing. The company was especially prominent in the production of sheet steel, which was widely used in the automotive, appliance, and construction industries. Inland Steel also gained a reputation for progressive labor practices and modern management. In 1998, the company was acquired by Ispat International, and the Inland name was removed from active use.

8.0 Assessment of Existing Condition

8.1 Bridge 21- WG Current Condition

Note: the following condition assessment does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The bowstring arch bridge identified as 21-WG is currently closed to vehicular traffic. The bridge remains passable by foot traffic and is visually in fair condition. The bridge was constructed c.1928 and is constructed of cast in place reinforced concrete. The current bridge replaced an early wooden bridge and original design schematics show the extant bridge to have reused the previous bridges abutments (Appendix C). Plans show that the southern abutment was reinforced at the time of 21-WG's construction by way of underpinning in order to compensate for the northward lean of the abutment, a lean that remained prominent at the time of site visit.

Site inspection found 21-WG to be fair overall condition based on the age of the structure and its retention of many of its as-built features. A notable departure from its as-built condition is the replacement of the original elliptical concrete tie brace with a modern steel 'I' beam. The original tie brace was damaged in 2012 after a vehicle strike. The steel beam bracing was installed in early 2013.

21- WG does show signs of delamination of concrete in areas resulting in the exposure of the underlying reinforcement bar.

Overall, Bridge 21-WG presents as a surviving example of a bowstring arch bridge, a prominent style of bridge constructed in Garafraxa Township, now the Township of Centre Wellington, in the early 20th century. The structure has visible degradation, which is not uncommon considering the structure has been in use and exposed to the elements for nearly a century. The state of deterioration and the increased load demands of modern vehicles would indicate that rehabilitation or replacement of the structure is likely required for the structure to reinstate this bridge for its current intended use as a vehicular bridge.

The 2024 Municipal Structure Inspection Form report for the bridge recommended structure replacement within 1-5 years (Appendix D).

8.2 Bridge 29-WG Current Condition

Note: the following condition assessment does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The bowstring arch bridge identified as 29-WG is currently in active use by vehicular traffic but has been subject to weight and height restrictions. The bridge was constructed c.1928 and is constructed of cast in place reinforced concrete. The current bridge replaced an early wooden bridge and original design schematics show previous abutments were removed (Appendix C).

Site inspection found Bridge 29-WG to be fair overall condition based on the age of the structure and its retention of many of its as-built features. The addition of modern height restriction markers detracts from the overall design of the structure.

Bridge 29-WG show signs of delamination of concrete in areas resulting in the exposure of the underlying reinforcement bar. This delamination is most pronounced at the base of the bowstring on the northeast corner.

Overall, the Bridge 29-WG presents as a surviving example of a bowstring arch bridge, a prominent style of bridge constructed in Garafraxa Township, now Township of Centre Wellington, in the early 20th century. The structure has visible degradation, which is not uncommon considering the structure has been in use and exposed to the elements for nearly a century. The state of deterioration and the increased load demands of modern vehicles would indicate that rehabilitation or replacement of the structure is likely required for the structure to reinstate this bridge for its current intended use as a vehicular bridge.

The 2024 Municipal Structure Inspection Form report for the bridge recommended structure replacement within 1-5 years (Appendix D).

8.3 Bridge 30-WG Current Condition

Note: the following condition assessment does not serve as an assessment by qualified engineer and must not be taken as an assessment of the overall structural integrity of the bridge.

The riveted steel fixed through-truss bridge identified as 30-WG is currently closed to vehicular traffic but remains accessible to foot traffic. Bridge 30-WG presents as a surviving example of a once prevalent bridge design. The 2024 Municipal Structure Inspection Form identified the bridge to have been constructed in 1942, which would indicate it is a late example of the style.

Bridge 30-WG shows signs of advanced oxidation and structural decay at key structural points resulting from prolonged exposure to the elements. Visual assessment of the structure identified multiple occurrences of structural repair including the replacement of a large portion of the eastern end of the bridge. The galvanized corrugated steel deck pans supporting the concrete deck indicate the current deck is not original to the structure. The western end of the bridge was found to be suffering from unrepaired structural damage resulting from vehicular impact.

Overall, Bridge 30-WG presents as being in poor structural condition but continues to serve as a monument to the historic use of riveted steel through-truss bridges.

The 2024 Municipal Structure Inspection Form report for the bridge recommended major rehabilitation/replacement be undertaken (Appendix D).

9.0 O. Reg. 9/06 Evaluations

O. Reg. 9/06 (as amended by O. Reg. 569/22) prescribes the criteria for determining the CHVI of a property/structure. As of January 1, 2023, the regulation requires that, to be considered a candidate for Designation under Section 29 of the OHA, a property/structure must meet "two or more" of the criteria listed in O. Reg. 9/06. To be a candidate for Listing, a property/structure must meet "one or more" of the criteria listed in O. Reg. 9/06. The nine criteria and associated evaluation are listed and assessed below.

The evaluation under O. Reg. 9/06 (as amended by O. Reg. 569/22) was completed in consultation with guidance for heritage evaluation and the broader descriptions of the O. Reg. 9/06 (as amended by O. Reg. 569/22) criteria, provided by the Government of Ontario in Section 5.7 (Explanation of Ontario Regulation 9/06) of *Heritage Property Evaluation: A Guide to Listing, Researching and Evaluating Cultural Heritage Property in Ontario Communities* (2021).

9.1 Bridge 21-WG O. Reg. 9/06 Evaluation

1. The property has design value or physical value because it is a rare, unique, representative or early example of a style, type, expression, material or construction method. (Criteria Met)

Bridge 21-WG is a surviving example of a cast in place reinforced concrete bowstring arch bridge. The bridge largely retains its as-built configuration including retention of its original guardrail. The presence of bowstring arch bridges in Centre Wellington was a defining feature of the area. Bridge 21-WG stands as a rare surviving example of that style. Based on the nature of the design it is deemed to meet the O. Reg. 9/06 criteria for design value or physical value as a representative (serving as a portrayal of symbol) example of the style.

2. The property has design value or physical value because it displays a high degree of craftsmanship or artistic merit. (Criteria Not Met)

Bridge 21-WG does present with design value for its overall artistic merit but does not demonstrate craftsmanship at a level well above industry standard at the time of construction.

3. The property has design value or physical value because it demonstrates a high degree of technical or scientific achievement. (Criteria Not Met)

Bridge 21-WG does not demonstrate a high degree of technical or scientific achievement. Its design and construction were common in the early 20th century, particularly in the current Township of Centre Wellington. Overall, Bridge 21- WG does not demonstrate technical or scientific achievement at a level well above industry standard

4. The property has historical value or associative value because it has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community. (Criteria Met)

Bridge 21-WG has a direct association to the theme of widespread transportation improvement programs of the early 20th century. The bridge is a functional example of a bowstring arch bridge which was historically significant to Centre Wellington. The design is

linked to local Fergus architect Charles Mattaini who is known to have popularized the bowstring arch design in Ontario. While no records found support Bridge 21-WG was designed or built by Mattaini, its design reflects Mattaini's influence in bridge design.

5. The property has historical value or associative value because it yields, or has the potential to yield, information that contributes to an understanding of a community or culture. (Criteria Not Met)

Bridge 21-WG was designed by A.W. Connor & Co. Engineers, an engineering firm located in Toronto, Ontario. A.W. Connor & Co. Engineers were involved in the design of numerous bridges and there is no indication Bridge 21-WG has the potential to yield new information that would contribute to the understanding of their work, or of a community or culture.

6. The property has historical value or associative value because it demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community. (Criteria Met)

Bridge drawings dated July 1928 were produced by A.W. Connor & Co. Engineers of Toronto, Ontario. While A.W. Connor & Co. were not identified to be significant to a community the bowstring arch design reflects the work of noted local Fergus architect Charles Mattaini, who introduced and popularized the bowstring arch design in Ontario.

7. The property has contextual value because it is important in defining, maintaining, or supporting the character of an area. (Criteria Met)

The cast in place reinforced concrete bowstring arch bridge design of Bridge 21-WG is important in defining or maintaining the historic character of the larger area and contributes to supporting the rural character of the immediate area. The design of the bridge reflects the historic character of Wellington County, which was known historically for its prevalence of bowstring arch bridges. The character of an area is defined as the combination of physical elements that together provide a place with a distinctive sense of identity.

8. The property has contextual value because it is physically, functionally, visually or historically linked to its surroundings. (Criteria Met)

The bowstring arch bridge is visually and historically linked to Centre Wellington based on its historic prevalence and the connection of the initial design of this type of bridge to Fergus architect Charles Mattaini, who introduced and popularized the bowstring arch design Ontario.

9. The property has contextual value because it is a landmark. (Criteria Not Met)

Bridge 21-WG is located in a rural area on a secondary road and as such was not identified to be a landmark.

Evaluation of the Bridge 21-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified Bridge 21-WG to meet five criteria and to therefore meet the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA. The bridge achieved a score of 42 on the MTO bridge assessment standards. MTO bridge assessment standard benchmarks a score of 60 as a threshold for heritage value (Appendix B).

9.2 Bridge 21-WG Draft Statement of Cultural Heritage Value

Bridge 21-WG is located on First line, north of Sideroad 15 in the road allowance between Lots 15 and 16, Concession 1, former township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 21-WG was constructed to replace an earlier wood structure and to provide egress across the Irvine River.

Bridge 21-WG is an example of a bowstring arch bridge constructed of reinforced concrete. This style of bridge is colloquially referred to as a 'rainbow arch bridge'. Original design schematics of the bridge show it to have been designed in 1929 and is assumed to have been constructed in 1930.

Bridge 21-WG represents one of the few remaining bowstring arch bridges in the county, a bridge style that the Township of Centre Wellington was once known for. The bowstring arch design was developed in the early 20th century and reached its height of popularity in the 1920's and 1930's. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic.

The bowstring design was popularized in the Township of Centre Wellington by local Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019). While no records found support Bridge 21-WG was designed or built by Mr. Mattaini, the bridge stands as a surviving example of the style.

Bridge 21-WG has stood for nearly a century and retains examples of all original finishes but exhibits significant degradation resulting in the exposure of the underlying square steel reinforcement bar. A single steel tie beam has been added to the upper limit of the arches and replaces the original concrete tie. Evaluation of Bridge 21-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Bowstring design
- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch bridge 29-WG

9.3 Bridge 29-WG O. Reg. 9/06 Evaluation

1. The property has design value or physical value because it is a rare, unique, representative or early example of a style, type, expression, material or construction method. (Criteria Met)

Bridge 29- WG is a surviving example of a cast in place reinforced concrete bowstring arch bridge. The bridge largely retains its as-built configuration including retention of its original guardrail and original cast upper tie brace. The prevalence of bowstring arch bridges in what is now identified as Centre Wellington was historically a defining feature of the area. Bridge 29-WG stands as a rare surviving example of that style. Based on the nature of the design it is deemed to meet the O. Reg. 9/06 criteria for design value or physical value as a representative (serving as a portrayal of symbol) example of the style.

2. The property has design value or physical value because it displays a high degree of craftsmanship or artistic merit. (Criteria Not Met)

Bridge 29-WG does present with design value for its overall artistic merit but does not demonstrate craftsmanship at a level well above industry standard at the time of construction.

3. The property has design value or physical value because it demonstrates a high degree of technical or scientific achievement. (Criteria Not Met)

Bridge 29-WG does not demonstrate a high degree of technical or scientific achievement. Its design and construction were common in the early 20th century, particularly in the current Township of Centre Wellington. Bridge 29-WG does not demonstrate technical or scientific achievement at a level well above industry standard as is necessary to meet this criterion.

4. The property has historical value or associative value because it has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community. (Criteria Met)

Bridge 29-WG has a direct association to the theme of widespread transportation improvement programs of the early 20th century. The bridge is a functional example of a bowstring arch bridge which was historically significant to Centre Wellington. The design is linked to local Fergus architect Charles Mattaini who is known to have popularized the bowstring arch design in Ontario. While no records found support Bridge 29-WG was designed or built by Mattaini, its design reflects Mattaini's influence in bridge design.

5. The property has historical value or associative value because it yields, or has the potential to yield, information that contributes to an understanding of a community or culture. (Criteria Not Met)

Bridge 29-WG was designed by A.W. Connor & Co. Engineers, an engineering firm located in Toronto, Ontario. A.W. Connor & Co. Engineers were involved in the design of numerous bridges and there is no indication Bridge 29- WG has the potential to yield new information that would contribute to the understanding of their work or of a community or culture.

6. The property has historical value or associative value because it demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community. (Criteria Met)

Bridge drawings dated July 1928 were produced by A.W. Connor & Co. Engineers of Toronto, Ontario. While A.W. Connor & Co. were not identified to be significant to a community the bowstring arch design reflects the work of noted local Fergus architect Charles Mattaini, who introduced and popularized the bowstring arch design in Ontario.

7. The property has contextual value because it is important in defining, maintaining, or supporting the character of an area. (Criteria Met)

The cast in place reinforced concrete bowstring arch bridge design of Bridge 29-WG is important in defining or maintaining the historic character of the larger area and contributes to supporting the rural character of the immediate area. The design of the bridge reflects the historic character of Wellington County, which was known historically for its prevalence of bowstring arch bridges. The character of an area is defined as the combination of physical elements that together provide a place with a distinctive sense of identity.

8. The property has contextual value because it is physically, functionally, visually or historically linked to its surroundings. (Criteria Met)

The bowstring arch bridge is visually and historically linked to Centre Wellington based on its historic prevalence and the connection of the design to Fergus architect Charles Mattaini, who introduced and popularized the bowstring arch bridge design in Ontario.

9. The property has contextual value because it is a landmark. (Criteria Not Met)

Bridge 29-WG is located in a rural area on a secondary road and as such was not identified to be a landmark.

Evaluation of Bridge 29-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified Bridge 29-WG to meet five criteria and to therefore meet the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA. The bridge achieved a score of 42 on the MTO bridge assessment standards. MTO bridge assessment standard benchmarks a score of 60 as a threshold for heritage value (Appendix B).

9.4 Bridge 29-WG Draft Statement of Cultural Heritage Value

Bridge 29-WG is located on Sideroad 15 in the road allowance between Lots 15 and 16, Concession 2, former Township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 29-WG was constructed to replace an earlier wood structure and to provide egress across the Irvine River.

Bridge 29-WG is a surviving example of a bowstring arch bridge constructed of reinforced concrete. This style of bridge is colloquially referred to as a 'rainbow arch bridge'. Original design schematics of the bridge show it to have been designed in 1928 and is assumed to have been constructed in 1929.

Bridge 29-WG represents one of the few remaining bowstring arch bridges in the county, a bridge style that the former Wellington County was historically known for. The bowstring arch design was developed in the early 20th century and reached its height of popularity in the 1920's and 1930's. The design was popular as it required minimal material, was relatively simple to install and could easily accommodate vehicular traffic.

The bowstring design was popularized in the Township of Centre Wellington by local Fergus architect Charles Mattaini. Mr. Mattaini was born in Italy and emigrated to Canada in 1892. Following his emigration to Canada, he settled in Fergus and started an engineering and construction firm where he employed the engineering skills he had developed while constructing tunnels through the Alps. Mattaini popularized the bowstring design and his company eventually built close to 70 bowstring bridges in Southern Ontario, with a high number of them being constructed in Wellington and Waterloo counties (Brennan 2019). While no records found support Bridge 29-WG was designed or built by Mr. Mattaini, the bridge stands as a surviving example of the style.

Bridge 29-WG has stood for nearly a century and retains examples of all original finishes but exhibits significant degradation resulting in the exposure of the underlying square steel reinforcement bar. Evaluation of Bridge 29-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Bowstring design
- Subtle design details: chamfered corners, recessed panels, impressed florets, integrated guardrail
- Proximity to bowstring arch Bridge 21-WG

9.5 Bridge 30-WG O. Reg. 9/06 Evaluation

1. The property has design value or physical value because it is a rare, unique, representative or early example of a style, type, expression, material or construction method. (Criteria Met)

Bridge 30-WG is a surviving example of fixed riveted steel through Pratt truss bridge. The bridge retains its original overall design and showcases the evolution of steel construction through ongoing repairs that employed bolt and nut and later welded elements. Bridge 30-WG stands as a locally rare surviving example of a style. Based on the nature of the design it is deemed to meet the O. Reg. 9/06 criteria for design value or physical value as a representative (serving as a portrayal of symbol) example of the style.

2. The property has design value or physical value because it displays a high degree of craftsmanship or artistic merit. (Criteria Not Met)

Bridge 30-WG does not present with design value for its overall artistic merit and does not demonstrate craftsmanship at a level well above industry standard at the time of construction.

3. The property has design value or physical value because it demonstrates a high degree of technical or scientific achievement. (Criteria Not Met)

Bridge 30-WG does not demonstrate technical or scientific achievement at a level well above industry standard as is necessary to meet this criterion.

4. The property has historical value or associative value because it has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community. (Criteria Not Met)

The design of Bridge 30-WG was not found to be significant to a community, and as such does not meet this criterion

5. The property has historical value or associative value because it yields, or has the potential to yield, information that contributes to an understanding of a community or culture. (Criteria Not Met)

Bridge 30-WG was not identified to be of potential to yield new information that would contribute to the understanding of a community or culture.

6. The property has historical value or associative value because it demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community. (Criteria Not Met)

The designer and/or builder of Bridge 30-WG is not known and as such does not meet this criterion.

7. The property has contextual value because it is important in defining, maintaining, or supporting the character of an area. (Criteria Met)

The fixed riveted steel through-truss bridge design of Bridge 30-WG contributes to maintaining the historic rural character of the surrounding area and supports the character of the area as a bridge design that stands out from surrounding bridges. The character of an

area is defined as the combination of physical elements that together provide a place with a distinctive sense of identity.

8. The property has contextual value because it is physically, functionally, visually or historically linked to its surroundings. (Criteria Not Met)

To satisfy this criterion a property/structure needs to have a relationship to its broader context that is important to understand the meaning of the property and/or its context. Research did not identify Bridge 30-WG to be of contextual value based on it physical, functional visual or historic links to its surroundings.

9. The property has contextual value because it is a landmark. (Criteria Not Met)

Bridge 30- WG is located in a rural area on a secondary road and as such was not identified to be a landmark.

Evaluation of the Bridge 30-WG against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified Bridge 30-WG to meet two criteria and to therefore meet the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA. The bridge did not meet the 60-point threshold for heritage value based on the MTO bridge assessment standards; the bridge achieved a score of 47 (Appendix B).

9.6 Bridge 30-WG Draft Statement of Cultural Heritage Value

Bridge 30-WG is located on Sideroad 15 in the road allowance between Lots 15 and 16, Concession 6, former Township of Garafraxa, now Township of Centre Wellington, Ontario. Bridge 30-WG was constructed to replace an earlier wood structure and to provide egress across the Irvine River.

Through-truss bridges emerged as a pivotal innovation in civil engineering during the 19th century and played a significant role in the expansion of railroads and road networks across the industrialized world. Their origins trace back to the early use of timber trusses, but with the advent of the Industrial Revolution, engineers began experimenting with wrought and cast iron. These materials provided the necessary strength and durability to span longer distances and support heavier loads than wood. The first iron truss bridges appeared in the early 1800s, with notable examples such as the Iron Bridge in England paving the way for widespread adoption. By the mid-19th century, through-truss designs were commonly used for both railroad and highway bridges across Europe and North America.

Bridge 30-WG is a surviving automotive use example of a fixed riveted steel through Pratt truss bridge. The bridge retains its original overall design and showcases the evolution of steel bridge construction through ongoing repairs that employed bolt and nut and later welded elements. Bridge 30-WG stands as a locally rare surviving example of a style. Evaluation of Bridge 30-WG found the bridge to be a candidate for Listing under Section 27 of the OHA, or Designation under Section 29 of the OHA.

Defining Characteristics

- Original riveted construction

- Pratt truss system

- Legibility of repairs detailing the evolution of steel working

10.0 Findings

Evaluation of the bridges against the nine criteria outlined by O. Reg. 9/06 (as amended by O. Reg. 569/22) identified each of the three bridges meet at least two criteria and to therefore meet the requirement for consideration for Listing under Part IV, Section 27 of the OHA or consideration for Designation under Part IV, Section 29 of the OHA.

This assessment also utilized the OHBG (MTO 2008). While the bridges are not provincially owned, the established assessment guidelines provide a proven methodology by which to assess the potential CHVI of municipally owned and operated bridges. The scoring system requires an overall score of 60 to be achieved before a bridge can be considered to exhibit CHVI. None of the bridges met the MTO bridge assessment threshold for heritage value. Bridges WG-21 and WG-29 each scored 42. Bridge 30-WG scored 47.

Based on the findings of this report it is recommended that the Township of Centre Wellington be presented with this report and that the Township, as representatives of the local community, decide if it wishes to pursue further heritage recognition by way of Listing on a municipal heritage register or Designation by municipal By-law, as per the terms of the OHA for any or all of the assessed bridges.

For consideration, the standard MTO ranked conservation options for bridges with CHVI are provided in Table 1 for reference purposes only.

Table 1: MTO Ranked Conservation Options for Bridges with CHVI

Ranking	Option	Description
1	Retain in Service	Retain bridge with no major modifications undertaken
2		Restore missing/deteriorated bridge elements
3		Retain bridge with sympathetic modification
4		Retain bridge with sympathetic modification
5	Retain for Other Uses	Adapt bridge for new use as pedestrian walkways, cycle paths, scenic viewing, etc.
6		Retain bridge as a heritage monument for viewing purposes only
7	Relocation	Relocate bridge to new location for continued or adaptive use
8	Removal and Replacement	Replace structure with a sympathetically designed structure and: a. Salvage bridge elements/members of bridge for incorporation into new structure or for future conservation work or display; b. Undertake full recording and documentation of existing structure

As all three bridges were found to exhibit CHVI and the proposed alterations are being conducted under the MCEA process, the structures will require a Heritage Impact Assessment (HIA) prior to the commencement of alterations. It is recommended this report be deposited with local archives as a record of the structure.

The *Provincial Planning Statement* (2024) notes that CHVI is identified for cultural heritage resources by communities. Thus, the system by which heritage is administered in Ontario places emphasis on the decision-making of local municipalities regarding matters of heritage. It is hoped that the information presented in this report will be useful in decisions pertaining to the bridge.

11.0 Closure

This report was prepared by Peninsula Heritage Ltd. for the exclusive use of the Township of Centre Wellington for their work associated with Bridges 21-WG, 29-WG and 30-WG.

All information, recommendations and opinions provided in this report are for the sole benefit of the Proponent. No other party may use or rely on this report or any portion thereof without the Proponent's or Peninsula Heritage Ltd.'s expressed written consent. Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Proponent in the design of the specific project. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of the third party.

We confirm this report conforms to accepted technical and ethical standards; the information included in this report is accurate to the best of our abilities, conforms to accepted technical and ethical standards, and reflects the professional opinion of Chris Lemon, Cultural Heritage Specialist.

Professional Qualifications for the primary author of this report are provided in Appendix A.

Sincerely,

Chris Lemon, B.Sc., Dip. Heritage, CAHP

Cultural Heritage Specialist

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Appendix A

Qualifications

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Cultural Heritage Specialist – Chris Lemon, B.Sc., Dip. Heritage, CAHP Member in Good Standing: Chris Lemon is a Cultural Heritage Consultant and Licensed Archaeologist (R289) with over 18 years' experience. He received an Honours B.Sc. in Anthropology from the University of Toronto and has completed course work towards an M.A. from the University of Western Ontario. Mr. Lemon has a Diploma in Heritage Carpentry and Joinery and a Certificate in Heritage Planning from Algonquin College. During his career Mr. Lemon has conducted archaeological and cultural heritage assessments across Ontario. He has managed field teams and projects ranging in value from <$5,000.00 to in excess of $1,000,000.00. Mr. Lemon is a member of the Ontario Archaeological Society and is a member in good standing with the Canadian Association of Heritage Professionals. Chris regularly assists clients with understanding heritage requirements, as it relates to their Project, and works with clients and approval authorities to ensure cultural heritage resources are appropriately protected. Chris has been working full time in Cultural Heritage since 2018.

Chris' training at Algonquin College and extensive field experience have provided Chris with skills and knowledge in the identification of historical building materials and construction techniques, including the viability of salvageable materials.

Project Manager, Cultural Heritage Practitioner – Jamie Lemon, M.A.: Jamie Lemon, MA, is a Senior Archaeologist and Cultural Heritage Practitioner with Peninsula Heritage Ltd. and is responsible for managing projects and field staff across Ontario. She is the primary author of numerous archaeological license reports for archaeological assessments ranging from Stage 1 to Stage 4 investigations and is proficient at artifact and archaeobotanical analysis. In addition, she is a former field technician and field director with experience on precontact Indigenous and historical Euro-Canadian sites. She has worked on archaeological projects for mining, land development, transportation, aggregates, and energy sectors. Jamie received a BA in Anthropology from the University of Waterloo in 2007, an MA from Trent University in 2014, and has been active in Cultural Resource Management in Ontario for over 17 years. Jamie holds a valid professional license with the Ontario Ministry of Citizenship and Multiculturalism (MCM). Jamie regularly assists clients with navigating the life cycle of archaeological and heritage assessments as it relates to their Project, including interpretation of MCM's Standards and Guidelines for Consultant Archaeologists and various policies and terms of reference related to heritage studies, scheduling of assessments to best suit the needs of the client, and engaging with Indigenous communities. Jamie has been a contributing author to cultural heritage reports since 2022.

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Appendix B

MTO Bridge Assessment Evaluations

Ontario Heritage Bridge Evaluation: Bridge 21-WG

Criteria	Details	Max. Score	Assigned Score	Comments
Design/ Physical Value (Total marks 50)				
Functional Design (Maximum score 20)	Excellent	20		
	Very Good	16		
	Fair	12	12	Historically a common style of bridge, constructed in large numbers in Wellington County Currently relatively few examples of the style left in the Centre Wellington (21-WG, 29-WG, 9-N, 3-E)
	Common	0		
Visual Appeal (Maximum score 20)	Excellent	20		
	Very Good	12	12	Bridge that is appropriate to the landscape and visually unobtrusive. Bridge contributes to the visual appeal of the surrounding area
	Fair	4		
	Common	0		
Materials (Maximum score 10)	Excellent	10		
	Very Good	8		
	Fair	5		
	Common	0	0	Relatively early example of reinforced concrete
Contextual Value (Total marks 25)				
Landmark (Maximum score 15)	Excellent	15		
	Very Good	9		
	Fair	3	3	Although not designed or built by Charles Mattaini, the bridge reflects Mattaini's contribution to the bowstring arch design in

				southern Ontario and is a contributing element to understanding a family of bridges that were once prevalent in Wellington County
	Common	0		
Character Contribution (Maximum score 10)	Excellent	10		
	Very Good	6	6	Bridge contributes to the overall aesthetic and character of immediate area. Bowstring arch bridges were historically linked and significant to Centre Wellington
	Common	0		
Historical/ Associative Value (Total marks 25)				
Designer/ Construction Firm (Maximum score 15	Excellent	15		
	Good	9		
	Fair	3	3	Designed by A.W. Connor & Co., builder is unknown
	Unknown	0		
Association with a historical theme, person or event (Maximum score 10)	Excellent	10		
	Good	6	6	Bridge 21-WG has connection to the history of transportation in the area. Functional example of a bowstring arch bridge which was historically significant to Centre Wellington. Design is linked to local Fergus architect Charles Mattaini who is known to have popularized the bowstring arch design in Ontario.
	Common	0		
TOTAL			**42/100**	**Does not meet heritage value threshold of 60 points**

Ontario Heritage Bridge Evaluation: Bridge 29-WG

Criteria	Details	Max. Score	Assigned Score	Comments
Design/ Physical Value (Total marks 50)				
Functional Design (Maximum score 20)	Excellent	20		
	Very Good	16		
	Fair	12	12	Historically a common style of bridge, constructed in large numbers in Wellington County Currently relatively few examples of the style left in the Centre Wellington (21-WG, 29-WG, 9-N, 3-E)
	Common	0		
Visual Appeal (Maximum score 20)	Excellent	20		
	Very Good	12	12	Bridge that is appropriate to the landscape and visually unobtrusive. Bridge contributes to the visual appeal of the surrounding area.
	Fair	4		
	Common	0		
Materials (Maximum score 10)	Excellent	10		
	Very Good	8		
	Fair	5		
	Common	0	0	Relatively early example of reinforced concrete
Contextual Value (Total marks 25)				
Landmark (Maximum score 15)	Excellent	15		
	Very Good	9		
	Fair	3	3	Although not designed or built by Charles Mattaini, the bridge reflects Mattaini's contribution to the bowstring arch design in

				southern Ontario and is a contributing element to understanding a family of bridges that were once prevalent in Wellington County
	Common	0		
Character Contribution (Maximum score 10)	Excellent	10		
	Very Good	6	6	Bridge contributes to the overall aesthetic and character of immediate area. Bowstring arch bridges were historically linked and significant to Centre Wellington
	Common	0		
Historical/ Associative Value (Total marks 25)				
Designer/ Construction Firm (Maximum score 15	Excellent	15		
	Good	9		
	Fair	3	3	Designed by A.W. Connor & Co., builder is unknown
	Unknown	0		
Association with a historical theme, person or event (Maximum score 10)	Excellent	10		
	Good	6	6	Bridge 29-WG has connection to the history of transportation in the area. Functional example of a bowstring arch bridge which was historically significant to Centre Wellington. Design is linked to local Fergus architect Charles Mattaini who is known to have popularized the Bowstring arch design in Ontario.
	Common	0		
TOTAL			**42/100**	**Does not meet heritage value threshold of 60 points**

Ontario Heritage Bridge Evaluation: 30-WG

Criteria	Details	Max. Score	Assigned Score	Comments
Design/ Physical Value (Total marks 50)				
Functional Design (Maximum score 20)	Excellent	20		
	Very Good	16		
	Fair	12	12	Historically a common style of bridge. Currently relatively few examples of the style left in the area
	Common	0		
Visual Appeal (Maximum score 20)	Excellent	20		
	Very Good	12	12	Bridge that is appropriate to the landscape and visually unobtrusive. Bridge contributes to the visual appeal of the surrounding area.
	Fair	4		
	Common	0		
Materials (Maximum score 10)	Excellent	10		
	Very Good	8	8	Constructed of riveted steel, which was in widespread use at the time of construction, however, was less commonly used for a roadway bridge. The construction technique is no longer utilized
	Fair	5		
	Common	0		
Contextual Value (Total marks 25)				
Landmark (Maximum score 15)	Excellent	15		
	Very Good	9		
	Fair	3	3	Bridge was not identified to be a landmark but would be well known to the immediate area
	Common	0		

Character Contribution (Maximum score 10)	Excellent	10		
	Very Good	6	6	Bridge contributes to the overall aesthetic and character of the area
	Common	0		
Historical/ Associative Value (Total marks 25)				
Designer/ Construction Firm (Maximum score 15	Excellent	15		
	Good	9		
	Fair	3		
	Unknown	0	0	Designer and construction firm is unknown
Association with a historical theme, person or event (Maximum score 10)	Excellent	10		
	Good	6	6	Bridge has connection to the history of transportation in the area. Surviving example of a fixed Pratt through truss bridge
	Common	0		
TOTAL			**47/100**	**Does not meet heritage value threshold of 60 points**

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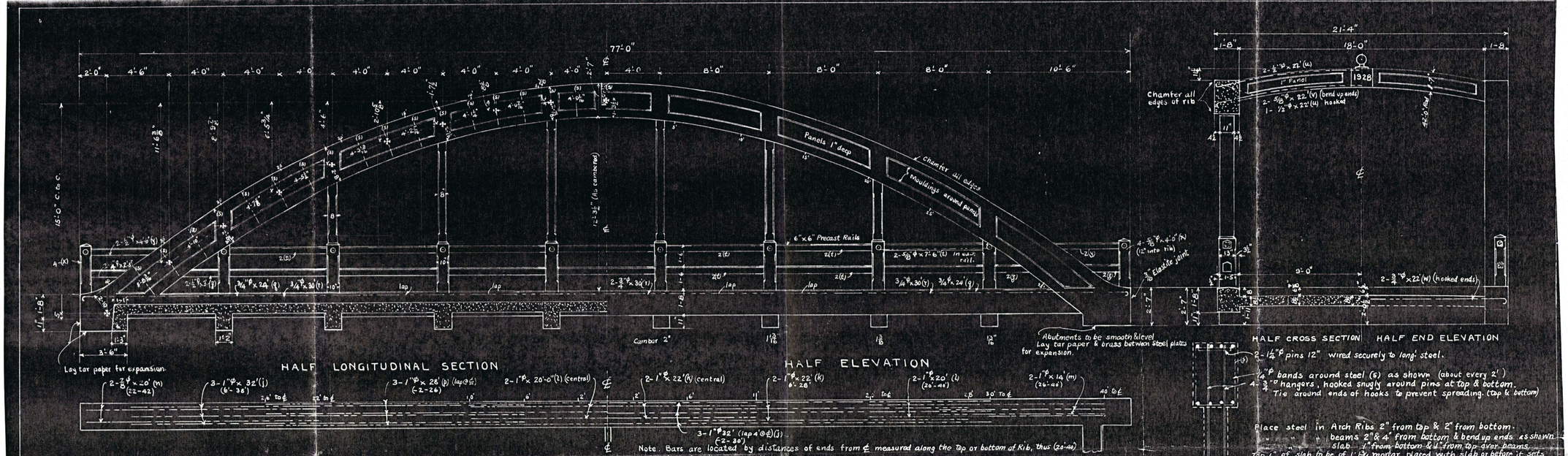
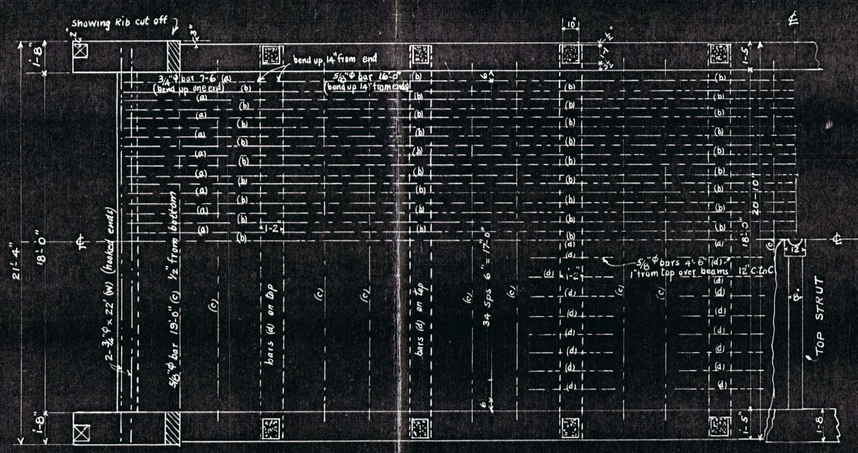
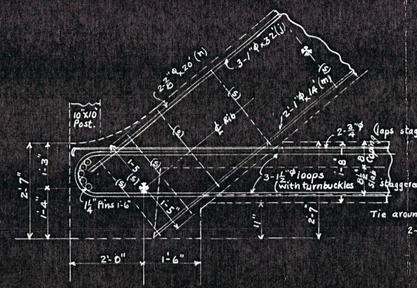
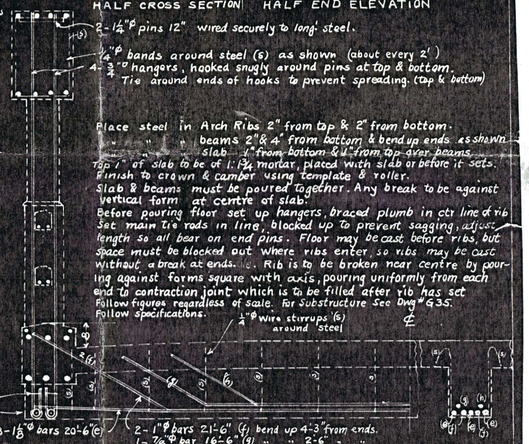
Appendix C

Bridge Drawings









Place steel in Arch Ribs 2" from top & 2" from bottom.
" " " beams 2" & 4" from bottom & bend up ends as shown
" " " slab 1" from bottom & 1" from top over beams.
Top 1" of slab to be of 1:1½ mortar, placed with slab or before it sets.
Finish to crown & camber using template & roller.
Slab & beams must be poured together. Any break to be against vertical form at centre of slab.
Before pouring floor set up hangers, braced plumb in ctr line of rib
Set main tie rods in line, blocked up to prevent sagging, adjust length so all bear on end pins. Floor may be cast before ribs, but space must be blocked out where ribs enter so ribs may be cast without a break at ends. . . Rib is to be broken near centre by pouring against forms square with axis, pouring uniformly from each end to contraction joint which is to be filled after rib has set
Follow figures regardless of scale. for Substructure See Dwg # 335.
Follow specifications.

DETAILS OF STEEL
Scale :- 1" = 2'-0"

	cu. yds.
Concrete in Arch Ribs (1:2:3½) =	28.0
" Hangers, Posts, Railing & Strut =	7.0
" Slab, Curbs, beams & Coping (1:2:4) =	57.2
Total	92.2

Tie rods & hangers = 8000 lbs
& steel coupling = 1300 "

3371-2

SUPERSTRUCTURE FOR A 70'x18' CONCRETE ARCHED TRUSS FOR THE LIVING SPRINGS BRIDGE

AT LOT # 15 CONCESSION # 2 TOWNSHIP OF W. GARAFRAXA ROAD # 15

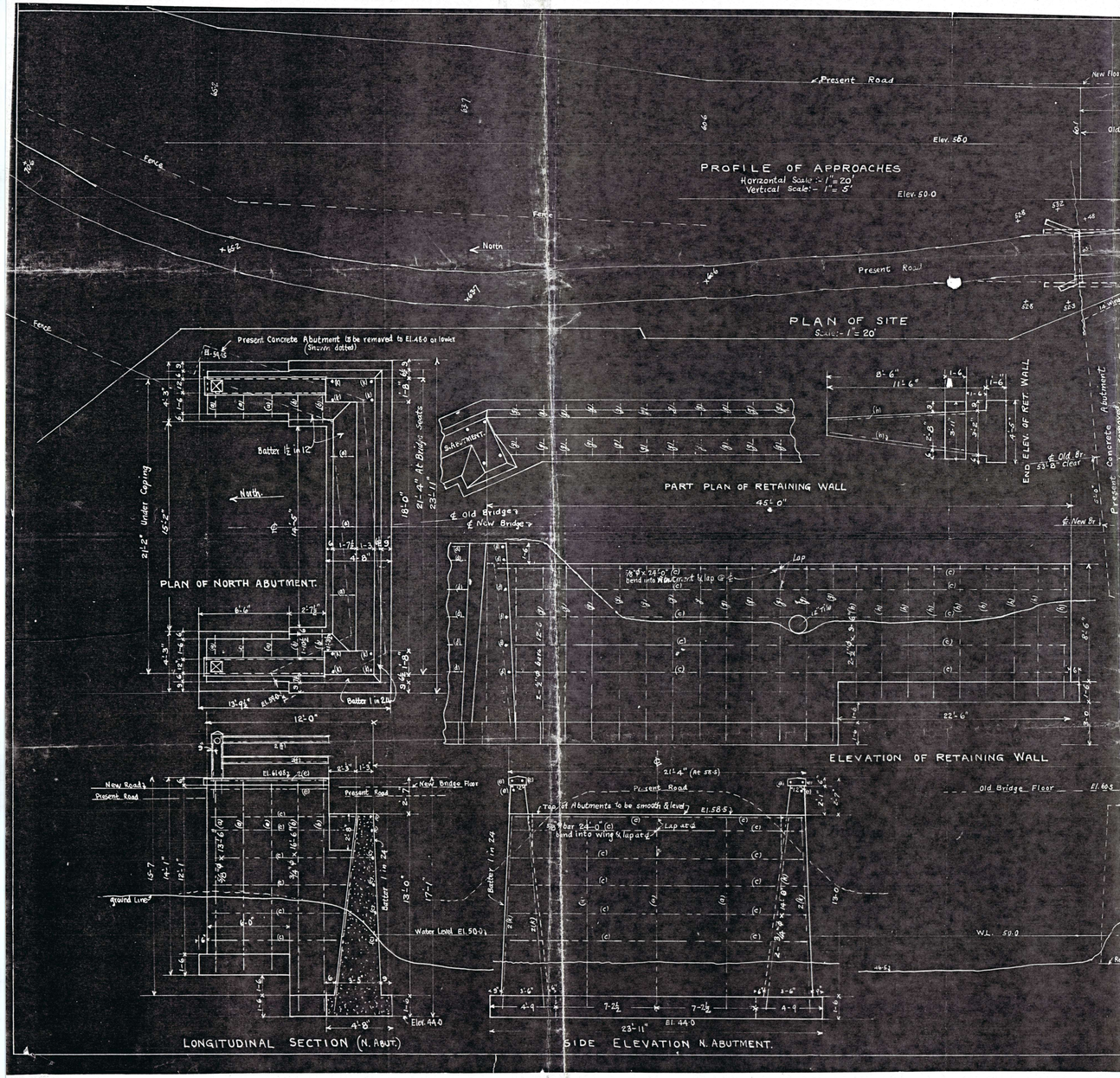
FOR THE TOWNSHIP OF WEST GARAFRAXA

Scale:- 1" = 4'-0"

A.W. CONNOR & CO. ENG'RS
301 Metropolitan Bldg. TORONTO.
July / 28

DWG # C-6-9

35-202



Reinforcing Steel shown thus ——
Place horizontal steel 2" from OUTSIDE of Walls
Vertical " 2" " INSIDE " "
" " 2" " Both sides of Retaining Wall.

Concrete in Substructure (1:2½:5 or 1:6) = 146·6 cu yds
" " Coping 1:2:4 & Railing = 1·5 " "
" " Superstructure = 92·2 " "
Total Concrete = 240·3 " "

Reinforcing Steel = 15000 lbs supplied tab. Req.
Tie Rods & Hangers = 8000 lbs

For Superstructure see Dwg C-6-9

SUBSTRUCTURE
FOR
70'x18' CONCRETE ARCH TRUSS
LIVING SPRINGS BRIDGE
AT Lot 15 Con. #2 Road #15 W. Garafraxa Tp
FOR THE
TOWNSHIP OF WEST GARAFRAXA

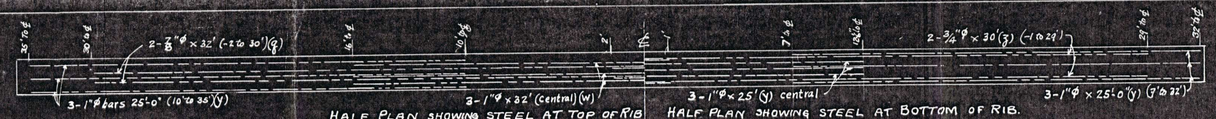
Scale:- 1"= 4'-0"

A.W. Connor & Co. Eng'rs
301 Metropolitan Bldg.
Toronto
July 4/28

Dwg # C-35

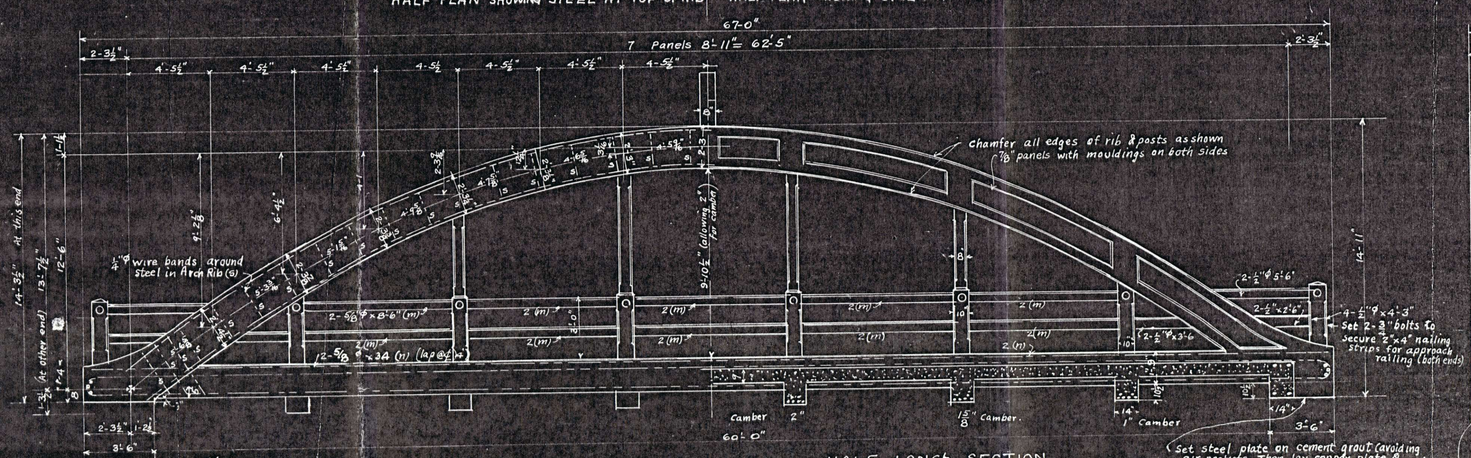
29 Aug
3379-1

SITE MAP
#35-202



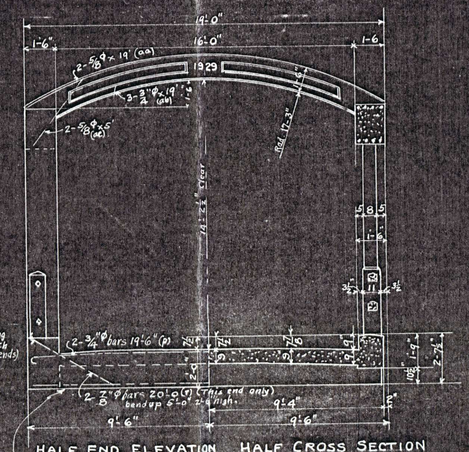
HALF PLAN SHOWING STEEL AT TOP OF RIB

HALF PLAN SHOWING STEEL AT BOTTOM OF RIB.



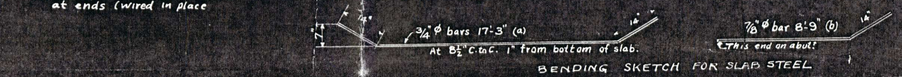
HALF ELEVATION

HALF LONGL SECTION

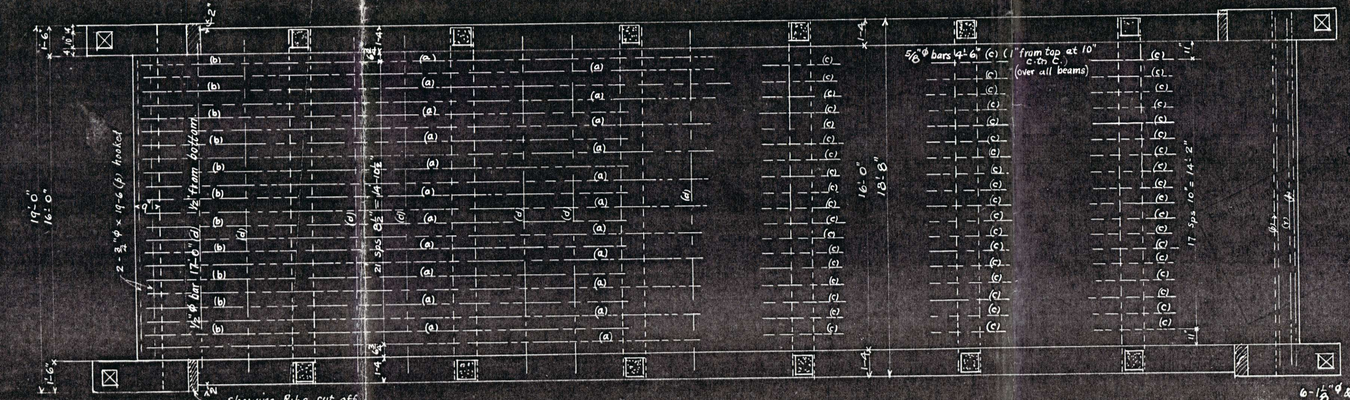


HALF END ELEVATION HALF CROSS SECTION

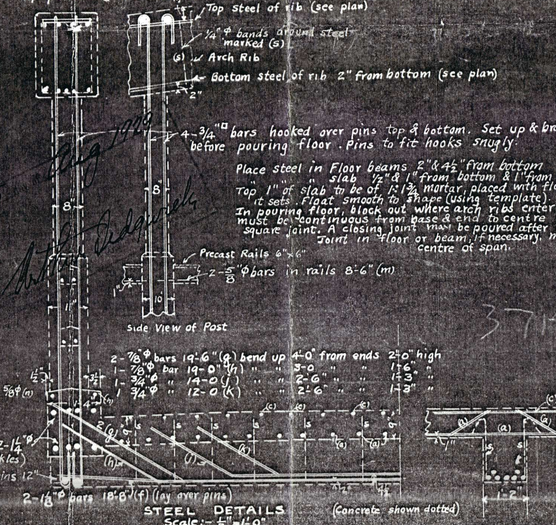
Set steel plate on cement grout (avoiding air pockets. Then lay copper plate & other steel plate for shoes for expansion. This end only.
Lay tar paper under end beam(" ")



BENDING SKETCH FOR SLAB STEEL



PLAN OF FLOOR



STEEL DETAILS (concrete shown dotted)
Scale:- ½"=1'-0"

ESTIMATE

Concrete in Arch Ribs (1:1½:3)	=	cu yds
" " Posts & Rails	=	" "
" " Slab & beams (1:2:4)	=	" "
Total Concrete in Superstructure	=	" "
Concrete in Substructure	=	
Total Concrete	=	
Reinforcing Steel	=	lbs
Steel Tie Rods	=	"
" Hanger "	=	"
Total Steel	=	lbs. (Supplied f.o.b. Fergus)

SUPERSTRUCTURE
FOR
60'×16' RETTIE BRIDGE
AT LOT 16 CON. I W. GARAFRAXA
FOR
THE TOWNSHIP OF WEST GARAFRAXA
Scale:- ½"=1'-0"
A.W. CONNOR & CO. ENGRS
301 Metropolitan Bldg. TORONTO July 29
DWG C5-10

37187

35-201

Site 35-201

58'-10"

Present Road — El. 60.65 — 61.90 — New Floor ℄ Present Wooden Truss — New Road El. 61.90 — Present Road ℄ 60.75 — New Approach 6% — Present Road

Exp. End

WL 50.0

Present ground ℄

5'-2" abt

2'-6"

2'-0"

Concrete 1:2:4

SECTIONAL ELEVATION SHOWING
PRESENT ABUTMENTS & UNDERPINNING

Present Ballast Wall — Present Road Level 61.5 and Unchanged — New Floor ℄ (El. 61.9) — 10'-1" — Present Road ℄

1'-3" — 1'-3" — 2'-0" — 1'-0"

El. 60.65 — Present Abutment — Fill in corner for appearance — El. 59.45 — Level up with Concrete Present Abutment

PART ELEVN SHOWING OLD & NEW WORK
(New Superstructure shown hatched)

N.B. Underpinning to be done in sections & section to be set 2 weeks before excavating for adjoining section.

Contractor to supply temporary bridge & roadway on North side

60.6 — 2'-6" — 1-1 — Edge of Road — 60.65 — 1'-7" — 2'-4" — 61.65 — 60.65 — 18'-5½" — 60.65 — Edge of Road

Wood Truss — 12'-10½" Width of present Bridge — Wood Truss

Stream

Approximate Extent of Underpinning shown dotted — 18'-1" — 59.45 — 1-1 — Edge of Road — 1'-5" — 2'-4" — 12'-10½" — 60.5 — East — Edge Road — 59.45 — 2'-0" — 10'-0" — 59.9

60.2 — 2'-7" — 15'-3"

PLAN OF PRESENT ABUTMENTS

½" Overhang (abt) — 1½" Overhang abt — Level over top of old wall — 18'-5½" — 18'-1" — 2'-4" — 2'-4" — 60'-0" For Superstructure — 58'-10" Clear of Abuts. — 5" — 9" — 19'-0" — Remove this Ballast Wall — 3'-6" — 3'-6"

PART PLAN SHOWING LOCATION
OF SHOES OF SUPERSTRUCTURE
Scale :- ½" = 1'-0"

SUBSTRUCTURE

FOR THE

58'-10" RETTIE BRIDGE

AT LOT 16 CON. 1 W. GARAFRAXA TP

FOR THE

TOWNSHIP OF WEST GARAFRAXA

A.W. Connor & Co. Engrs
Metropolitan Bldg
Toronto. July/29

Scale :- ¼" = 1'-0"

DWG E5108

3718-7

SITE MAP
N 35-201

Peninsula Heritage Ltd.
Archaeology & Built Heritage

Appendix D

OSIM Reports

Structure Condition Summary Form

Structure Name 21 - WG
Structure Number 21 - WG
Date of Inspection April 01, 2024
Project No. 18015
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	60.00	0.00	52.00	4.00	4.00	360	244	68	00	18
Barriers	Railing Systems	m	200.00	68.60	0.00	56.60	8.00	4.00	13720	9130	67	08	00
	Posts (Steel/Concrete)	Each	200.00	16.00	0.00	10.00	3.00	3.00	3200	1740	54	08	00
Trusses/ Arches	Top Chords	Sq.m	300.00	147.20	0.00	122.20	15.00	10.00	44160	29295	66	00	08
	Verticals	Sq.m	300.00	6.88	0.00	0.00	3.44	3.44	2064	413	20	01	00
	Bottom Chords	Sq.m	300.00	113.98	0.00	63.98	25.00	25.00	34194	17396	51	01	00
Decks	Deck Top - Thin Slab	Sq.m	120.00	95.00	0.00	65.00	15.00	15.00	11400	6570	58	00	00
	Soffit - Thin Slab	Sq.m	120.00	88.50	0.00	58.50	15.00	15.00	10620	5985	56	00	00
Beams/ Main Longitudinal	Floor Beams - Concrete	Sq.m	200.00	60.18	0.00	47.18	6.50	6.50	12036	7597	63	00	00
Abutment	Wingwalls	Sq.m	350.00	64.00	0.00	15.60	30.60	17.80	22400	8379	37	00	00
	Bearings	Each	1000.00	4.00	0.00	2.00	2.00	0.00	4000	2300	58	00	00
	Abutment Walls	Sq.m	900.00	34.22	0.00	7.00	17.22	10.00	30798	10924	35	01	00
									188952	99972			

Bridge Condition Index (BCI) **53**

Structure Name 21-WG

FIRST LINE

HP Engineering

Municipal Structure Inspection Form

MTO Site Number:	**35-201**
BCI:	**53.00**

Inventory Data:

Structure Name:	21-WG						
Main Hwy/Road #		On ☑ / Under ☐	Crossing Type:	Navig. Water ☑	Non-Navig Water ☐	Rail ☐	Ped. ☐
				Road ☐	Other ☐		
Road Name	First Line						
Structure Location	0.17 km North of Sideroad 15						
Latitude	N 43° 45' 14.2"		Longitude	W 80° 24' 31.5"			
Owner(s)	Township of Centre Wellington	Heritage Designation	Not Cons. ☐	Cons. /not App ☐	List/not Desig. ☐	Desig./not List ☐	Desig.& List ☐
MTO Region *	- -	Road Class	Freeway ☐	Collector ☐	Arterial ☐	Local ☑	
MTO District *	- -	Posted Speed	80	No. of Lanes:	2		
Current County*	- -	AADT		% Trucks			
Geographic Twp. *	West Grarafraxa	Special Routes:	Transit ☐	School ☐	Truck ☐	Bicycle ☐	
Structure Type*	1 Bowstring Arch		Detour Length	9 (km)			
Total Deck Length	19.2 (m)		Fill on Structure	(m)			
Overall Str. Width	5.7 (m)		Skew Angle	(degrees)			
Total Deck Area	110.2 (sq. m)		Direction of Structure	N-S			
Roadway Width	4.9 (m)		No. of Spans	1			
Span Lengths.	18.0 (m)						

Historical Data:

Year Built	1929	Last Biennial Inspection	May 01, 2022
Current Load Limit	10 (tonnes)	Last BridgeMaster Inspection	
Load Limit By-Law #		Last Evaluation	
By-Law Expiry Date		Last Underwater Inspection	
Min. Vertical Clearance	4.00 (m)	Last Condition Survey	

Rehab History : (Date/description)

HP Engineering

Municipal Structure Inspection Form **MTO Site Number:** 35-201

Repair and Rehabilitation Required		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6-10 years	1 - 5 years	Within 1 year	Urgent	
	Replace structure	☐	☑	☐	☐	$1,584,000.00
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
						$1,584,000.00

Associated Work:	Comments	Estimated Cost
Approaches		
Detours	Required	$100,000.00
Traffic Control	Required	$60,000.00
Utilities		
Right of Way		
Environmental Study	Approvals	$10,000.00
Other		
Contingencies		
	Total Cost	$170,000.00

Justification

Estimated cost is based on replacement structure being the same size as the existing.

Construction Cost	$1,584,000.00
Associated Costs	$ 170,000.00
TOTAL Estimated Cost	$1,754,000.00

Municipal Structure Inspection Form **MTO Site Number** **35-201**

Element Data

Element Group	900	Abutments					Length	5.90	
Element Name	901	Abutment Walls					Width		
Location	North & South Underside of Structure						Height	2.90	
Material	Cast-in-place concrete						Count	2	
Element Type	Conventional closed			Element code	1		Total Qnty.	34.22	
Environment	Moderate						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		1	Load Carrying capacity	
	Sq. m.	0	7	17.22	10				

Comments:
Medium to severe scaling and wide cracks noted on both abutments. Wide cracks observed near the southwest & northeast arch corners. Severe erosion of concrete noted at north abutment. South abutment appears to be rotated inwards.

Recommended Work:	Rehab	☐	Replace	☒	Maint. Needs	-	-
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	900	Abutments					Length		
Element Name	904	Bearings					Width		
Location	North & South Underside fo Structure						Height		
Material	Steel						Count	4	
Element Type	Plate			Element code	6		Total Qnty.	4	
Environment	Moderate						Limited Insp.	X	
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	-	
	Each	0	2	2	0				

Comments:
Bearings not visible at the time of inspection due to fill on the wingwalls. Assumed to be generally in good to fair condition.

Recommended Work:	Rehab	☐	Replace	☐	Maint. Needs	-	-
	Urgent	☐	1-5 yrs	☐	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	900	Abutments					Length	8.00	
Element Name	903	Wingwalls					Width		
Location	NE, NE, SW & SE of Structure						Height	2.00	
Material	Cast-in-place concrete						Count	4	
Element Type	Reinforced concrete			Element code	6		Total Qnty.	64	
Environment	Moderate						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	-	
	Sq. m.	0	15.6	30.6	17.8				

Comments:
Medium to severe scaling and wide cracks noted on the southeast wingwall. Moderate honeycombing and Moderate to localized severe scaling and narrow to medium cracks with damp stains noted on all wingwalls. Severe erosion observed at the base of the northwest wingwall. Wide crack, severe scaling and moderate honeycombing noted at northeast wing wall.

Recommended Work:	Rehab	☐	Replace	☒	Maint. Needs		
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Municipal Structure Inspection Form **MTO Site Number** 35-201

Element Data

Element Group	1500	Signs					Length		
Element Name	1501	Sign					Width		
Location	NE, NW, SE & SW of Structure						Height		
Material	Steel						Count	8	
Element Type	4 Hazard Signs, 2 Load Posting Signs 2 Height Clearance Signs		Element code	N/A			Total Qnty.	8	
Environment	Severe						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	-	
	Each	0	8	0	0				

Comments:
Signs are generally in good condition. The northeast and southeast hazard sign were bent at the time of inspection.

Recommended Work:						Maint. Needs	-	-
	Rehab	☐	Replace	☐				
	Urgent	☐	1-5 yrs	☐	6-10 yrs ☐	Urgent	☐	1 year ☐

Element Group	1600	Approaches					Length	6.00	
Element Name	1601	Wearing surface (app)					Width	5.00	
Location	North & South of Structure						Height		
Material	Gravel						Count	2	
Element Type	N/A		Element code	N/A			Total Qnty.	60	
Environment	Severe						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	-	
	Sq. m.	0	52	4	4				

Comments: Loose gravel noted throughout and vegetation grown at shoulders. Wearing surface to be regraded at south side and generally in good condition. Roadway is closed at sideroad 15 and 1st line intersection. Small potholes and loose gravel at edge of shoulder noted at north approach wearing surface. Severe erosion noted near deck end at northwest corner.

Recommended Work:						Maint. Needs	18	Regrade Approaches
	Rehab	☐	Replace	☐				
	Urgent	☐	1-5 yrs	☐	6-10 yrs ☐	Urgent	☐	1 year ☒

Element Group	400	Barriers					Length	0.28	
Element Name	403	Posts					Width	0.25	
Location	East & West Sides of Structure						Height	1.05	
Material	Cast-in-place concrete						Count	16	
Element Type	N/A		Element code	N/A			Total Qnty.	16	
Environment	Severe						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	08	
	Each	0	10	3	3				

Comments:
Abrasion damage, spalls, and wide stained cracks with exposed corroded reinforcement observed on multiple posts. Existing barrier does not meet current standards and should be replaced with a code complaint barrier. Northwest posts is detached and damaged.

Recommended Work:						Maint. Needs		
	Rehab	☐	Replace	☒				
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent	☐	1 year ☐

Municipal Structure Inspection Form **MTO Site Number** **35-201**

Element Data

Element Group	400	Barriers				**Length**	2.45	
Element Name	402	Railing Systems				**Width**	0.15	
Location	East & West Side of Structure					**Height**	0.15	
Material	Cast-in-place concrete					**Count**	28	
Element Type	Concrete post and bars		**Element code**	6		**Total Qnty.**	68.6	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	08	
	m.	0	56.6	8	4			

Comments: Spalls with exposed corroded reinforcement and medium to wide crack observed on railing. Existing barrier does not meet current standards and should be replaced with a code compliant barrier. A code compliant approach barrier should be installed.

Recommended Work: Rehab ☐ Replace ☒ Urgent ☐ 1-5 yrs ☒ 6-10 yrs ☐ **Maint. Needs** - - Urgent ☐ 1 year ☐

Element Group	500	Beams/MLE's				**Length**	5.90	
Element Name	502	Floor Beams				**Width**	0.30	
Location	Underside of Structure					**Height**	0.40	
Material	Cast-in-place concrete					**Count**	6	
Element Type	Rectangular-solid		**Element code**	4		**Total Qnty.**	60.18	
Environment	Moderate					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Sq. m.	0	47.18	6.5	6.5			

Comments:
Large areas of delaminations, narrow cracks with efflorescence and spalls with exposed corroded reinforcement noted at ends of floor beams. Barn swallow nests also observed along the length of floor beam.

Recommended Work: Rehab ☐ Replace ☒ Urgent ☐ 1-5 yrs ☒ 6-10 yrs ☐ **Maint. Needs** - - Urgent ☐ 1 year ☐

Element Group	100	Decks				**Length**	19.00	
Element Name	102	Deck top				**Width**	5.00	
Location	Top of Deck					**Height**		
Material	Cast-in-place concrete					**Count**	1	
Element Type	Cast-in-place conc on supports, composite		**Element code**	1		**Total Qnty.**	95	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Sq. m.	0	65	15	15			

Comments:
Moderate to severe scaling and few medium transverse and longitudinal cracks observed.

Recommended Work: Rehab ☐ Replace ☒ Urgent ☐ 1-5 yrs ☒ 6-10 yrs ☐ **Maint. Needs** Urgent ☐ 1 year ☐

Municipal Structure Inspection Form **MTO Site Number** 35-201

Element Data

Element Group	100	Decks				Length	17..7	
Element Name	103	Soffit Thin Slab				Width	5.00	
Location	Underside of Deck					Height		
Material	Cast-in-place concrete					Count	1	
Element Type	N/A		Element code	N/A		Total Qnty.	88.5	
Environment	Benign					Limited Insp.		
Protection System	None					Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor	-	-	
	Sq. m.	0	58.5	15	15			

Comments:
Large area of delaminations, medium cracks with area of efflorescence and severe spalls with exposed corroded reinforcement noted throughout. Multiple bar swallow nests noted on bridge deck near beam. Narrow crack with efflorescence at soffit exterior interface.

Recommended Work:						Maint. Needs		
	Rehab	☐	Replace	☒				
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐	

Element Group	1400	Embankments and Streams				Length		
Element Name	1402	Embankments				Width		
Location	NE, NW, SE & SW of Structure					Height		
Material	Other					Count	4	
Element Type	N/A		Element code	N/A		Total Qnty.	4	
Environment	-					Limited Insp.		
Protection System	None					Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor	-	-	
	Each	0	0	4	0			

Comments:
Erosion observed at all four corners. Moderately sloped and well vegetated embankments.

Recommended Work:						Maint. Needs	13	Erosion Control at Bridges
	Rehab	☐	Replace	☐				
	Urgent	☐	1-5 yrs	☐	6-10 yrs ☐	Urgent ☐	1 year ☒	

Element Data

Element Group	1400	Embankments and Streams					Length		
Element Name	1401	Streams and Waterways					Width		
Location	Below Structure						Height		
Material	Native						Count	1	
Element Type	N/A			Element code	N/A		Total Qnty.	1	
Environment	-						Limited Insp.		
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		-	-	
	All	0		0	0				

Comments:
Moderate volume, low flow from East to West with no obstructions observed.

Recommended Work:	Rehab		Replace		Maint. Needs	-	-
	Urgent		1-5 yrs	6-10 yrs	Urgent		1 year

Element Group	1300	Foundations					Length		
Element Name	1301	Foundation (below ground level)					Width		
Location	Below Abutment Walls						Height		
Material	Unknown						Count		
Element Type	Unknown			Element code			Total Qnty.	1	
Environment	Benign						Limited Insp.	X	
Protection System	None						Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor		1	Load Carrying capacity	
	N/A	0	0	0	1				

Comments:
South abutment has noticeably settled (Top of wingwalls and footings are inclined at 15 degrees).

Recommended Work:	Rehab		Replace		Maint. Needs	-	-
	Urgent		1-5 yrs	6-10 yrs	Urgent		1 year

Element Data

Element Group	600	Trusses/Arches				Length	20.50	
Element Name	602	Bottom chords				Width	0.42	
Location	East & West Side of Structure					Height	0.55	
Material	Cast-in-place concrete					Count	2	
Element Type	Rectangular-solid		Element code			Total Qnty.	113.98	
Environment	Severe					Limited Insp.		
Protection System	None					Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor	1	Load Carrying capacity	
	Sq. m.	0	63.98	25	25			

Comments:
Spalls on underside with exposed reinforcing steel. Long wide crack near mid span on exterior face of both chords. Medium to wide longitudinal crack with effloresnce and delaminations oberved on the interior face of chords.

Recommended Work:	Rehab	☐	Replace	☒	Maint. Needs	-	-
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	600	Trusses/Arches				Length	23.00	
Element Name	601	Top chords				Width	0.45	
Location	East & West Side of Structure					Height	0.70	
Material	Cast-in-place concrete					Count	2	
Element Type	Rectangular-solid		Element code			Total Qnty.	147.2	
Environment	Severe					Limited Insp.		
Protection System	None					Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor	-	-	
	Sq. m.	0	122.2	15	10			

Comments: Localized spalls with exposed corroded reinforcement. Medium to wide cracks with area of heavy efflorescence on inside and underside face of east arch. Light to moderate scaling observed throughout. Small spall with exposed corroded reinforcement at northeast underside of arch. Steel bracing appear to be generally in good condition with localized light corrosion and coating failure.

Recommended Work:	Rehab	☐	Replace	☐	Maint. Needs	08	Repair of bridge concrete
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☒

Element Group	600	Trusses/Arches				Length	0.20	
Element Name	603	Verticals/diagonals				Width	0.20	
Location	East & West Side of Structure					Height	1.75	
Material	Cast-in-place concrete					Count	8	
Element Type	Rectangular-solid		Element code			Total Qnty.	6.88	
Environment	Severe					Limited Insp.		
Protection System	None					Suspected Performance Deficiencies		
Condition Data	Units	Ex.	Good	Fair	Poor	1	Load Carrying capacity	
	Sq. m.	0	0	3.44	3.44			

Comments:
Severe delaminations and spalls with exposed reinforcement observed on most verticals.

Recommended Work:	Rehab	☐	Replace	☒	Maint. Needs	-	-
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Photo 1 Structure from north approach

Photo 2 Structure from south approach

Photo 3 North approach from centre of structure

Photo 4 South approach from centre of structure

Photo 5 East elevation

Photo 6 West elevation

Photo 7 South approach wearing surface

Photo 8 Moderate to severe scaling on visible portion of exposed deck top.

Photo 9 Typical view of southwest hazard sign

Photo 10 Wide cracks with efflorescence on east concrete arch.

Photo 11 Spall with exposed corroded reinforcement on east truss vertical.

Photo 12 Erosion and wide cracks noted at north abutment.

Photo 13 South abutment wall appears to be rotated inwards.

Photo 14 Southeast corner of foundation appears to have settled.

Photo 15 Typical view of underside of structure

Photo 16 Wide cacks with stains and spall noted on east exterior soffit

Photo 17 Wide cracks, spall and severe scaling noted on northwest wingwall

Photo 18 Delaminations, medium cracks with area of efflorescence and severe spalls with exposed corroded reinforcement noted soffit

Photo 19 Severe erosion observed at the base of the northwest wingwall.

Photo 20 delaminations, narrow cracks with efflorescence and spalls with exposed corroded reinforcement noted at ends of floor beams

Structure Condition Summary Form

Structure Name	29 - WG
Structure Number	29 - WG
Date of Inspection	April 01, 2024
Project No.	18015
Consultant	HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Approaches	Wearing Surface	Sq.m	6.00	66.00	0.00	58.00	4.00	4.00	396	271	68	09	18
Barriers	Railing Systems	m	200.00	61.60	0.00	56.60	5.00	0.00	12320	8890	72	08	00
	Posts (Steel/Concrete)	Each	200.00	16.00	0.00	14.00	1.00	1.00	3200	2180	68	08	08
Trusses/ Arches	Top Chords	Sq.m	300.00	173.90	0.00	151.90	12.00	10.00	52170	35618	68	00	00
	Verticals	Sq.m	300.00	12.77	0.00	8.77	2.00	2.00	3831	2213	58	00	00
	Bottom Chords	Sq.m	300.00	120.96	0.00	70.96	25.00	25.00	36288	18966	52	01	00
Decks	Deck Top - Thin Slab	Sq.m	120.00	118.80	0.00	0.00	71.28	47.52	14256	3421	24	09	00
	Soffit - Thin Slab	Sq.m	120.00	117.15	0.00	87.86	17.57	11.72	14058	8751	62	00	00
Beams/ Main Longitudinal	Floor Beams - Concrete	Sq.m	200.00	63.36	0.00	0.00	31.68	31.68	12672	2534	20	01	00
	Wingwalls	Sq.m	350.00	33.60	0.00	21.60	8.00	4.00	11760	6790	58	00	00
Abutment	Bearings	Each	1000.00	2.00	0.00	0.00	2.00	0.00	2000	800	40	00	00
	Abutment Walls	Sq.m	900.00	35.84	0.00	18.84	10.00	7.00	32256	16317	51	01	00
									195207	106751			

Bridge Condition Index (BCI) **55**

Municipal Structure Inspection Form
TOWNSHIP OF CENTRE WELLINGTON

Structure Name 29-WG

SIDEROAD 15

HP ENGINEERING INC.

HP Engineering

Municipal Structure Inspection Form

MTO Site Number:	**35-202**
BCI:	**55.00**

Inventory Data:

Structure Name:	29-WG						
Main Hwy/Road #		On ☑ / Under ☐	Crossing Type:	Navig. Water ☑	Non-Navig Water ☐	Rail ☐	Ped. ☐
				Road ☐	Other ☐		
Road Name	Sideroad 15						
Structure Location	0.7 km West of Second Line						
Latitude	N 43° 45' 26.3"		Longitude	W 80° 24' 09.5"			
Owner(s)	Township of Centre Wellington		Heritage Designation	Not Cons. ☐	Cons. /not App ☐	List/not Desig. ☐	Desig./not List ☐
					Desig.& List ☐		
MTO Region *	- -		Road Class	Freeway ☐	Collector ☐	Arterial ☐	Local ☑
MTO District *	- -		Posted Speed	80	No. of Lanes:	2	
Current County*	- -		AADT	39	% Trucks	0.00%	
Geographic Twp. *	West Grarafraxa		Special Routes:	Transit ☐	School ☐	Truck ☐	Bicycle ☐
Structure Type*	1 Bowstring Arch		Detour Length	9 (km)			
Total Deck Length	22.6 (m)		Fill on Structure	(m)			
Overall Str. Width	6.4 (m)		Skew Angle	(degrees)			
Total Deck Area	144.4 (sq. m)		Direction of Structure	E-W			
Roadway Width	5.6 (m)		No. of Spans	1			
Span Lengths.	21.4 (m)						

Historical Data:

Year Built	1928	Last Biennial Inspection	May 01, 2022
Current Load Limit	Unrestricted (tonnes)	Last BridgeMaster Inspection	
Load Limit By-Law #		Last Evaluation	
By-Law Expiry Date		Last Underwater Inspection	
Min. Vertical Clearance	4.00 (m)	Last Condition Survey	

Rehab History : (Date/description)

HP Engineering

Municipal Structure Inspection Form **MTO Site Number:** **35-202**

Field Inspection Information:

Date of Inspection:	April 01, 2024	
Inspector:	Tashi Dwivedi, P.Eng., (HP Engineering)	
Others in Party:	Sagar Chhayani, EIT, Tusharkumar Khunt, B.Tech. (HP Engineering)	
Equipment Used:	Hammer, tape, Hipwaders, camera	
Weather	Overcast	
Temperature	10	°C

Additional Investigations Required	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey:	☑	☐	☐	
DART Survey:	☑	☐	☐	
Detailed Coating Condition Survey:	☑	☐	☐	
Underwater Investigation	☑	☐	☐	
Fatigue Investigation:	☑	☐	☐	
Seismic Investigation:	☑	☐	☐	
Structure Evaluation:	☑	☐	☐	
Monitoring Deformation	☑	☐	☐	
Load Posting - Estimated Load 0			Total Cost	

Special Notes:
The structure is in poor condition and it is recommended to be rehabilitated/replaced. It is recommended that a rehabilitation / replacement study be performed ($22,000.00)

Next Detailed Inspection: April 2026

HP Engineering

Municipal Structure Inspection Form **MTO Site Number:** 35-202

Repair and Rehabilitation Required		Priority				Estimated Construction Cost
Element	Repair and Rehabilitation Required	6-10 years	1 - 5 years	Within 1 year	Urgent	
	Replace Structure	☐	☑	☐	☐	$1,174,000.00
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
		☐	☐	☐	☐	
						$1,174,000.00

Associated Work:	Comments	Estimated Cost
Approaches		
Detours	Engineering Fees (15%)	$100,000.00
Traffic Control	Approach SBGR	$60,000.00
Utilities		
Right of Way		
Environmental Study	Approvals	$10,000.00
Other		
Contingencies		
	Total Cost	$170,000.00

Justification

The outcome of condition survey, structural evaluation and other project constraints could result in significant escalation of estimated cost.

Construction Cost	$1,174,000.00
Associated Costs	$ 170,000.00
TOTAL Estimated Cost	$1,344,000.00

HP Engineering

Municipal Structure Inspection Form **MTO Site Number** **35-202**

Element Data

Element Group	900	Abutments				**Length**	6.40		
Element Name	901	Abutment Walls				**Width**			
Location	East & West Underside of Structure					**Height**	2.80		
Material	Cast-in-place concrete					**Count**	2		
Element Type	Conventional closed		**Element code**	1		**Total Qnty.**	35.84		
Environment	Moderate					**Limited Insp.**			
Protection System	None					**Suspected Performance Deficiencies**			
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	1	Load Carrying capacity		
	Sq. m.	0	18.84	10	7				

Comments: Medium scaling observed throughout abutments. Wide vertical cracks with areas of disintegration around crack noted on west wall and below northwest arch. Concrete disintegration observed at the top of east abutment wall below the northeast arch, and at the interface of the southeast wingwall. Narrow stained cracks, light to localized moderate scaling noted at east wall.

Recommended Work:	Rehab ☐	Replace ☒		**Maint. Needs**			
	Urgent ☐	1-5 yrs ☒	6-10 yrs ☐	Urgent ☐	1 year ☐		

Element Group	900	Abutments				**Length**			
Element Name	904	Bearings				**Width**			
Location	On East Abutment Wall					**Height**			
Material	Steel					**Count**	2		
Element Type	Plate		**Element code**	6		**Total Qnty.**	2		
Environment	Moderate					**Limited Insp.**			
Protection System	None					**Suspected Performance Deficiencies**			
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-		
	Each	0	0	2	0				

Comments:
Moderate corrosion noted on visible portion of steel bearing plates.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	-	-	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☐		

Element Group	900	Abutments				**Length**	4.00		
Element Name	903	Wingwalls				**Width**			
Location	NE, NW, SE & SW Of Structre					**Height**	2.10		
Material	Cast-in-place concrete					**Count**	4		
Element Type	Reinforced concrete		**Element code**	6		**Total Qnty.**	33.6		
Environment	Moderate					**Limited Insp.**			
Protection System	None					**Suspected Performance Deficiencies**			
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-		
	Sq. m.	0	21.6	8	4				

Comments:
Medium to severe scaling and honeycombing observed throughout wingwall. Vertical wide crack on southwest wingwall. Concrete disintegration observed on northeast and southeast wingwall.

Recommended Work:	Rehab ☐	Replace ☒		**Maint. Needs**			
	Urgent ☐	1-5 yrs ☒	6-10 yrs ☐	Urgent ☐	1 year ☐		

HP Engineering

Municipal Structure Inspection Form **MTO Site Number** **35-202**

Element Data

Element Group	1500	Accessories				**Length**	-	
Element Name	1501	Signs				**Width**		
Location	NE, NW, SE & SW of Structure					**Height**		
Material	Steel					**Count**	6	
Element Type	4 Hazard Signs, 2 Height Clearance		**Element code**	N/A		**Total Qnty.**	6	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Each	0	4	2	0			

Comments:
Signs are generally in good condition with the northeast hazard sign being twisted/leaning. Southwest sign slightly leaning. Small dents and light abrasion noted on signs.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	-	-	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☐		

Element Group	1600	Approaches				**Length**	6.00	
Element Name	1601	Wearing surface				**Width**	5.50	
Location	East & West of Structure					**Height**		
Material	Gravel					**Count**	2	
Element Type	Approach Wearing Surface		**Element code**	N/A		**Total Qnty.**	66	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	9	Rough riding surface	
	Sq. m.	0	58	4	4			

Comments:
Small to medium potholes noted on both approaches. Loose gravel noted throughout. Vegetation growth observed at shoulder.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	18	Regrade Approaches	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☒		

Element Group	400	Barriers				**Length**	0.35	
Element Name	403	Posts				**Width**	0.26	
Location	North & South Sides of Structure					**Height**	1.05	
Material	Cast-in-place concrete					**Count**	16	
Element Type	N/A		**Element code**	N/A		**Total Qnty.**	16	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	8	Pedestrian / Vehicular Hazard	
	Each	0	14	1	1			

Comments:
Spall with exposed corroded reinforcement observed on two post. Light scaling noted throughout. Deck barrier is substandard and should be replaced with a code complaint barrier.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	8	Repair of Bridge Concrete	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☒		

HP Engineering

Municipal Structure Inspection Form **MTO Site Number** **35-202**

Element Data

Element Group	400	Barriers				**Length**	2.20	
Element Name	402	Railing Systems				**Width**	0.15	
Location	North & South Underside of Structure					**Height**	0.15	
Material	Cast-in-place concrete					**Count**	28	
Element Type	Concrete post and bars		**Element code**	6		**Total Qnty.**	61.6	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	8	Pedestrian Vehicular Hazard	
	m.	0	56.6	5	0			

Comments:
Railings on wingwalls omitted since approach barrier has been installed. However, in northeast, southeast & northwest quadrants there are no approach barrier posts for the entire length of the wingwall (inadequate stiffness). Light to medium scaling noted throughout deck barrier.

Recommended Work:	Rehab ☐	Replace ☐				**Maint. Needs**	-	-
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐			Urgent ☐	1 year ☐	

Element Group	500	Beams/MLE's				**Length**	0.40	
Element Name	502	Floor Beams (Intermediate)				**Width**	6.40	
Location	Underside of Structure					**Height**	0.30	
Material	Cast-in-place concrete					**Count**	8	
Element Type	Rectangular-solid		**Element code**	4		**Total Qnty.**	63.36	
Environment	Moderate					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	1	Load Carrying capacity	
	Sq. m.	0	0	31.68	31.68			

Comments:
Numerous severe wide cracks, area of efflorescence stains, delaminations and spalls with exposed corroded reinforcement noted on floor beams, with the majority located at the end section of beams.

Recommended Work:	Rehab ☐	Replace ☒				**Maint. Needs**		
	Urgent ☐	1-5 yrs ☒	6-10 yrs ☐			Urgent ☐	1 year ☐	

Element Group	100	Decks				**Length**	21.60	
Element Name	102	Deck top				**Width**	5.50	
Location	Top of Deck					**Height**		
Material	Cast-in-place concrete					**Count**	1	
Element Type	Cast-in-place conc on supports, composite		**Element code**	1		**Total Qnty.**	118.8	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	9	Rough riding surface	
	Sq. m.	0	0	71.28	47.52			

Comments:
Moderate to severe scaling noted throughout with some small spalls and exposed corroded reinforcement.

Recommended Work:	Rehab ☐	Replace ☒				**Maint. Needs**	-	-
	Urgent ☐	1-5 yrs ☒	6-10 yrs ☐			Urgent ☐	1 year ☐	

HP Engineering

Municipal Structure Inspection Form | **MTO Site Number** | **35-202**

Element Data

Element Group	100	Decks				**Length**	21.30	
Element Name	103	Soffit Thin Slab (Interior)				**Width**	5.50	
Location	Underside of Deck					**Height**		
Material	Cast-in-place concrete					**Count**	1	
Element Type	N/A		**Element code**	N/A		**Total Qnty.**	117.15	
Environment	Benign					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Sq. m.	0	87.86	17.57	11.72			

Comments:

Moderately large areas of delaminations, medium to wide cracks, area of efflorescence stains and spalls with exposed corroded reinforcement observed throughout. Lots of birds nests observed on the soffit interior.

Recommended Work:	Rehab	☐	Replace	☒	**Maint. Needs**		
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	1400	Embankments and Streams				**Length**		
Element Name	1402	Embankments				**Width**		
Location	NE, NW, SE & SW of Structure					**Height**		
Material	Native					**Count**	4	
Element Type	N/A		**Element code**	N/A		**Total Qnty.**	4	
Environment	-					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Each	0	4	0	0			

Comments:

Steeply sloped, well vegetated and stable embankments. Light erosion noted at all corners.

Recommended Work:	Rehab	☐	Replace	☐	**Maint. Needs**	-	-
	Urgent	☐	1-5 yrs	☐	6-10 yrs ☐	Urgent ☐	1 year ☐

HP Engineering

Municipal Structure Inspection Form | **MTO Site Number** | **35-202**

Element Data

Element Group	1400	Embankments and Streams					**Length**		
Element Name	1401	Streams and Waterways					**Width**		
Location	Below Structure						**Height**		
Material	Native						**Count**	1	
Element Type	N/A			**Element code**	N/A		**Total Qnty.**	1	
Environment	-						**Limited Insp.**		
Protection System	None						**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**		-	-	
	All	0		0	0				

Comments:
High volume, and low flow from south to north with no visible flow obstructions.

Recommended Work:	Rehab ☐	Replace ☐	**Maint. Needs**	-	-		
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☐		

Element Group	1300	Foundations					**Length**		
Element Name	1301	Foundation (below ground level)					**Width**		
Location	Below Abutment Walls						**Height**		
Material	Unknown						**Count**		
Element Type				**Element code**			**Total Qnty.**	1	
Environment	Benign						**Limited Insp.**	X	
Protection System	None						**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**		-	-	
	N/A	0	1	0	0				

Comments:
No visible evidence of foundation instability at the time of inspection.

Recommended Work:	Rehab ☐	Replace ☐	**Maint. Needs**	-	-		
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☐		

Municipal Structure Inspection Form **MTO Site Number** **35-202**

Element Data

Element Group	600	Trusses/Arches				**Length**	21.60	
Element Name	602	Bottom chords				**Width**	0.45	
Location	North & South Sides of Structure					**Height**	0.50	
Material	Cast-in-place concrete					**Count**	2	
Element Type	Rectangular-solid		**Element code**			**Total Qnty.**	120.96	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	1	Load Carrying capacity	
	Sq. m.	0	70.96	25	25			

Comments:
Numerous large delaminations on the north face and underside and spalls with exposed corroded reinforcement noted along length of bottom chord. Medium delaminations noted on the inside face of bottom chords.

Recommended Work:	Rehab	☐	Replace	☒	**Maint. Needs**		
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	600	Trusses/Arches				**Length**	23.50	
Element Name	601	Top chords				**Width**	0.50	
Location	North & South Sides of Structure					**Height**	0.85	
Material	Cast-in-place concrete					**Count**	2	
Element Type	Rectangular-solid		**Element code**			**Total Qnty.**	173.9	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Sq. m.	0	151.9	12	10			

Comments:
Spalls with exposed corroded reinforcement and medium delamination on underside of both arches with majority on the north arch. Light to moderate scaling noted throughout. Graffitti noted at inside face of north arch of structure at the time of inspection.

Recommended Work:	Rehab	☐	Replace	☒	**Maint. Needs**	-	-
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

Element Group	600	Trusses/Arches				**Length**	0.20	
Element Name	603	Verticals/diagonals				**Width**	0.28	
Location	North & South Sides of Structure					**Height**	2.10	
Material	Cast-in-place concrete					**Count**	12	
Element Type	Rectangular-solid		**Element code**			**Total Qnty.**	12.77	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	Sq. m.	0	8.77	2	2			

Comments:
Spall with exposed corroded reinforcement on 3rd vertical from east on south side and 4th vertical from west on north side. Light to moderate scaling noted throughout.

Recommended Work:	Rehab	☐	Replace	☒	**Maint. Needs**	-	-
	Urgent	☐	1-5 yrs	☒	6-10 yrs ☐	Urgent ☐	1 year ☐

HP Engineering

Municipal Structure Inspection Form **MTO Site Number** # 35-202

Element Data

Element Group	600	Accessories				**Length**	-	
Element Name	603	Utilities				**Width**	-	
Location	North Side of Strucutre					**Height**	-	
Material	Metal					**Count**	1	
Element Type	Metal Conduit		**Element code**			**Total Qnty.**	1	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	each	0	1	0	0			

Comments:
Metal conduit is generally in good condition.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	-	-	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☐	Urgent ☐	1 year ☐		

Element Group	1600	Approaches				**Length**	NE & SE 28.6, NW & SW 32.4	
Element Name	1601	Approach Barrier				**Width**		
Location	NE, NW, SE & SW of Structure					**Height**		
Material	Steel					**Count**	4	
Element Type	Steel flex beam on steel posts		**Element code**	N/A		**Total Qnty.**	122	
Environment	Severe					**Limited Insp.**		
Protection System	None					**Suspected Performance Deficiencies**		
Condition Data	**Units**	**Ex.**	**Good**	**Fair**	**Poor**	-	-	
	m	0	118	2	2			

Comments:
Small dent observed at northeast end treatment. Small collision damage and dents observed throughout. Severe erosion noted near southwest end treatment.

Recommended Work:	Rehab ☐	Replace ☐		**Maint. Needs**	13	Erosion control at bridges	
	Urgent ☐	1-5 yrs ☐	6-10 yrs ☒	Urgent ☐	1 year ☒		

Photo 1 Structure from east approach

Photo 2 Structure from west approach

Photo 3 East approach from centre of structure

Photo 4 West approach from centre of structure

Photo 5 North elevation

Photo 6 South elevation

Photo 7 Vehicle damage on northeast end treatment

Photo 8 Potholes on west approach near deck

Photo 9 Typical barrier panel with arch on north side of structure

Photo 10 Moderate to severe scaling on deck wearing surface

Photo 11 Spall with exposed corroded reinforcement on north truss

Photo 12 Spall with exposed corroded reinforcement on floor beams and soffit exterior

Photo 13 Wide crack on north corner of east abutment wall

Photo 14 Typical underside of structure

Photo 15 Scaling on foundation of east abutment wall

Photo 16 Cracks with stains and small spalls noted on south exterior soffit

Photo 17 Typical hazard sign and end treatment at southeast corner

Photo 18 Large spall with exposed corroded reinforcement at northwest wingwall

Photo 19 Small spall, scaling and narrow cracks with efflorescence stains noted on arch ribs

Photo 20 Moderate scaling and severe concrete disintegration southeast wingwall interface

Photo 21 Vertical wide crack on southwest wingwall

Photo 22 Concrete disintegration observed east abutment and at the interface of the southeast wingwall

Structure Condition Summary Form

Structure Name 30-WG
Structure Number TS-BR-00024
Date of Inspection April 01,2024
Project No. 18015
Consultant HP Engineering Inc.

Element Group	Element Name	Unit (Qty.)	Unit Price (MTO)	Total Element Quantity	Element Qty. in Excellent Condition (1.00)	Element Quantity in Good Condition (0.75)	Element Quantity in Fair Condition (0.4)	Element Quantity in Poor Condition (0)	Total Replacement Value (TRV)	Current Element Value (CEV)	Element Condition Index	Performance Deficiency	Maintenance Need
Trusses/ Arches	Top Chords	Sq.m	300.00	100.00			50.00	50.00	30000	6000	20	00	00
	Verticals	Sq.m	300.00	100.00		50.00	50.00		30000	17250	58	00	00
	Diagonals	Sq.m	300.00	100.00		50.00	50.00		30000	17250	58	00	00
	Bottom Chords	Sq.m	300.00	100.00			50.00	50.00	30000	6000	20	00	00
Decks	Deck Top - Thin Slab	Sq.m	120.00	100.00	0.00	50.00	50.00	0.00	12000	6900	58	00	00
Beams/ Main Longitudinal	Floor Beams - Steel	Sq.m	420.00	100.00		25.00	50.00	25.00	42000	16275	39	00	00
Bracing	Bracing - Steel	Each	500.00	100.00			50.00	50.00	50000	10000	20	00	00
Abutment	Wingwalls	Sq.m	350.00	110.00		40.00	60.00	10.00	38500	18900	49	00	00
	Abutment Walls	Sq.m	900.00	110.00		40.00	60.00	10.00	99000	48600	49	00	00
									361500	147175			

Bridge Condition Index (BCI) **41**

Township of Centre Wellington

Municipal Structure Inspection Form

Structure Name: 30-WG
Structure No: TS-BR-00024
MTO Site No:

Inventory Data

Structure Name:	30-WG	Hwy No.					
Crossing Over:	Road	Crossing Under:	Road				
Road Name:	Sideroad 15						
Location:	Sideroad 15						
Owner:	TCW, Township of Centre Wellington (100 %)						
		Heritage Status:	N				
Latitude/Northing:		Longitude/Easting:					
MTO Region:		Road Class:	5				
MTO District:		Lane Type:					
Old County:		Posted Speed:		Lanes:	2		West Garafraxa
Geo Twp.:	West Garafraxa	AADT:		Trucks:	0	%	<NONE>
Structure Type:	TT - Through Truss	Min Vert. Clear.:		m			6
Material:	S - Steel	No. of Spans:	1				<NONE>
Articulation:							
Deck Length:	26.0 m	Special Routes:	☐ Transit ☐ Truck				
Deck Width:	6.7 m		☐ School ☐ Bicycle				
Deck Area:	174.2 m2	Detour Length:	8.00 km			Skew Angle:	degrees
Trav Deck Wdt	4.7 m		m			Structure Dir.:	E-W

Key Photo

Historical Data

Year Built: 1942	Superstruct. Year:	Year of Last Major Rehab:	
Last OSIM Inspection:	May 01, 2022	Contract No. When Built:	
Last Enhanced OSIM:		Last Evaluation:	
Last Enhanced Access:		Current Load Limit:	t t t
Last Underwater Insp.		Bylaw No.:	
Last Condition Survey:.		Bylaw Exp. Date:	

Township of Centre Wellington

Municipal Structure Inspection Form

Structure Name: 30-WG
Structure No: TS-BR-00024
MTO Site No:

Field Inspection Information

Inspection Date: April 01,2024 **Inspection Type** ☒ OSIM ☐ Enhanced OSIM **BCI:** 0.0

Inspector: Tashi Dwivedi, P.Eng., (H.P. Engineering) **Eng. Responsible:**

Others in Party: Sagar Chhayani and Tusharkumar Khunt, B.Tech. (H.P. Engineering)

Access Equip: ☐ Lift ☐ Ladder ☐ Boat ☐ Bridge Master Other:

Other Equipment: Hammer, tape, Camera, Chest waders

Weather: Sunny **Temperature:** 8 °C

Additional Investigations Required

Investigation	Priority			Estimated Cost
	None	Normal	Urgent	
Detailed Deck Condition Survey	☒	☐	☐	0.00
Delamination Survey of Asphalt-Covered Deck	☒	☐	☐	0.00
Concrete Substructure Condition Survey	☒	☐	☐	0.00
Detailed Coating Condition Survey	☒	☐	☐	0.00
Detailed Timber Investigation	☒	☐	☐	0.00
Post-Tension Strand Investigation	☒	☐	☐	0.00
Underwater Investigation	☒	☐	☐	0.00
Fatigue Investigation	☒	☐	☐	0.00
Seismic Investigation	☒	☐	☐	0.00
Structure Evaluation	☒	☐	☐	0.00
Monitoring of Deformations, Movements and Settlements	☒	☐	☐	0.00
Monitoring of Crack Widths	☒	☐	☐	0.00
			Total Cost:	0.00

Overall Structure Notes

Recommended Work On Structure: Major Rehab / replacement

Timing of Recommended Work: ADEQ

Next Inspection Date: April 2026 **Estimated Load Limit:** 0 t 0 t 0 t

Overall

It is recommended that a rehabilitation / replacement study be performed.

BCI Change Justification

The inspection was conducted on April 01, 2024 by Tushar Khunt (HP Engineering), Sagar Chhayani (HP Engineering). The bridge was closed at the time of the inspection. The following was noted during the inspection:

The existing end-treatments are substandard and should be replaced with code compliant end treatments. Moderate to severe rot was noted on the approach guiderail posts. Both diagonal members at the east end of the truss structure exhibited apparent deformations; possibly due to a vehicular collision.
Bracing members at the east end of the truss structure also exhibited apparent deformations; possibly due to a vehicular collision.
Light scaling was noted throughout the exposed concrete deck. Medium transverse cracks noted on bridge deck.
Severe concrete disintegration with exposed corroded reinforcement and area of heavy efflorescence damp stained narrow cracks throughout noted at the NE & SE wingwalls.
The floor beam at the east end of the structure was disconnected and had fallen into the stream. Several bracing members were also disconnected from the structure.
Multiple perforations were noted in the floor beams, stringers, bracing members and in the bottom chord of the truss structures.
Severe corrosion and section loss was observed at several of the connections in the truss structure.
Severe concrete disintegration was noted at both the east and west abutments. Localized spalls and delamination noted at west abutment. Moderate to severe concrete disintrigation with area of heavy efflorescence noted at west abutment.
Moderate spalls and delamination with area of heavy efflorescence noted both abutment walls. Top of east of ballast wall is completely disintegrated with severe scaling. Graffiti on northwest wing wall.

Township of Centre Wellington

Municipal Structure Inspection Form

Structure Name: 30-WG
Structure No: TS-BR-00024
MTO Site No:

Element Data
Repair/Rehabilitation Required
Associated Work

	Comments	Estimated Cost
Approaches		0.00
Detours		100,000.00
Traffic Control		60,000.00
Utilities		0.00
Right-of-Way		0.00
Environmental Study		10,000.00
Other		0.00
Contingencies		0.00
Engineering		0.00

Total Associated Work Cost	$ 170,000.00
Total Repair/Rehabilitation Cost	$ 1,414,000.00
Total Cost	$ 1,584,000.00

Photo 1 Structure from east approach

Photo 2 Structure from west approach

Photo 3 East approach from center of structure

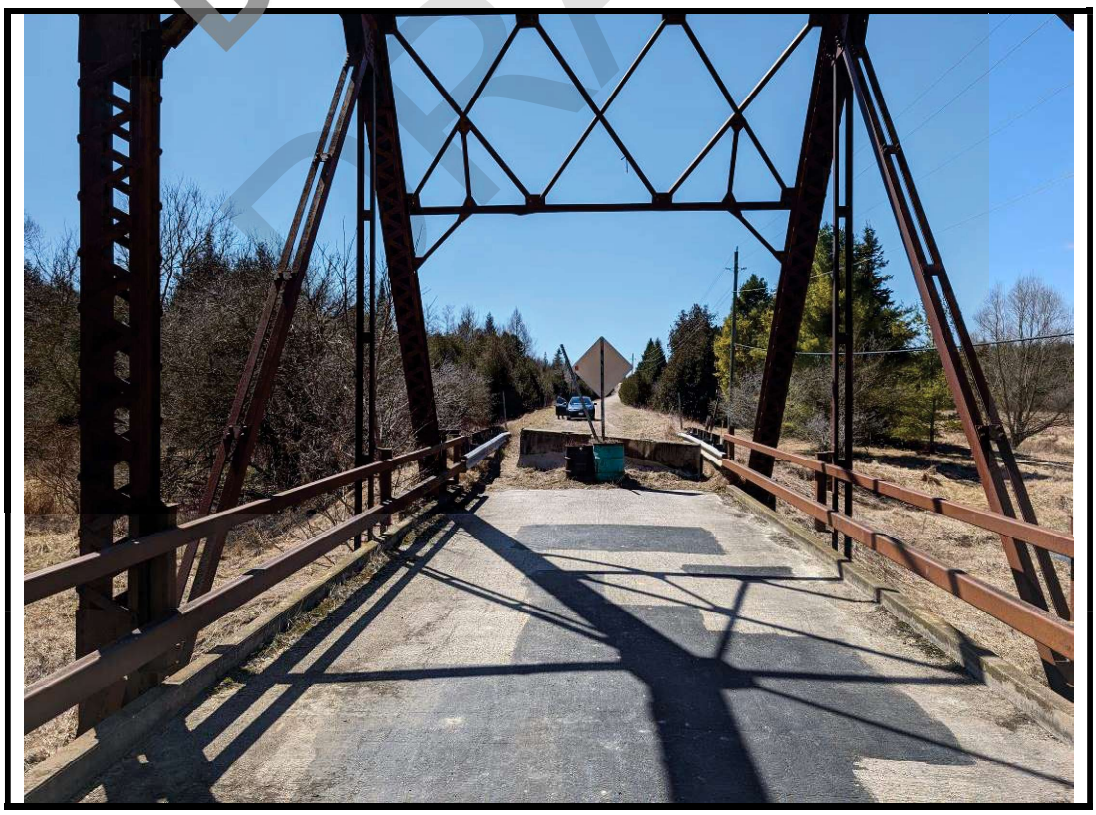


Photo 4 West approach from center of structure

Photo 5 North elevation

Photo 6 South elevation

Photo 7 Substandard approach barrier at NE approach

Photo 8 Previous asphalt patches on deck wearing surface

Photo 9 Deformation of truss elements and bracing at east side of structure

Photo 10 Perforations on north bottom chord

Photo 11 Perforations at girder ends at the east side of structure

Photo 12 Damaged bracing at east end of structure

Photo 13 Concrete Disintegration at SE wingwall

Photo 14 Concrete Disintegration, Scaling, and Cracks at east abutment wall

Photo 15 Severe corrosion and section loss at connections in the structure.

Photo 16 Severe concrete disintegration with area of heavy efflorescence at west abutment.

Photo 17 Top of east of ballast wall is completely disintegrated with severe scaling

Photo 18 Cracks with efflorescence and graffiti at northeast wing wall

Peninsula Heritage Ltd.

Archaeology & Built Heritage