COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN
CENTRAL BRUCE COUNTY

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COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN
CENTRAL BRUCE COUNTY

April 24, 2013

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File No. 11101

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COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN
CENTRAL BRUCE COUNTY

FINAL REPORT

1.0 INTRODUCTION

1.1 Purpose of the Report

The County of Bruce initiated a Bridge Infrastructure Master Plan process in July 2011 to define the best strategy for resolving deficiencies identified with a group of bridges situated in central Bruce County. The structures span the main branches of the Saugeen and Teeswater Rivers within a defined study area located immediately south of Paisley. Six of the bridges are at least 80 years in age and exhibit extensive deficiencies which will require either significant repairs or replacement within the next 5 – 10 years. The process followed the procedures set out in the Municipal Class Environmental Assessment (Class EA) document, dated October 2000, as amended in 2007 and 2011. B. M. Ross and Associates Limited (BMROSS) was engaged to conduct the Class EA process on behalf of the proponent.

The purpose of this report is to document the Master Planning process followed for this project. The report includes the following major components:

- An overview of the general project area.
- A summary of deficiencies associated with the existing structures.
- A review of specialized investigations completed in support of the Master Plan.
- A description of the alternative solutions considered for resolving the defined problems.
- A synopsis of the decision-making process conducted to select a preferred alternative.
- A detailed description of the preferred alternative.

The Bridge Infrastructure Master Plan established through this process sets out a preferred long-term strategy for transportation infrastructure within the defined study area. In this regard, the Master Plan will become the basis for, and be used in support of, future investigations for specific projects required to implement this strategy.

1.2 General Description of Master Plans

Master Plans are long-range plans which integrate infrastructure requirements for existing and future land uses with environmental assessment planning principles. These plans examine existing infrastructure systems within defined areas in order to outline a framework for planning subsequent works. Master Plans typically exhibit several common characteristics. They:

- Address the key principles of successful environmental planning.
- Provide a strategic level assessment of various options to better address overall system needs and potential impacts and mitigation.
- Address at least the first two phases of the Municipal Class EA process.
- Are generally long-term in nature.
- Apply a system-wide approach to planning which relates infrastructure either geographically or by a particular function.
- Recommend an infrastructure servicing plan which can be implemented through the completion of separate projects.
- Include a description of the specific projects needed to implement the Master Plan.

1.3 Integration with the Class EA Process

1.3.1 Class EA Project Phases

The Bridge Infrastructure Master Plan has been completed in accordance with the planning and design process of the Municipal Class Environmental Assessment. The Class EA is an approved planning document which describes the environmental assessment process that proponents must follow in order to meet the requirements of the Environmental Assessment Act (EA Act).

The Class EA approach allows for the evaluation of alternatives methods of carrying out a project, and identifies potential environmental impacts. The Class EA process is self-regulatory and municipalities are expected to identify the appropriate level of environmental assessment based upon the project they are considering.

The Class EA planning process is divided into five project phases which are described below and illustrated in Figure 1.1.

- Phase 1 - Problem identification.

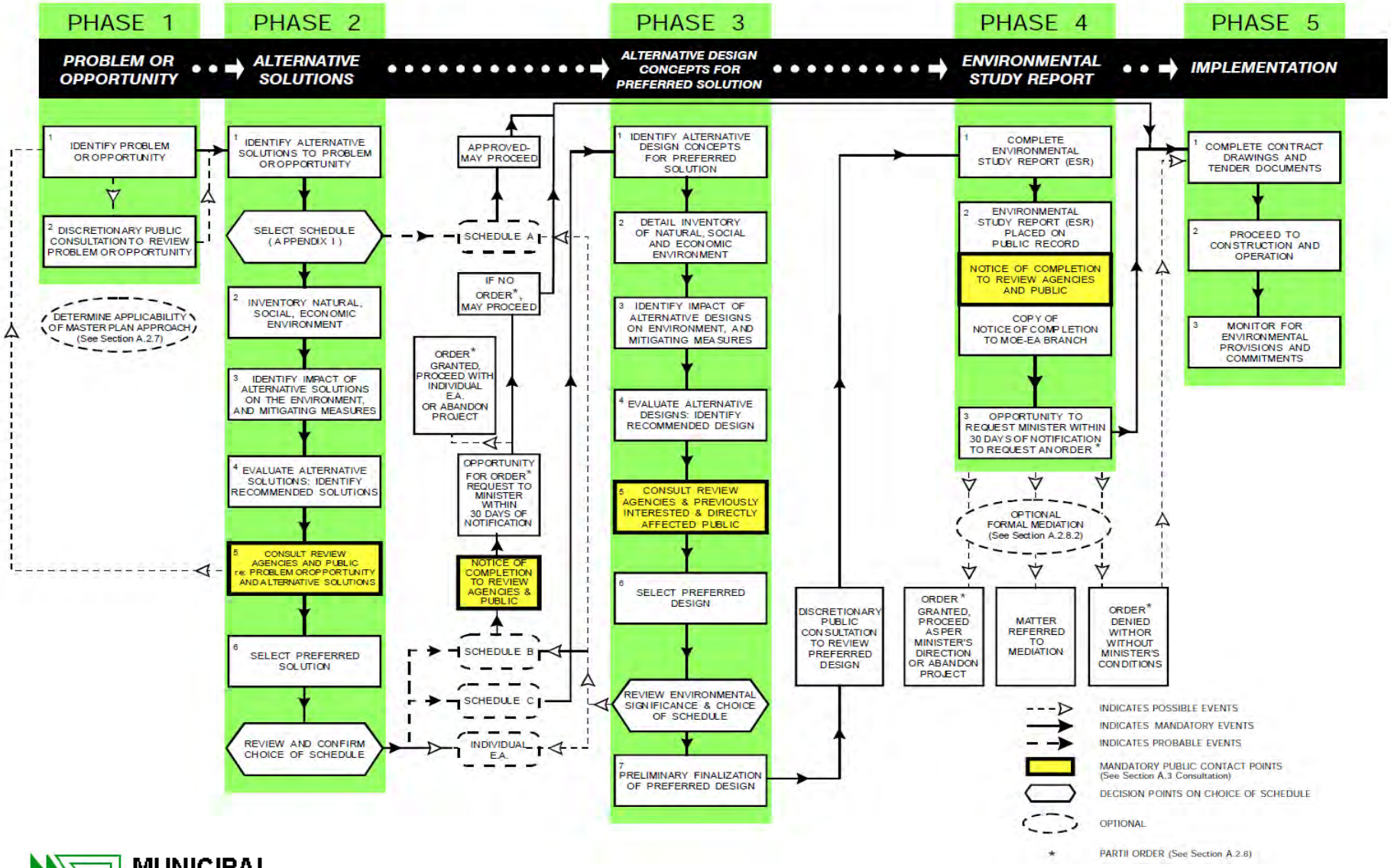
- Phase 2 - Evaluation of alternative solutions to the defined problems and selection of a preferred solution.

- Phase 3 - Identification and evaluation of alternative design concepts in selection of a preferred design concept.

- Phase 4 - Preparation and submission of an Environmental Study Report (ESR) for public and government agency review.

- Phase 5 - Implementation of the preferred alternative and monitoring of any impacts.

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



MUNICIPAL ENGINEERS ASSOCIATION

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COUNTY OF BRUCE
BRIDGE INFRASTRUCTURE MASTER PLAN
FOR CENTRAL BRUCE COUNTY
CLASS EA PROCESS

DATE: OCT 10, 2012

PROJECT No. 11101

FIGURE No. 1.1

1.3.2 Classification of Project Schedules

Projects associated with Master Plans are classified to different project schedules according to the potential complexity and the degree of environmental impacts that could be associated with the project. There are four levels of schedules:

Schedule A – Projects that are approved with no need to follow the Class EA process.

Schedule A+ – Projects that are pre-approved but require some form of public notification.

Schedule B – Projects that are approved following the completion of a screening process that incorporates Phases 1 and 2 of the Class EA process, as a minimum.

Schedule C – Projects that are approved subject to following the full Class EA process.

The Class EA process is self-regulatory and municipalities are expected to identify the appropriate level of environmental assessment based upon the project they are considering.

1.4 Master Plan Framework

1.4.1 Alternative Approaches

The Class EA document provides proponents with four approaches for conducting Master Plan investigations, given the broad nature and scope of these studies. Proponents are encouraged to adapt and tailor the Master Planning process to suit the needs of the study being undertaken, providing that at a minimum, the assessment involve an evaluation of servicing deficiencies followed by an review of possible solutions (i.e., Phases 1 and 2 of the Class EA process).

Table 1.1 summarizes the primary components associated with the four Master Plan approaches outlined within the MEA Class EA document.

Table 1.1
Summary of Master Planning Approaches

Approach	Key Characteristics	Project Implementation
# 1	- Master Plan prepared at the conclusion of Phases 1 and 2 of the Class EA process. - Completed at a broad level of assessment. - Serves as basis for future investigations associated with specific Schedule B and C projects.	- Schedule B and C projects would require further Class EA investigations.
# 2	- Master Plan prepared at the conclusion of Phases 1 and 2 of MEA Class EA process. - More detailed level of investigation and consultation completed, such that it satisfies requirements for Schedule B screenings. - Final public notice for Master Plan serves as Notice of Completion for individual Schedule B projects.	- Schedule B projects are approved. - Schedule C projects must complete Phase 3 to 4 of Class EA process.

Approach	Key Characteristics	Project Implementation
# 3	- Master Plan prepared at the conclusion of Phase 4 of Class EA process. - Level of review and consultation encompasses Phases 1 to 4 of the Class EA process. - Final public notice for Master Plan serves as Notice of Completion for Schedule B and C projects reviewed through the Master Plan.	- Class EA investigations are not required for projects reviewed through the Master Plan.
# 4	- Integration of Master Plan with associated Planning Act approvals. - Establishes need and justification in a very broad context. - Best suited when planning for a significant geographical area in the long term.	- Depending on level of investigation associated with the Master Plan, Class EA investigations may be required for specific projects.

1.4.2 Applied Framework

For the purposes of the Bridge Infrastructure Master Plan, it was determined during the course of the investigation that Approach #2 would be the most appropriate planning framework to utilize for this assessment. The Infrastructure Master Plan therefore defines broad infrastructure requirements within the study area, but also provides sufficient detail to satisfy future site specific issues associated with the implementation of project specific components.

The decision to apply Approach #2 for this Master Plan was based upon the following rationale:

- The level of consultation completed in conjunction with the Master Plan was sufficient to satisfy the MEA Class EA process associated with Schedule B Activities;

- Several Schedule B projects identified as a component of the preferred infrastructure servicing alternative must be implemented immediately to address ongoing deterioration at existing bridge sites. Utilization of this approach will permit implementation of these projects immediately upon completion of the Master Plan.

Upon completion, the Master Plan document will become the basis for Schedule B projects identified as part of the preferred infrastructure plan, and will be used in support of future investigations for specific Schedule C projects identified within it. Schedule B projects will be pre-approved based upon consultation completed as part of the Master Plan. Schedule C projects would be required to fulfill Phases 3 and 4 of the Class EA process and file an Environmental Study Report for public review.

1.4.3 Approval Requirements

The Bridge Infrastructure Master Plan is subject to approval from the County of Bruce as well as support from the Municipalities of Brockton and Arran-Elderslie, but does not require formal approval under the EA Act. However, those Schedule B activities which were reviewed in conjunction with the Master Plan are subject to formal approval, therefore the Completion Notice issued at the conclusion of the Master Plan will also serve as a Notice of Study Completion for Schedule B activities identified within.

If significant environmental impacts are identified with Schedule B activities identified within the Master Plan, or with Schedule C activities undertaken subsequent to completion of the Master Plan, a person/party may request that the County of Bruce voluntarily elevate the project(s) to a higher level of environmental assessment. If the proponent declines, or if it is believed that the concerns are not properly dealt with, any individual or organization has the right to request that the Minister of the Environment make an order for the project(s) to comply with Part II of the EA Act which addresses individual environmental assessments. This request must be submitted to the Minister within 30 days of the publication of the Notice of Completion of the Class EA process for any specific project.

1.5 Study Co-ordination

B. M. Ross and Associates Limited (BMROSS) conducted the Class EA planning process on behalf of the proponent, the County of Bruce. A Technical Steering Committee (TSC) was also formed to provide direction to study investigations. The Committee consisted of representatives from the Municipalities of Brockton and Arran-Elderslie, Bruce County Highways Department staff, representatives from the Bruce County Highways Committee, and BMROSS staff. Project information was presented to the TSC for input at all major stages in the process and prior to presentation to the general public. The Steering Committee reported to the Bruce County Highways Committee which reported directly to County Council, providing direction and recommendations on study investigations and results. Information associated with the Steering Committee meetings is included in Appendix ‘A’.

2.0 STUDY AREA DESCRIPTION

2.1 Background Review

A background review was carried out to obtain a general characterization of the project area and to identify factors that could influence the selection of alternative solutions to the defined problem.

The background review for the Master Plan process incorporated these activities:

- Assembly of information on the existing structures and the environmental setting.
- Review of deficiencies at each bridge site.
- Preliminary assessment of the identified deficiencies and potential remediation.

A desktop analysis of the project setting was completed as part of the background review process. The following represent the key sources of information for this analysis:

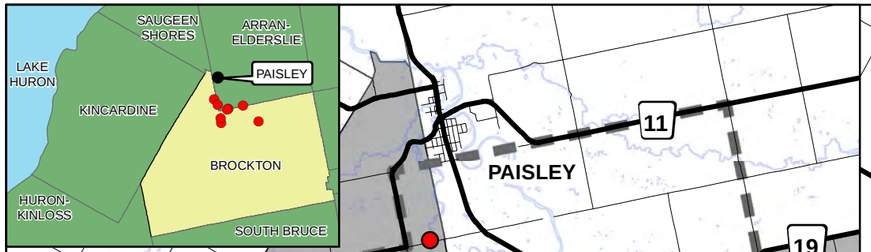
- BMROSS. Ontario Structure Inspection Manual (OSIM) reports and files.
- Saugeen Valley Conservation Authority (SVCA). Website and Mapping Services.
- Government of Canada. Species at Risk Public Registry website.
- Ministry of Natural Resources. Natural Heritage Information Centre website.
- County of Bruce. Files and discussions with staff.

2.2 General Environmental Setting

2.2.1 Central Bruce County

The County of Bruce forms the northwest portion of Southern Ontario and is bounded on the west by Lake Huron and on the northeast by Georgian Bay. The project study area is located in central Bruce County, just south of the Community of Paisley. The southwest portion of the study area is located within the Municipality of Brockton, while the northeast quadrant is within Arran-Elderslie. The limits of the study area boundary, as illustrated on Figure 2.1 (attached), are bounded by Bruce Road No. 1 to the north and west, Bruce Road 15 to the south and Bruce Road 19 to the east. Bruce Road 3 bisects the middle of the study area along the north/south axis.

Two main river systems traverse the countryside within central Bruce County being the Saugeen and Teeswater Rivers. The two watercourses converge in Paisley, just north of the study area limits. The two river systems have posed significant barriers to transportation in this portion of the County since overland transportation routes were first surveyed in the mid-19th century. The potential for numerous river crossings created a significant eastward deviation of the proposed Saugeen and Elora Roads, one of the first roadways surveyed within the region, and is the current route of Bruce Road 3. Five of the primary bridge structures included in the Master Plan are located on former municipal boundaries being the boundaries between the Townships of Brant, Greenock and Elderslie. The location of the primary bridge structures are illustrated on Figure 2.1.



STUDY AREA BOUNDARY

PAISLEY

PINKERTON

CHESLEY

20TH CONCESSION

McCURDY BRIDGE

WATSON'S BRIDGE

BIG IRWIN

LITTLE IRWIN

GREGG BRIDGE

DUDGEON BRIDGE

12TH OF BRANT

BRUCE ROAD 3

CONCESSION 8 ELDERSLIE

SIDEROAD 5 ELDERSLIE

BRUCE ROAD 10

BRUCE ROAD 11

SIDEROAD 25 ELDERSLIE

SIDEROAD 5

CONCESSION 22

CONCESSION 2 ELDERSLIE

CONCESSION 2A ELDERSLIE

SIDEROAD 10 SOUTH ELDERSLIE

SIDEROAD 30 NORTH

BRUCE ROAD 20

SIDEROAD 25

BASELINE NORTH

BRANT ELDERSLIE

SIDEROAD 10

CONCESSION 18

CONCESSION 14 WEST

BRUCE ROAD 19

CONCESSION 2

BRUCE ROAD 1

CONCESSION 16

BASELINE SOUTH

CONCESSION 12

CONCESSION 14

BANTING LINE

GREENOCK BRANT

CONCESSION 10 BRANT

SIDEROAD 20

SIDEROAD 25 NORTH

GAMBLE ROAD

BRUCE ROAD 15

CONCESSION 8

CONCESSION 11

CONCESSION 10 GREENOCK

CARGILL ROAD

BRUCE ROAD 3

CONCESSION 6 EAST

1

3

11

15

19

20

N

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COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN FOR CENTRAL BRUCE COUNTY

GENERAL LOCATION PLAN

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1 : 75,000	2.1

2.2.2 Physiography and Soils

Table 2.1 summarizes the general physiographic features and soils evident in the vicinity of the subject properties.

Table 2.1
Physiographic Features and Soil Types

Feature	General Characteristics
Physiography	• The bridge sites are located within the Saugeen Clay Plain physiographic region which is situated in the Saugeen River drainage basin, north of the Walkerton Moraine. • The Saugeen Clay Plain is a small clay plain underlain by deep stratified clay deposited in a bay of historic Lake Warren.
Soils (General)	• The river valleys at all bridge sites are classified as Bottomland. This is comprised of alluvial soils exhibiting variable drainage characteristics. • Soils immediately adjacent to the stream channels vary from Saugeen silty loam and Fox sandy loam to Elderslie clay loam. Most soils are a series of the Grey-Brown Podzolic soil group. These sandy till loams are typically comprised of brown, sandy loam, overlaying heavy clay till material. The series exhibits imperfect drainage characteristics.

2.2.3 Hydrology

Two major river systems bisect the study area limits; the Saugeen River to the east and the Teeswater River to the west. Six of the structures being examined as part of the Master Plan are located within the limits of the Teeswater river watershed, while two span the Lower Saugeen River channel.

The Lower Saugeen River, adjacent to the bridge sites, is utilized by local fisherman and canoeists; a launch site is currently situated on the northwest riverbank at the McCurdy Bridge. The river is located within the watershed limits of the Saugeen Valley Conservation Authority and is one of the largest river systems in southwestern Ontario, draining 2360 km^2 of predominantly rural Ontario from the community of Dundalk west towards its outlet at Lake Huron. The presence of numerous cold water streams in the upper reaches of the watershed provide excellent habitat for a variety of salmonoid species such as Brook Trout, Rainbow Trout, Brown Trout and Chinook Salmon. Bass and pike are also found within the Saugeen River watershed making it an important recreational fishery in the area.

The land use of the basin is predominately agricultural in nature with the intensity of cropping increasing generally from east to west. Forest cover varies from 40 to 50 percent in the eastern headwaters area to 10 to 15 percent in the western portion of the basin. Approximately thirty percent of the watershed remains in forest cover. The Teeswater River converges with the Saugeen at Paisley and drains an area of 683 km^2 from Paisley to the community of Teeswater. The watershed is home to the Greenock Swamp which is the largest forested wetland in Southern Ontario. Land uses within the Teeswater drainage basin are similar to the Saugeen, with agricultural uses being the predominant form.

2.2.4 Sensitive Natural Features in the Vicinity of the Project Sites

The project study area is located in central Bruce County within the Teeswater and Saugeen River watersheds, which are managed by the Saugeen Valley Conservation Authority (SVCA). The landscape is comprised of rural farmland with rolling terrain bisected by the many river systems. A review of sensitive natural heritage features located in the vicinity of the project area was carried out as part of the Master Plan background review. The Ontario Ministry of Natural Resources' Natural Heritage Information Centre (NHIC) database was consulted to verify the current status of significant natural areas in the vicinity of bridge sites. Utilizing a jurisdictional search method, five significant features were identified within a 10 km radius. Figure 2.2 illustrates the location of these sensitive natural features in relation to the project study area boundaries.

i. Greenock Swamp – Provincially Significant Wetland, LS-ANSI

The Greenock Swamp, which is located southwest of the project study area, is southern Ontario's single largest forested wetland. The swamp is designated as a Provincially Significant Wetland (PSW) as well as a Provincially Significant Life Science Area of Natural and Scientific Interest (ANSI). The swamp is situated in the headwaters of the Teeswater River system and is located approximately 8 km southwest of the Dudgeon Bridge.

ii. Elderslie Swamp - Locally Significant Wetland, LS-ANSI

The Elderslie Swamp is a locally significant wetland complex located approximately 7 km north of the McCurdy Bridge. This natural area has also been identified as a regionally significant Life Science ANSI and is approximately 280 ha in size.

iii. Edengrove Wetland Complex – Provincially Significant Wetland

Edengrove Wetland Complex is a provincially significant wetland located adjacent to the south boundary of the study area. It is comprised of four individual wetlands and three wetland types (3% fen, 83.6% swamp and 13.4% marsh) (Huizer, 1989). The site is situated approximately 3.5 km southwest of the 12th of Brant Bridge.

iv. Dunkeld Saugeen Oxbows – Locally Significant Wetland, LS-ANSI

The Dunkeld Saugeen Oxbows are located within abandoned river meanders (oxbows) adjacent to the Saugeen River channel, south of the study area. The site is comprised of several wetlands and woodlands which have formed within these abandoned channels and have been designated as a regionally significant Life Science ANSI as well as a locally significant wetland. This natural heritage features is situated approximately 5 km southwest of the 12th of Brant structure.

LEGEND

- PRIMARY BRIDGES
- STUDY AREA BOUNDARY
- WOODED AREAS
- PROVINCIALLY SIGNIFICANT LIFE SCIENCES ANSI
- WETLANDS
- PROVINCIALLY SIGNIFICANT WETLANDS

N

TOWNLINE BRUCE SAUGEEN
BRUCE ROAD 3
B LINE
CONCESSION 8 ELDERSLIE
ELDERSLIE SWAMP
CONCESSION 6 ELDERSLIE
BRUCE ROAD 10
SIDEROAD 25 ELDERSLIE
11
BRUCE ROAD 11
1ST AVENUE NORTH
GREY BRUCE LINE
PAISLEY
MILL DRIVE
JAMES STREET
SIDEROAD 5 ELDERSLIE
SIDEROAD 5
CONCESSION 22
CONCESSION 2 ELDERSLIE
SIDEROAD 10 SOUTH ELDERSLIE
CHESLEY
19
CONCESSION 8
SIDEROAD 15
CONCESSION 6
SIDEROAD 30
BRUCE GREENOCK SOUTH
CONCESSION 2A ELDERSLIE
BASELINE NORTH
BRANT ELDERSLIE
CONCESSION 14 EAST
BRUCE ROAD 10
20
SIDEROAD 20
CONCESSION 2
SIDEROAD 25
BRUCE ROAD 1
SIDEROAD 10
CONCESSION 18
CONCESSION 14 WEST
SIDEROAD 20 NORTH BRANT
CONCESSION 16
BASELINE SOUTH
CONCESSION 12
SIDEROAD 30 NORTH
1
CONCESSION 14
BANTING LINE
GREENOCK BRANT
SIDEROAD 20
SIDEROAD 25 NORTH
15
BRUCE ROAD 15
CONCESSION 10 BRANT
EDENGROVE WETLAND
GAMBLE ROAD
PINKERTON
CONCESSION 8
CONCESSION 11
SIDEROAD 5 GREENOCK
CARGILL ROAD
CONCESSION 6 EAST
SIDEROAD WEBER
CONCESSION 9
DUNKELD SAUGEEN OXBOW
BRUCE ROAD 19
CONCESSION 10 GREENOCK
CONCESSION 6 WEST
CONCESSION 8 EAST
3
CONCESSION 7
SIDEROAD 30
GREENOCK SWAMP
BRUCE ROAD 20

0 0.5 1 2 3 KILOMETRES

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BRIDGE INFRASTRUCTURE MASTER PLAN FOR CENTRAL BRUCE COUNTY

NATURAL HERITAGE FEATURES

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1 : 85,000	2.2

2.3 Bruce County Road Network

The County of Bruce is responsible for the maintenance and upkeep of approximately 600 kilometers of roadway. This road system contains 123 bridges that are located on, and form part of this road system. In addition to the bridges on the County road system, the Department is responsible for a number of bridges located on local municipal roads. Figure 2.2 identifies the location of most of the bridges that are currently part of the County road network.

The County bridges located on local roads became the County's responsibility either because the bridge was in excess of twenty feet and was located on a municipal boundary or the bridge was deemed the responsibility of the County by a Judge's Order. Following municipal amalgamations that occurred in 2000 and 2001, many of these bridges were no longer located on a municipal boundary. As of November 1, 2005, the County had jurisdiction over seventeen bridges on current or former Municipal boundary roads (roads which are not County Roads). Of the 17 bridges, 7 of these structures are on the Bruce/Grey boundary between Scone and Alvanley. Grey and Bruce Counties assumed this section of the Grey-Bruce Line on January 1, 2005 and the seven bridges became County bridges on a county road. Of the remaining 10 bridges, 5 are on current municipal boundaries while the other 5 are no longer on a municipal boundary.

Five of the bridges which are part of the Master Plan study are County maintained bridges located on local roads. Three of the structures are located on a current municipal boundary (McCurdy, Big Irwin, Watson's) while two (Dudgeon & 12th of Brant) are not. These five structures are also some of the oldest bridges currently maintained by the county, with the oldest (Big Irwin) being constructed in 1900 and the youngest (Dudgeon) constructed in 1930. At an estimated replacement cost in excess of 13 million, these five structures represent a significant capital commitment to the county when replacement of the structures becomes a necessity over the next 5 – 10 years as the condition of the bridges continues to deteriorate.

Given the close physical proximity of the structures and other similarities such as age, condition and capacity, the County felt that a review of the structures through a Master Plan assessment process was the most appropriate means to examine future outcomes associated with the crossings from a wider context that would consider a range of possibilities and the potential impacts associated with each.

N

Wiarton

Sauble Beach

Port Elgin

Paisley

Walkerton

Hanover

Lucknow

Kincardine

Lake Huron

LEGEND

BRIDGE

- COUNTY BRIDGE ON LOCAL ROAD
- COUNTY BRIDGE ON COUNTY ROAD

ROAD TYPE

- PROVINCIAL HIGHWAY
- COUNTY ROAD
- LOCAL ROAD
- BRUCE COUNTY
- STUDY AREA

0 5 10 20 30 KILOMETRES

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COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN FOR CENTRAL BRUCE COUNTY

COUNTY BRIDGE NETWORK

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1 : 300,000	2.3

2.4 Bridge Descriptions

The following section provides a brief description of each bridge included in the Master Plan study. Distinguishing features of each structure are identified, including notable deficiencies. Deficiencies associated with the bridges were identified during recent engineering inspections conducted by BMROSS and are summarized within 2010 Ontario Structure Inspection Manual (OSIM) reports provided in Appendix 'B'. Figure 2.3 illustrates the approximate location of each structure described below.

2.4.1 12th of Brant

Spanning the Saugeen River, the 12th of Brant Bridge is located on Concession 12 in the former Township of Brant (Brockton), 1.9 km west of County Road 19. This single lane, dual span steel through truss bridge was placed at the crossing in the 1920's following destruction of the previous crossing during a flood. With a total structural area of 472.42 square meters, the last inspection of the bridge occurred in 2010 and included repairs to the deck within the westerly span. The photo below illustrates the overall structural layout of the two separate truss spans.

12th of Brant Bridge

2.4.2 McCurdy's Bridge

Built in 1913, the McCurdy Bridge spans the Saugeen River on the Brant-Elderslie Road, 2 km east of County Road 3. This single span, through truss bridge can accommodate a single lane of traffic and covers a total structural area of 320.46 square meters. The 2010 OSIM inspection identified a number of deteriorated bridge components that would require remediation within 1-5 years including repairs to railings, trusses, floor beams, joints and bank erosion protection. The load limit of the structure was reduced to 5 tonnes in November 2012 due to significant corrosion identified during the 2012 bridge inspection. Repairs to the structure were initiated immediately, as the lower weight limit would not permit traditional snow removal equipment to cross the structure. The repairs were completed on December 20th, 2012 and the former triple load posting of 17/20/28 was restored. The photo below of McCurdy's Bridge demonstrates the overall shape and form of the steel truss.

BMROSS engineering better communities

COUNTY OF BRUCE

BRIDGE INFRASTRUCTURE MASTER PLAN FOR CENTRAL BRUCE COUNTY

BRIDGE LOCATIONS

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1 : 70,000	2.4

McCurdy's Bridge

2.4.3 Watson's Bridge

Watson's Bridge, which is located 6.3 km north of County Road 15 on the Greenock Brant Townline Road, spans the Teeswater River and was constructed in the 1920's. This single span, steel through truss bridge was last inspected in 2012. Repairs to the abutments and replacement of the end beams were identified as needing immediate attention. Replacement of the entire structure was recommended within the next 5 years. Emergency repairs to this structure were also required in December of 2012 due to significant deterioration identified during 2012 safety inspections of the bridge, requiring a reduced load posting to 5 tonnes. The necessary repairs were successfully completed and the structure subsequently reopened to traffic. The photos below demonstrate the overall structural layout and evidence of deterioration in the structure.

Watson's Bridge

2.4.4 Big Irwin

Spanning the Teeswater River, the Big Irwin Bridge is located on the Brant-Elderslie Road, 0.8 km west of County Road 3. This single lane, steel span bridge was erected in 1900 and has a total structural area of 151.9 square meters. The last inspection, completed in 2010 determined that repairs to the curbs and abutments would be needed within the next five years. Significant repairs to the structure were completed in 2010 due to a vehicle collision. Some of the same areas required additional repairs in 2012 due to another vehicle strike. The photos below demonstrate the overall structural layout and ongoing deterioration evident in the east abutment.

Big Irwin Bridge

2.4.5 Little Irwin

Constructed in 1953, the Little Irwin Bridge is a concrete rigid frame bridge located on the Brant-Elderslie Road, 0.4 km east of the Big Irwin. This two lane structure spans a tributary of the Teeswater River. The last inspection in 2010 determined that minor repairs to the structure were required due to spalling of concrete. The photos below of the Little Irwin Bridge demonstrate the overall structural layout of the bridge.

Little Irwin Bridge

2.4.6 Dudgeon Bridge

The Dudgeon Bridge is a three span structure located 3 km north of County Road 15 on the Greenock Brant Townline Road. Spanning the Teeswater River this half-through truss former rail bridge was constructed in 1930. Due to deficiencies relating to concrete spalling, deterioration of abutments, and poor alignment of approaches, it was recommended for replacement within the next 5 years. The photos below demonstrate the overall structural layout and a deficiency of concern associated with the Dudgeon Bridge.

Dudgeon Bridge

2.4.7 Gregg

The Gregg Bridge is located 3.8 km north of County Road 15 on the Greenock Brant Townline Road, spanning a tributary of the Teeswater River. The bridge is a two lane, concrete rigid frame bridge constructed in 1965 and was last inspected in 2012. There were no significant deficiencies identified at the time. The photo below of the Gregg Bridge demonstrates the overall structural layout.

Gregg Bridge

2.4.8 20th Concession

The Concession 20 Bridge is the only municipally owned structure that is being included as part of the Master Plan study. Constructed in 1920, the crossing is a single lane bridge located 0.6 km east of County Road 1 on Concession 20 of former Greenock Township. Spanning the Teeswater River this single lane, half-through truss bridge was last inspected in 2009. Major repairs were recommended which would reduce the load capacity or eventually lead to closure if not remediated. The photos below of the Concession 20 Bridge demonstrate the overall structural layout of the crossing and a deficiency of concern.

Concession 20 Bridge

2.5 Background Studies

2.5.1 General

A number of background reports were commissioned at the start of the Master Plan process in order to gain a better understanding of the project study area and to aid in the selection of preferred Master Plan alternatives. Specialists in cultural heritage, natural environment and transportation, were retained to provide individual reports on those specific aspects of the environment. The specialized studies completed in conjunction with the Master Plan include:

- Natural Environment Characterization Report, summarized within Section 2.4.5
- Cultural Heritage Evaluation Report, which examined the cultural significance of each of the structures.
- Stage 1 Archaeological Assessment, which identified the potential for buried cultural artefacts; and
- Traffic Analysis, which examined the impact of various study alternatives on the transportation network through the study area.

In addition, several studies were previously completed by the County of Bruce which have some bearing on the current analysis.

2.5.2 Bruce County Studies

i. Bruce County Road Designation Study (2004)

In 2003, the Bruce County Highways Committee undertook a study to assess the status of the County Road network in order to ensure that it was reflective of the current and future transportation needs of the County. The study reviewed the status of all roads within the county in order to identify those routes serving, 1) primarily local functions, and 2) those acting as through traffic roads. The study was also required to confirm that plans associated with a long-term bridge replacement program were in conformity with roads serving a County or regional function. None of the roads that are part of the current Bridge Infrastructure Master Plan were included in recommendations associated with the Road Designation Study.

ii. Bruce County Bridge Report (2005)

Following completion of the Road Designation Study, the County of Bruce released a report which inventoried and reviewed all bridges under the County's jurisdiction located on County roads as well as County-maintained bridges located on local roads. The report was undertaken in order to determine which bridges should remain County structures and which should be transferred to the jurisdiction of the local municipality. An additional goal of the report was to identify an appropriate Five-Year Bridge Repair Program and a Ten-Year Bridge Replacement Program, to achieve the transfers and to maintain the bridges remaining under the County's jurisdiction. Table 2.2 summarizes recommendations associated with seven of the eight bridges included in the Master Plan study, which were recognized in the report.

Table 2.2
Primary Bridge Structures Associated with
Findings from the Bruce County Bridge Report (2005)

Bridge Name	Location	Recommended Actions	Proposed Transfer
Dudgeon Bridge	Greenock-Brant Boundary	• Replace bridge in 2012	• Transfer to Brockton in 2012
Gregg Bridge	Brant-Greenock Boundary	• No major repair work needed	• Transfer to Brockton in 2006
McCurdy Bridge	Brockton/Arran-Elderslie Boundary	• Bridge should be considered for replacement in 15 – 20 years	• Retain ownership
Big Irwin Bridge	Brockton/Arran-Elderslie Boundary	• Closure in the period 2010 – 2015	• N/A
Little Irwin Bridge	Brockton/Arran-Elderslie Boundary	• Closure in the period 2010 – 2015	• N/A
Watson's Bridge	Brockton/Arran-Elderslie	• Replacement of bridge in 2014	• Retain ownership
12th of Brant Bridge	Concession 12, Brant Township	• Closure in the period 2010 – 2015	• N/A

2.5.3 Cultural Heritage Evaluation Report

i. Background

In accordance with the Ontario Heritage Act, R.S.O. 1990, which is administered by the Ministry of Tourism and Culture, a Heritage Impact Assessment is often required as a component of the Class EA process, when the structure being considered as part of the project is greater than 40 years in age. A preliminary Heritage Assessment was completed for all eight bridges included in the Bridge Infrastructure Master Plan in order to identify potential issues associated with the structural heritage features of the study bridges.

ii. Methodology

Golder Associates Limited (Golder) was retained by BMROSS to assess the cultural heritage value of each structure and to provide recommendations for future works. The study team consisted of a Senior Built Heritage Specialist and Cultural Heritage Specialist. Field reviews were conducted August 31st and September 1st of 2011 and included a site visit to each structure as well as examination of historical records associated with each bridge on file with the County.

iii. Cultural Heritage Evaluation

The Cultural Heritage Evaluation completed for the Bridge Infrastructure Master Plan utilized a scoring system based on criteria provided in Ontario Regulation 9/06 of the *Ontario Heritage Act*. The scoring system was designed to assess three primary characteristics of a structure being the design or physical value of the structure, the contextual value, and the historic or associative value. Each of the eight bridges was assigned a score based upon the criteria, along with comments explaining how the value was assigned.

The report also provided a brief description of other relevant provincial legislation that might have an impact on the cultural heritage of each bridge, including the Provincial Policy Statement (PPS), Ministry of Transportation, and local Official Plan policies. Sections 27 and 29 of the *Ontario Heritage Act* allow a municipality to list or designate a property or structure that is deemed to have cultural value or interest. Table 2.3 provides a summary of the cultural heritage evaluation completed for the eight structures included in the Bridge Infrastructure Master Plan.

iv. Recommendations

A number of recommendations were provided at the conclusion of the report which will be considered by the County Highways Committee in determining the most appropriate Master Plan option for implementation as well as identifying final outcomes for the study area bridges.

A copy of the Heritage Evaluation report is included within Appendix ‘C’.

Table 2.3
Cultural Heritage Evaluation Summary

Bridge Name	Cultural Heritage Characteristics	Score *
12th of Brant	• Two truss types; Pratt and more rare double-intersection Warren truss; • Technically advanced, rare designs, rare materials; some modifications; balanced and well proportioned; • Prominent structure, contributing factor in character of the region.	75
McCurdy's	• Pennsylvania truss is rare design; Intricately designed, rare materials; • Relatively unmodified for age; • Locally significant; Character defining structure.	75
Watson's	• Pratt through truss with lattice railings, concrete abutments & deck; • Well designed and relatively rare in region; rare materials; • Regionally significant and contributes to local character; • Constructed by Hamilton Bridge Works Co. Ltd., prolific builder-designer.	70
Big Irwin	• Single span Pratt through truss structure has been modified significantly over the years; • Regionally significant and contributes to local character; • Well designed and relatively rare in region, rare materials; • Constructed by Sarnia Bridge Company Ltd., prolific builder-designer.	65
Concession 2	• Warren pony truss with concrete abutments, modern deck constructed with timber; • Relatively rare survivor in region, rare materials; • Contributes to local character.	50
Dudgeon	• Two structure types; concrete and converted steel truss railway bridge; • Concrete and steel designs rare within region; • Lattice work on steel truss altered but rare; • Known builder-designer.	50
Little Irwin	• Concrete rigid frame structure; • Typical bridge design of era and region; • Familiar association with neighbouring bridge, Big Irwin.	20
Gregg	• Concrete rigid frame structure with modern steel guard rails and posts; • Typical bridge design of era and region, known builder; • Appropriate massing within landscape.	20

* Out of 100

2.5.4 Natural Environment Characterization Report

Natural Resource Solutions Inc. (NRSI) was retained to conduct a Natural Environment Characterization study in conjunction with the Master Plan. Individual habitat characterizations of the eight bridge sites in the Saugeen and Teeswater watersheds were completed, as well as one potential bridge site on the Saugeen north of McCurdy. The investigation examined sensitivities at each bridge site associated with each option being considered for the structure.

i. Methodology

Field investigations were conducted during the summer and fall of 2011. The study consisted of three primary components in order to analyse all potential impacts associated with the proposed Master Plan study. They are as follows:

- Background (Desktop) Analysis
- Individual Site Habitat Characteristics and Considerations
- Overall Recommendations

ii. Background Analysis

A background review of species at risk (SAR) occurrences was conducted using information collected from the Ontario Ministry of Natural Resources and Natural Heritage Information Centre (NHIC), Ontario Breeding Bird Atlas, and the Saugeen Valley Conservation Authority. The review indicated that no SAR records were present within the vicinity of any of the bridge sites. However, discussions with MNR staff indicated that ten SAR had the potential to be present within the study area. It should be noted that no SAR were found during the 2011 site visits. Table 2.4 lists the individual species, their preferred habitats and the potential for them to be present in the vicinity of the bridge sites.

iii. Individual Site Habitat Characteristics and Considerations

Individual site characteristics were examined in order to identify natural features that may be potentially impacted by construction activities at a given crossing. Both terrestrial and aquatic habitats adjacent to each of the bridge sites were reviewed to determine:

- Extent and sensitivity of natural areas present.
- Potential occurrences of SAR
- Significant vegetation communities.
- Aquatic habitat inventories up/downstream of crossings.

Table 2.5 summarizes the site characteristics and considerations for each of the crossing locations.

Table 2.4
Species at Risk Potential
Bruce County Infrastructure Master Plan

Species	Status	Preferred Habitat	Potential
Butternut (*Juglans cinerea*)	Endangered	Forested floodplains	Moderate
Tuberous Indian Plantain (*Arnoglossum plantagineum*)	Special Concern	Wet, sandy areas along river banks near Lake Huron	Low
Short-eared Owl (*Asio flammeus*)	Special Concern	Open grasslands and marshes	Low
Monarch Butterfly (*Danaus plexippus*)	Special Concern	Anywhere where milkweed is present	High
Least Bittern (*Ixobrychus exilis*)	Threatened	Large undisturbed marsh habitats	Low
Loggerheard Shrike (*Lanius ludovicianus*)	Endangered	Open pasture and grasslands with scattered low trees and shrubs	Low to Moderate
Pugnose Shiner (*Notropis anogenus*)	Endangered	Slow moving watercourses with clear water.	Moderate
Eastern Ribbonsnake (*Thamnophis sauritus septentrionalis*)	Special Concern	Close to watercourses and marshes	Low to Moderate
Rainbow Mussel (*Villosa iris*)	Endangered	Small to medium sized rivers	Low to Moderate
Hungerford's Crawling Water Beetle (*Brychius hungerfordi*)	Endangered	Cool, swift flowing alkaline streams with gravel and sand bottoms	Low

Figure 2.5 illustrates some of species identified as potentially being present.

iv. Recommendations

Based upon the results of the background review and on-site investigations of individual habitat characteristics and considerations, the following recommendations were developed in conjunction with the County of Bruce Bridge Infrastructure Master Plan:

- The less interference a crossing has on the watercourse and floodplain, the less of an overall impact it will have;

- Movement of abutments and/or piers out of the active channel, and decreasing the encroachment of approach-roads into the floodplain, will provide long-term benefit to wildlife by restoring some of the natural movement through the floodplain;

- Increasing floodplain capacity at a crossing would help to restore natural river-processes, however the impact and/or benefit on fish habitat must be further assessed;

A copy of the Natural Environment Characterization Report is contained within Appendix 'D'.

Figure 2.5
Potential SAR located within the Project Study Area

Photo Credit: Brian Kenney

Photo Credit: SCRCA

Photo Credit: Karen Weisel

Photo Credit: U.S. Fish and Wildlife Service

Photo Credit: John Lyons, Wisconsin DNR

Top: Eastern Ribbonsnake (Left); Rainbow Mussel (Right)
Middle: Butternut (Left); Hungerford's Crawling Water Beetle (Right)
Bottom: Pugnose Shiner

Table 2.5: Natural Environment Site Characteristics and Considerations

Site Characteristic and Considerations	Bridge								
	12th of Brant	**McCurdy**	**Watson's**	**Big Irwin**	**Concession 20**	**Dudgeon**	**Little Irwin***	**Gregg***	**No Existing Bridge (Concession 2A)**
Watercourse	**Saugeen River**	**Saugeen River**	**Teeswater River**	**Teeswater River**	**Teeswater River**	**Teeswater River**	**Teeswater River Trib.**	**Teeswater River Trib.**	**Saugeen River**
Species at Risk (SAR) Potential	Potential for SAR (Rainbow mussel)	Potential for SAR (Rainbow Mussel)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	Potential for SAR (Pugnose Shiner, Butternut, Tuberous Indian Plantain)	n/a	n/a	Potential for SAR (Rainbow Mussel, Butternut, Tuberous Indian Plantain)
Riparian Corners	•NW/SW: Pasture •NE/SE: Thick scrub brush with lots of herbaceous vegetation cover	•NW/SW: Cultural meadow •NE: Cattle fencing with regenerating scrub •SE: Scrub-brush of Willow, Maple and Poplar	•NE: Basswood and Walnut, with grassed banks •SW: Mature mixed forest •NE: Basswood and Willow meadow/shrub •SE: Graminoid/Goldenrod meadow	•NW/NE: Graminoid meadow •SW: Cedar scrub with historical or current grazing •SE: Graminoid meadow with active pasture	•NW: Meadow transitioning into Cedar bush •SW/NE/SE: Graminoid meadow with sparse occurrences of other species	•NW: Older scrub with Maple and Birch species, dense understory •SW/SE: Graminoid/ Goldenrod meadow •NE: Goldenrod meadow with mowed grass	n/a	n/a	•NW/SW: Natural scrub with naturalizing pasture behind •NE/SE: Band of Willow, and deciduous trees with graminoid understory
Banks/ Flooding Considerations	•Steep and high banks but relatively stable	•45° slope, relatively stable (minor erosion)	•NE and SE bank 45° slope, stable; W bank is stable	•10° slope on E bank leading to floodplain; 20° slope on NW (no floodplain)	•NW bank stable; E banks steep	•N side is floodplain; SW stable; NE has some eroding	n/a	•Roads occupy the broad floodplain	•W and E banks are steep (minor erosion)
Gradient/ Substrate/ Channel Morphology	•Very low gradient •100% pool (still water) •Fine substrates	•Low gradient •Dominated by pools (still water) •Fine substrates (cobbles present)	•Low gradient •100% pool (still water) • Shallow depths with silt-covered rock	•Medium gradient (S); low gradient (N) •100% pool (still water) (N) •Stone and silt substrate (S) •Fine substrates	•Medium gradient (S); medium/low gradient (N) •Silt-covered cobble and rubble substrates(N); less silt deposits (S)	•Medium/low gradient (u/s); low gradient (d/s) •100% pool (still water) •Rock (u/s), rock/slit (d/s)	n/a	n/a	•Medium/high gradient •Clean rock substrate (various sizes)
Water Clarity	Moderate turbidity	Moderate turbidity	Moderate/high turbidity	Low/moderate turbidity	Low/moderate turbidity	Low turbidity	n/a	Moderate/high turbidity	Low turbidity
Thermal Regime/ Timing Restrictions	•Migratory coldwater, resident coolwater and warmwater • In water work period: July 16 – September 14	•Migratory coldwater, resident coolwater and warmwater •In water work period: July 16 – September 14	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	•Coolwater and warmwater •Allowable in water work period: July 16 – March 14 (summer through to winter)	n/a	n/a	•Migratory coldwater, resident coolwater and warmwater • Inn water work period: July 16 – September 14
Sensitivity	Low	Low	Low	Low	Medium	High	Low	n/a	High
Mitigation Measures **Short-term**	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize probability of sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry	n/a	n/a	•Minimize riparian removal •Conduct in water work during appropriate timing window •Minimize duration of near water works •Two-tier approach to minimize sediments reaching watercourse •Isolate abutment and pier using coffer dam to work in the dry
Long-term	•Consider westward migration of channel in placement of west abutment •If possible, space abutments out of active channel •Reduce footprint in the floodplain	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•Avoid W forest (Walnut trees present with potential for Butternut to occur) •If possible, space abutments out of active channel •Reduce footprint in the floodplain	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road	•Avoid natural upstream side, expanding towards downstream (E) •If possible, space abutments out of active channel •Reduce footprint in the floodplain	n/a	n/a	•If possible, space abutments out of active channel •Reduce area footprint in the floodplain of the approach road
Considerations	•A new structure would be a net benefit if it restricts flood flows less than they are currently	•Less ecological impact by using existing road alignment •Increased flood-capacity will result in a net benefit to the river	•Good crossing location due to narrow floodplain width •Minimizing encroachment of forests with potential SAR will eliminate impact •Few piers would restore the river's floodplain	•Reduce encroachment of approach roads into floodplain •Increase in the distance between abutments may be beneficial •Riparian tree planting is encouraged in this area	•Long-term benefit from the removal of the existing abutments and replacement with a larger span, increasing the capacity of flood flows	•Wide floodplain makes this difficult crossing location •Abutment and piers should be placed outside of the bankful width of the active channel •Reach downstream needs riparian tree planting	n/a	n/a	•Site may be more sensitive to placement of a pier in the water given the higher gradient and associated higher force of channel-forming flows

2.5.5 Archaeological Investigation

(a) General

The project study area is bisected by two major river systems, being the Teeswater and Saugeen Rivers. These waterways provided an essential transportation corridor for early inhabitants of the area, creating a high potential for the discovery of pre-contact and historic era archaeological resources within the study area. Given this potential, William R. Fitzgerald, Ph.D. was retained to conduct a Stage 1 assessment of the project study area as part of the Master Plan Class EA process. The purpose of the work was to evaluate the archaeological potential of the study area; determine if there are known sites present; and conclude whether a Stage 2 field assessment process is warranted prior to any proposed construction activity. The goal of the archaeological assessment process is to determine whether any proposed construction will impact known or potential archaeological resources and, if so, offer options for the mitigation of construction impacts.

(b) Stage 1 Assessment

The Stage 1 archaeological assessment was carried out in February and March of 2012 for the project study area and the eight bridge sites being considered as part of the Master Plan review. The background review indicated that much of the area demonstrated potential for pre-contact and historic First Peoples sites and historic Euro-Canadian sites, due to the presence of the two major river systems as well as early transportation corridors which passed through the area. Follow-up reconnaissance demonstrated that although there has been some previous disturbance at each site associated with prior bridge and approach road construction, undisturbed lands located adjacent to the structures and approaches will require a Stage 2 survey if affected by the proposed construction.

The Stage 1 background study included a consideration of soils, topography and drainage for the study area, as well as a review of historic land use and settlement patterns. A field reconnaissance was also undertaken in order to document existing conditions. Although the precise nature of the proposed modifications at each bridge site were not known during completion of the Stage 1 Assessment, an additional review will be undertaken of each site once the final outcome for each structure is determined at the conclusion of the Master Plan process. Stage 3 investigations may be required if archaeological resources are discovered during the completion of Stage 2 assessments. A copy of the Stage 1 Archaeological Assessment is contained within Appendix ‘E’.

3.0 CLASS EA MASTER PLAN PROCESS

3.1 Overview

As discussed in Section 2.0 of this report, the County of Bruce currently owns and maintains five aging structures which span the Saugeen and Teeswater Rivers in south central Bruce County near the community of Paisley. The county-owned structures, as well as several municipally owned crossings, are located on local municipal roads and are situated in close physical proximity. As a group, they represent a significant potential capital expenditure to the county and local municipalities, should they all require replacement within the next 10 years. In order to address this situation the County of Bruce authorized BMROSS to undertake a Bridge Infrastructure Master Plan utilizing the Class Environmental Assessment planning process, to investigate potential outcomes associated with the structures.

The overall goal of the Master Planning process can be summarized as follows:

To develop a long range Infrastructure Master Plan for five county-owned and one municipally-owned structure located in central Bruce County and to identify outcomes for each of the structures which will include replacement, rehabilitation or retirement. These recommendations will be considered in conjunction with other road infrastructure and transportation needs within the study area and will be implemented over a 20 year timeframe.

The following sections of this report document the environmental assessment process conducted during the Master Planning process, as well as the identification of a preferred outcome for the Bridge Infrastructure Master Plan. The key components of the process are summarized below:

- A description of the identified transportation infrastructure deficiencies.
- Identification of practical options to resolve deficiencies in the long-term
- An evaluation of potential impacts associated with the identified alternatives
- Selection of a preferred infrastructure alternative.
- Identification of a conceptual implementation plan.
- Synopsis of issues related to the implementation of the infrastructure plan.

3.2 Problem Identification

Section 1.4 of this report indicates that the investigation followed Master Plan Approach #2, which addresses Phases 1 and 2 of the Class EA process and satisfies the requirements for Schedule ‘A’, ‘A+’, and ‘B’ screenings. Phase 1 of this process involves the identification of the problem, or problems, which need to be addressed. Given the structural deficiencies identified in conjunction with the Master Plan, the following problem statement has been developed to summarize issues central to this analysis:

> *Five county-owned and one municipally-owned structure, located on local municipal roadways near the community of Paisley, are aging and in poor condition and will require replacement over the next 20 years.*

These structures represent a significant capital commitment to the county which is unsustainable given that they do not form part of the county road network, are in close physical proximity, and experience relatively low volumes of traffic.

3.3 Identification of Alternative Solutions

3.3.1 General

At the start of the Master Plan process, a number of possible outcomes were considered for each of the structures being assessed through the study. The range of alternatives being reviewed could include the replacement, rehabilitation or retirement of each of the structures. The Gregg and Little Irwin Bridges were included in the Master Plan study due to their close physical proximity to the Dudgeon and Big Irwin bridges respectively. However, both bridges are currently in good condition and have few deficiencies and will therefore not require alteration in conjunction with the Master Plan study. However, these two structures will be impacted by the outcome which is ultimately selected for the adjacent crossing and roadway which currently connect the two crossings and may therefore have a bearing on future maintenance decisions associated with each of the crossings. A brief description of the work associated with each of the Master Plan outcomes is described in Table 3.1.

Table 3.1
Primary Components of the Identified Alternatives

Structural Options	Related Works
Replacement	- Replace the existing structure with a new concrete bridge designed in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code. - Reconstruct road approaches to accommodate the new bridge and to address existing approach road deficiencies. - Install rock rip rap erosion protection around piers and abutments adjacent to the channel to protect against scour.
Rehabilitation	- Replace all deteriorated components of structure with sympathetic components in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code.
Retirement (Repair and Eventual Closure)	- Replace significantly deteriorated components of existing structure with required components in accordance with established standards of the latest edition of the Canadian Highway Bridge Design Code in order to maintain the structure in a condition which is safe for posted load limits. - Establish timeline for eventual closure of the crossing. - Close crossing to vehicular traffic through installation of barricades and construction of cul-de-sacs. - Consider alternative uses for crossing such as pedestrian or recreational. - Remove bridge structure and salvage if possible. - Remove piers and abutments and associated road approaches. - Restore any disturbed sections of the river bank and channel.

3.3.2 Steering Committee Meetings

The project Steering Committee, which was formed to help guide study investigations, met on a regular basis during completion of the background studies to review the data and identify potential constraints which may affect study outcomes. Following completion of the background review, a Steering Committee meeting was held on August 15, 2012 to finalize the study alternatives and identify a preliminary preferred alternative to bring forward to the County Highways Committee for further evaluation. This section of the report examines the alternatives which were subsequently identified and the analysis of these options which assisted with the identification of a preferred option.

3.3.3 Guiding Principles

With three possible outcomes identified for each of the bridges included in the Master Plan Study, the range of options available for consideration became unmanageable. In order to simplify the process and streamline the decision making process, the Steering Committee adopted a series of guiding principles to assist with the identification of alternatives. The following guiding principles were proposed by committee members. Accordingly, each option considered in conjunction with the Master Plan incorporated these guidelines:

i) Replace only one of the Saugeen River crossings (McCurdy and/or 12th of Brant).

ii) Provide a full capacity crossing to access the central block of land bounded by C.R. 3, C.R. 1, C.R. 15 and Sideroad 5 Greenock.

iii) Rehabilitate the 20th Concession Bridge.

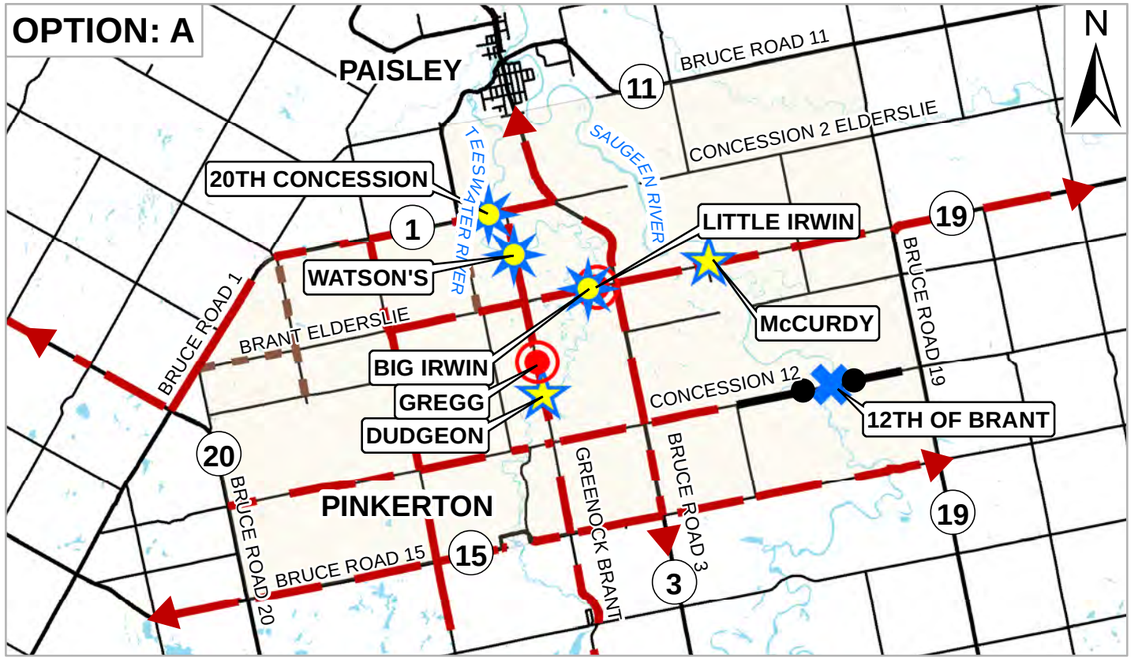
iv) Replace or close the Dudgeon Bridge (rehabilitation of the structure is not technically feasible).

3.3.4 Identification of Alternative Solutions

Based upon the guiding principles described above, and input received from the Steering Committee members, seven potential options were initially identified for inclusion in the formal evaluation of alternatives process. The options identified a series of outcomes for the primary study bridges as well as the anticipated costs to complete the proposed works. These options, and the associated costs, are illustrated on Figures 3.1 and 3.2 and are summarized in Tables 3.2 – 3.4

The do nothing option, although not detailed below, is a consideration during any Master Plan Class EA process. This option would propose that no improvements or changes be made to address the identified problem. During the Master Plan planning and design process, this alternative may be implemented at any time prior to implementation of the preferred option. A decision to “do nothing” would typically be made when the costs of all other alternatives, both financial and environmental, significantly outweigh the benefits.

OPTION: A



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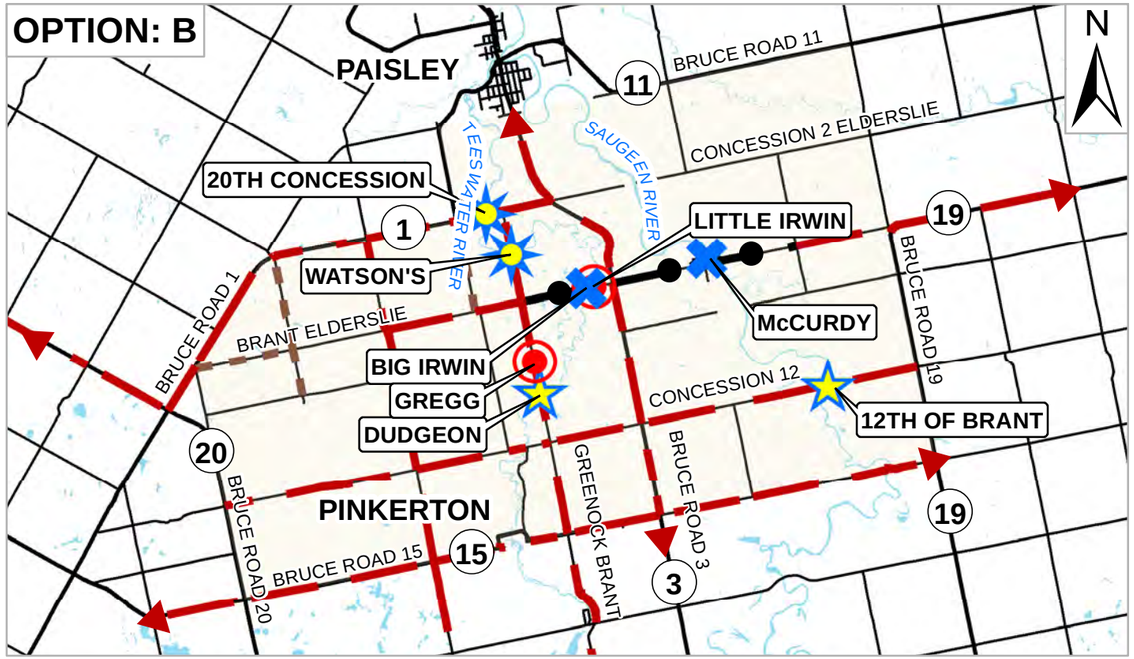

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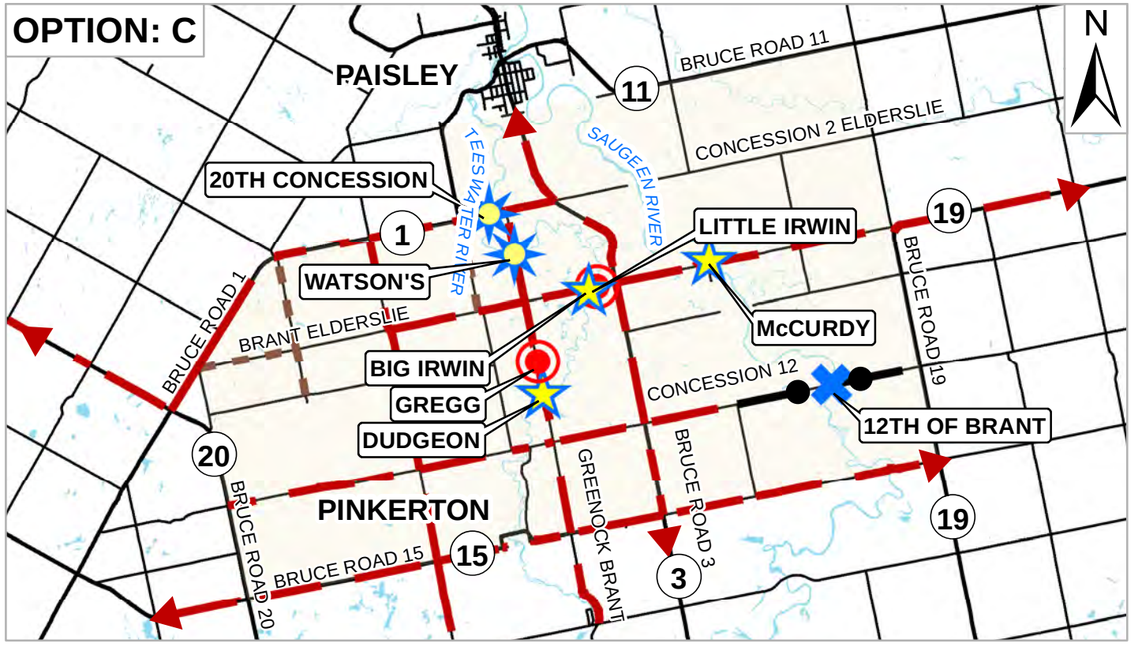
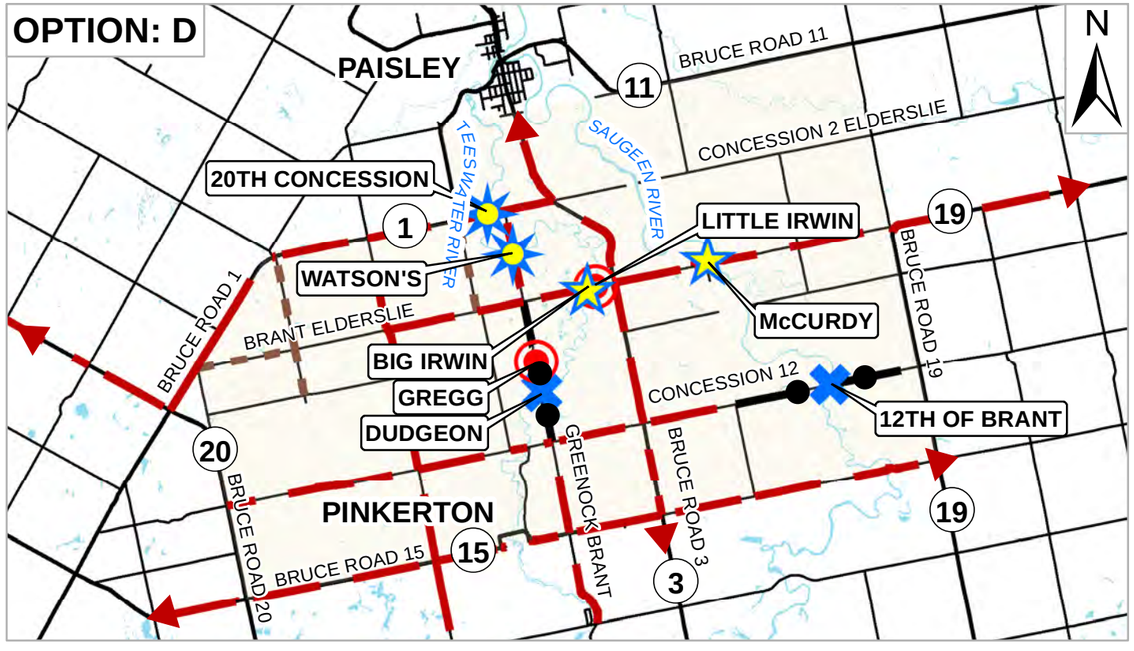


OPTION: D



LEGEND

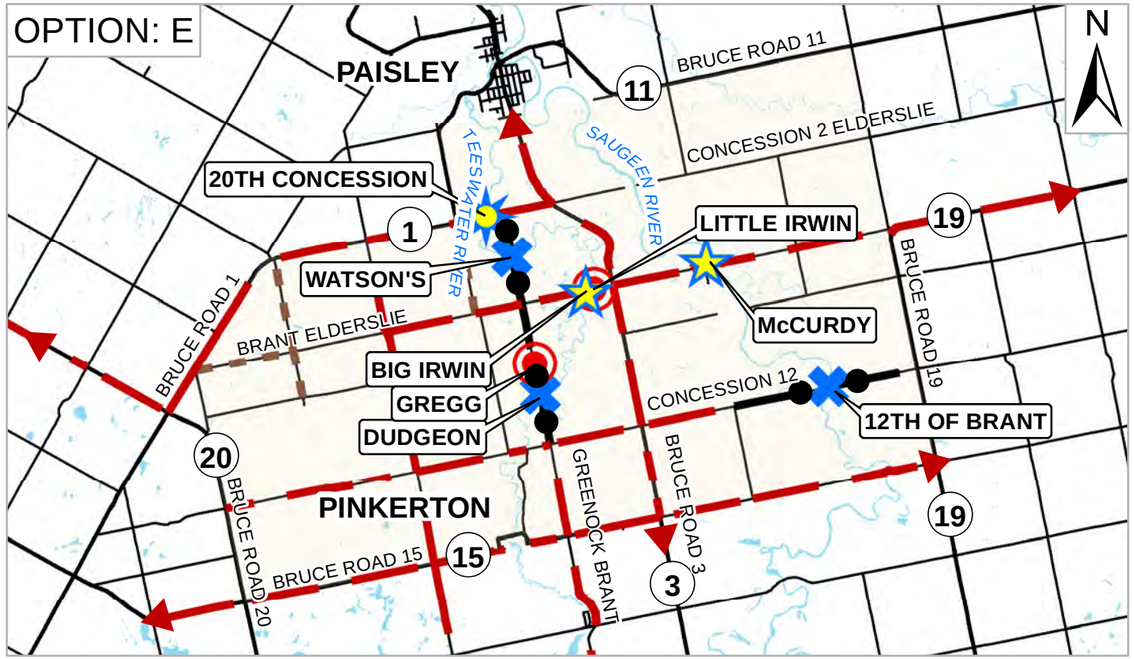
- BRIDGE (NO CHANGE)
- REHABILITATION
- EVENTUAL CLOSURE
- REPLACE
- CORRIDOR
- CUL DE SAC
- WINTER NON-MAINTENACE

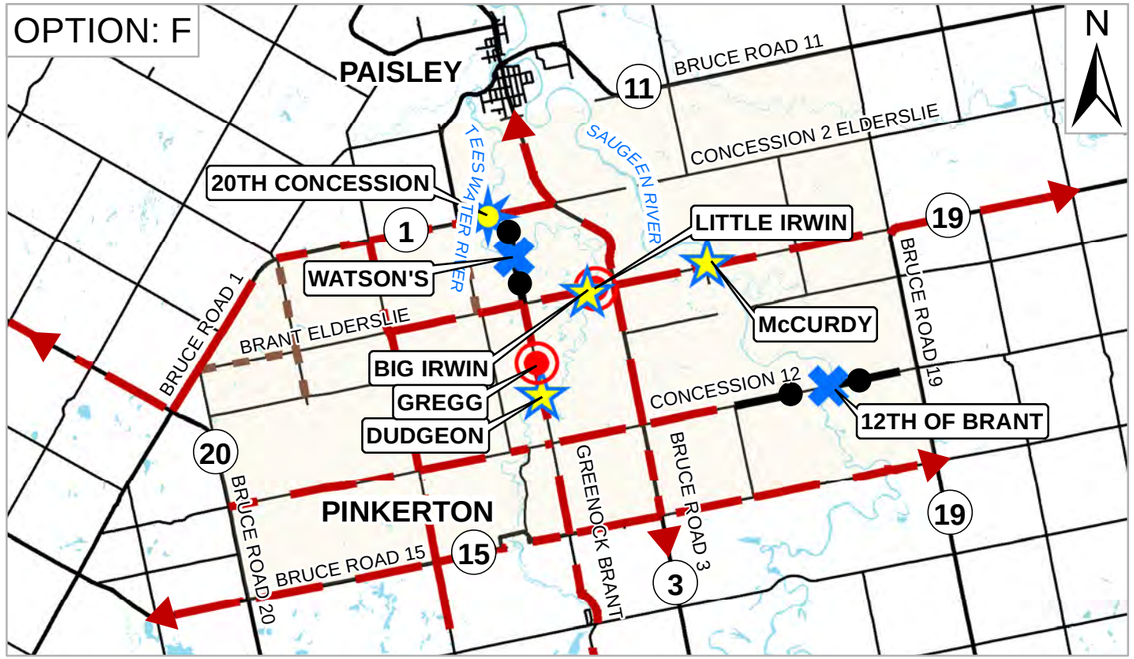
BMROSS engineering better communities

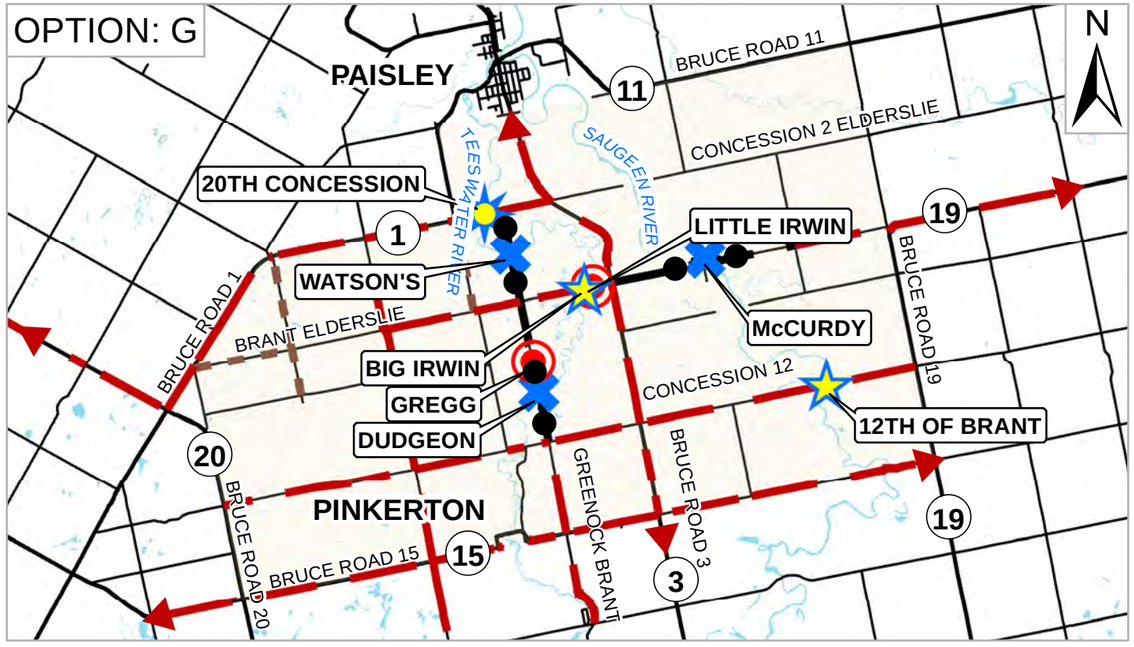
BRUCE COUNTY INFRASTRUCTURE MASTER PLAN
IMPLEMENTATION OPTIONS

OPTIONS: A - D

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1:130,000	3.1







LEGEND

- BRIDGE (NO CHANGE)
- EVENTUAL CLOSURE
- REHABILITATION
- REPLACE
- CORRIDOR
- CUL DE SAC
- WINTER NON-MAINTENACE

BMROSS engineering better communities

BRUCE COUNTY INFRASTRUCTURE MASTER PLAN
IMPLEMENTATION OPTIONS

OPTIONS: E - G

DATE	PROJECT No.
OCT. 10, 2012	11101
SCALE	FIGURE No.
1:130,000	3.2

Table 3.2
Preliminary Bridge Infrastructure Master Plan Options

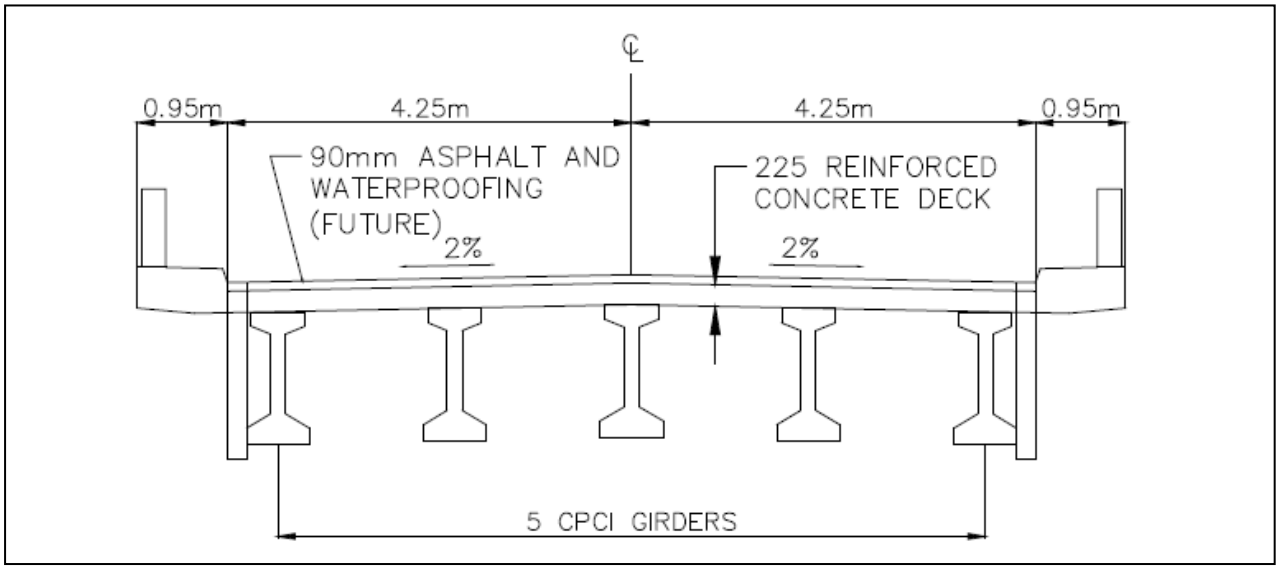
Options	Replace	Rehabilitate	Retire
A	Dudgeon/McCurdy	20th Concession/ Watsons/ Big Irwin	12th of Brant
B	Dudgeon/12th of Brant	20th Concession/ Watsons	McCurdy/ Big Irwin
C	Dudgeon/McCurdy/ Big Irwin	20th Concession/ Watsons	12th of Brant
D	Big Irwin/McCurdy	20th Concession/ Watsons	Dudgeon/ 12th of Brant
E	Big Irwin/McCurdy	20th Concession	Watsons/ 12th of Brant/ Dudgeon
F	Dudgeon/McCurdy/ Big Irwin	20th Concession	Watsons/12th of Brant
G	Big Irwin/12th of Brant	20th Concession	Watsons/ McCurdy Dudgeon

3.3.5 Engineering Review

(a) Design Considerations

In order to evaluate the potential impacts associated with each of the options being considered an engineering analysis was completed by BMROSS structural engineering staff. The evaluation included a review of each bridge site and associated road approaches to determine the size and configuration required for a new bridge crossing to be constructed at each location. Figure 3.3 illustrates the standard deck cross section to be used for the new structures.

Figure 3.3
Proposed Bridge Deck Cross-Section



The evaluation also identified horizontal and vertical alignment deficiencies for the existing road approaches at each crossing as well as proposing a preliminary engineering design for each site. Table 3.3 summarizes existing deficiencies of note associated with each crossing and design considerations identified through the engineering review.

Table 3.3
Bruce County Infrastructure Master Plan:
Engineering Design Considerations

Bridge Crossing	Approach Road Deficiencies	Potential Design Speed	Other Issues	Proposed Structure
Big Irwin	Steep west approach (14.1%)	60 kph	Laneway immediately west of bridge.	Two span bridge 16 m/28 m same location.
Dudgeon	Steep south approach (10.8%)	80 kph	Three laneways at crest of south hill. Poor horizontal alignment.	Two span bridge 27 m/27 m located 30 m d/s from existing
Watson	Steep south approach (11.7%)	80 kph	Two laneways at crest of south hill.	Three span bridge 20 m/25 m/ 15 m in same location.
20th Concession	Steep west approach (8-10.4%)	60 kph	Significant road fill required to improve vertical alignment.	Three span bridge 16 m/23 m/16 m in same location.
McCurdy	Steep west approach (9.7%)	60 kph	Cut and fill required on west approach to address vertical alignment issues.	Three span bridge 26 m/ 32 m/26 m with two in-water piers in same location.
12th of Brant	Steep west approach ends at bridge (8.7%)	80 kph	Two lanes at crest of west hill limit vertical alignment options.	Four span bridge 20 m/30 m/30 m/20 m in same location.

(b) Estimated Construction Costs

In order to estimate construction costs associated with each of the options detailed above, costs for the rehabilitation, replacement or retirement of each of the various structures needed to be determined. Table 3.4 summarizes anticipated construction costs for each of these outcomes for the primary bridges. Replacement costs for each structure also include the cost of approach road reconstruction, as required, to achieve the anticipated posted speed limit at each crossing. Various design speeds were considered for each bridge in order to determine the preferred speed which best suited the design limitations of the existing municipal roadway and anticipated construction costs required to upgrade existing approaches. The preferred design speed for each structure is shown in the following tables. Bridge closure costs would include the construction of a cul-de-sac adjacent to each end of the bridge as well as costs associated with the eventual removal of the structure.

Table 3.4
Estimated Construction Costs:

Structure	Potential Design Speed	Replacement	Rehabilitation	Retirement
Big Irwin	60 kph	$ 1,903,000.00	$ 530,000.00	$ 100,000.00
Dudgeon	80 kph	$ 2,287,400.00	N/A	$ 100,000.00
Watson	80 kph	$ 2,451,700.00	$ 419,000.00	$ 100,000.00
20th Concession	60 kph	$ 2,509,000.00	$ 416,000.00	$ 100,000.00
McCurdy	60 kph	$ 2,941,000.00	$ 677,000.00	$ 100,000.00
12th of Brant	80 kph	$ 3,408,600.00	$ 815,000.00	$ 100,000.00
Total		$ 15,500,700.00	$ 2,857,000.00	$ 600,000.00

(c) Estimated Costs for Municipal Partners

For County-owned structures located on local municipal roads, a portion of the costs detailed above would be paid by the local municipality. Typically, the County's responsibility would include the bridge structure and 30 metres of approaches on either side of the bridge. Any portion of the work that extends beyond 30 metres would be paid by the municipality having responsibility for that section of road. Where the roadway is a boundary road between two abutting municipalities, costs are split equally between the two municipal partners. Table 3.5 summarizes anticipated construction costs for each municipal partner for the seven study options.

Table 3.5
Estimated Construction Costs for Preliminary Bridge Infrastructure Options

Options	Bruce County	Arran-Elderslie	Brockton	Total
A	$ 5,457,800.00	$ 197,000.00	$ 1,038,600.00	$ 6,693,400.00
B	$ 5,320,400.00	-	$ 1,410,600.00	$ 6,731,000.00
C	$ 6,545,000.00	$ 339,900.00	$ 1,181,500.00	$ 8,066,400.00
D	$ 4,738,200.00	$ 339,900.00	$ 755,900.00	$ 5,879,000.00
E	$ 4,464,200.00	$ 339,900.00	$ 755,900.00	$ 5,560,000.00
F	$ 6,226,000.00	$ 339,900.00	$ 1,181,500.00	$ 7,747,400.00
G	$ 4,756,800.00	$ 142,900.00	$ 1,127,900.00	$ 6,027,600.00

3.4 Evaluation of Alternatives

3.4.1 General Process

Phase 2 of the Class EA process involves the evaluation of the defined alternatives and is conducted by examining the technical, economic, and environmental considerations associated with implementing any alternative. Mitigation measures that could lessen environmental impacts are also defined. A preferred solution or solutions is then selected. Several activities were incorporated into this assessment process, including a land use analysis, a site inspection, a review of expert technical opinion and consultation with affected stakeholders, and regulatory agencies.

3.4.2 Assessment Methodology

(a) Evaluation Method and Procedures

The evaluation of alternatives process was carried out using a comparative assessment methodology designed to predict the nature and magnitude of environmental impacts resulting from each defined option and to assess the relative merits of the alternative solutions. The evaluation method involves these principal tasks:

- Identification of existing environmental conditions (baseline conditions, inventories).
- Assessment of existing land use activities, infrastructure, natural features and socio-economic characteristics (i.e., environmental scoping).
- Review of proposed alternatives and related works.
- Determination of the level of complexity required to complete the impact assessment.
- Identification of environmental components and sub-components that may be affected by the defined alternatives (i.e., define evaluation criteria).
- Prediction of environmental impacts (positive, negative) resulting from the construction and operation of the defined options.
- Identification and evaluation of measures to mitigate adverse effects.
- Selection of a preferred alternative following a comparative analysis of the relative merits of each option.

(b) Public Consultation Program

Public consultation is an integral component of the Class EA process. Public consultation allows for an exchange of information, which assists the proponent in making informed decisions during the evaluation of alternative solutions.

The Ministry of the Environment (MOE) has established protocols for the design of Class EA public consultation programs in order to facilitate effective, two-way communication during the process. In this respect, the Ministry prescribes that to achieve meaningful participation, Class EA consultation plans should adhere to these key principles:

- Initiate consultation activities early in the process to promote dialogue and information sharing.
- Ensure project information is disseminated adequately and effectively to affected property owners, stakeholders, review agencies and Aboriginal Communities (where appropriate).
- Create multiple opportunities to engage interested parties and to solicit input.
- Present the assessment process and the project in an open and transparent manner.
- Establish a systematic method to record, review and consider input received.
- Promptly acknowledge, and attempt to address, concerns raised.
- Clearly document input received through consultation.
- Identify outstanding concerns at the conclusion of the process.

At the outset of the Master Planning process, a consultation program was developed that was considered to be appropriate for the local environmental context and suitable for the nature of the problem and the scale of the proposed alternatives. The general elements of the program are as follows:

- Hold an initial public meeting to introduce the project to residents and identify potential issues or concern to be addressed through the Master Plan process.
- Distribute background information to government review agencies.
- Compile and review comments received.
- Present preliminary preferred alternative to lower-tier municipal partners and County Council to obtain feedback and support prior to seeking input from the general public.
- Prepare a draft Master Plan report documenting the study results and identifying the preliminary preferred alternative.
- Make the preliminary report available for public and agency/stakeholder review.
- Arrange for a second public meeting to present the preferred alternative and to solicit input on potential impacts from residents and agencies.
- Compile and review comments received.
- Finalize the Master Plan report based on input received following the second public meeting.
- Make the report available for public review.
- Issue a Notice of Completion; circulate to interested parties and review agencies.
- Document input received and outstanding concerns within the Master Plan.
- Attempt to address any outstanding issues.

3.4.3 Identification of Environmental Components and Sub-Components

(a) Environmental Features

Section 3.3.3 of this report listed the alternative solutions that were identified to resolve the identified deficiencies. As part of the evaluation process, it is necessary to assess what effect each option may have on the environment and what measures can be taken to mitigate the identified impacts. The two main purposes of this exercise are to:

- Minimize or avoid adverse environmental effects associated with a project.
- Incorporate environmental factors into the decision-making process.

By definition, the EA Act generally separates the “environment” into five general elements:

- Natural environment.
- Social environment.
- Cultural environment.
- Economic environment.
- Technical environment.

The identified environmental elements can be further subdivided into specific components and sub-components, which have the potential to be adversely affected by the construction and/or operation of the alternative solutions. Table 3.6 summarizes the environmental components considered of relevance to this Class EA.

Table 3.6
Summary of Project-Related Environmental Considerations

Element	Component	Sub-Component
Natural	Aquatic	• Aquatic Resources • Fisheries
	Atmosphere	• Air Quality • Noise
	Surface Water	• Water Quality/ Quantity
	Terrestrial	• Amphibians & Reptiles • Birds & Mammals • Vegetation
	Geologic	• Physiographic Features and Soils • Drainage Characteristics
Social	Neighbourhood	• Disruption • Quality of Life
	Community	• Health and Safety • Recreational Activities
Cultural	Heritage	• Historical/ Cultural Resources
Economic	Project Area	• Capital and Operational Costs • Property Values
	Community	• Property Taxes
Technical	Transportation	• Traffic Patterns/ Volumes • Pedestrian/ Vehicular Safety • Accessibility
	Infrastructure	• Road Capacity/ Routes • Infrastructure Technologies

(b) Impact Analysis

The environmental effects of each project alternative on the identified environmental features are generally determined through an assessment of the following impact predictors (i.e., impact criteria):

- Nature (direct, indirect, cumulative).
- Magnitude (level of effect, loss of function).
- Location/ Extent (where effect occurs, number/ volume affected).
- Scale (localized or regional effects).
- Timing (seasonality of effects, immediate or delayed impacts).
- Duration (period of impact).
- Frequency (intermittent or continuous).
- Reversibility (extent of recovery, recovery time).
- Socio-economic and cultural context (characteristics of affected community).

For the purposes of this Master Plan Class EA process, criteria have been developed to predict the magnitude of environmental effects resulting from the implementation of a proposed alternative. Table 3.7 summarizes the impact criteria.

Table 3.7
Criteria for Impact Determination

Level of Effect	General Criteria
High	Implementation of the project could threaten sustainability of feature and should be considered a management concern. Additional remediation, monitoring and research may be required to reduce impact potential.
Moderate	Implementation of the project could result in a resource decline below baseline, but impact levels should stabilize following project completion and into the foreseeable future. Additional management actions may be required for mitigation purposes.
Low	Implementation of the project could have a limited impact upon the resource during the lifespan of the project. Research, monitoring and/or recovery initiatives may be required for mitigation purposes.
Minimal/ Nil	Implementation of the project could impact upon the resource during the construction phase of the project but would have a negligible impact on the resource during the operational phase.

Given these criteria, the significance of adverse effects is predicated on these considerations:

- Impacts from a proposed alternative assessed as having a Moderate or High level of effect on a given feature would be considered significant.

- Impacts from a proposed alternative assessed as having a Minimal/ Nil to Low level of effect on a given feature would not be considered significant.

3.5 Environmental Effects Analysis

The potential interactions between the identified alternatives and environmental features (Table 3.6) were examined as part of the evaluation of alternatives phase. The purpose of this analysis was to determine, in relative terms, the environmental effects of constructing and operating each identified option on the defined environmental components and sub-components (using the impact criteria described in Table 3.7). In this regard, the level of effect for the environmental interactions were rated as High, Moderate, Low and Minimal/ Nil. Potential mitigation measures were also considered as part of this evaluation.

Table 3.8 summarizes the outcome of the environmental effects analysis carried out for the seven Bridge Infrastructure Master Plan Options identified by the Steering Committee.

Table 3.8
Master Plan Options: Environmental Effects Analysis

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
Natural • Aquatic	(A)	Moderate	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon and McCurdy crossings.
	(B)	Moderate	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon and 12th of Brant crossings.
	(C)	Moderate to High	• Impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at the Dudgeon, McCurdy and Big Irwin crossings.
	(D)	Low to Moderate	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Big Irwin and McCurdy crossings.
	(E)	Low to Moderate	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Big Irwin and McCurdy crossings.
	(F)	Moderate to High	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the Dudgeon, McCurdy and Big Irwin crossings.
	(G)	Low to Moderate	• Some impacts to aquatic habitat are anticipated as a result of construction-related activities, as in-stream work will required at both the 12th of Brant and Big Irwin crossings.
• Terrestrial	(A)	Moderate	• Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy.
	(B)	Moderate	• Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at 12th of Brant.
	(C)	Moderate to High	• Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy and Big Irwin.
	(D)	Low to Moderate	• Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin.
	(E)	Low to Moderate	• Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin.

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)	Moderate to High	• Moderate impacts to terrestrial habitat are anticipated as a result of new Dudgeon Bridge alignment and wider footprint and approach road re-grading at McCurdy and Big Irwin.
	(G)	Low to Moderate	• Some impacts to terrestrial habitat are anticipated as a result of the wider footprint and approach road re-grading at McCurdy and Big Irwin
Social • Community	(A)	Low	• Some impacts to traffic movement are anticipated during construction, however overall impact is relatively low given that only one crossing will be closed and a majority of the crossings will be either replaced or rehabilitated. • Residents on the 12th Concession of Brant will have reduced accessibility following the closure of the 12th of Brant Bridge.
	(B)	Moderate	• Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. . • Impact is greatest to residents living on Brant Elderslie Road as both river crossings will be eventually closed.
	(C)	Low	• Some impacts to traffic movement are anticipated during construction, however overall impact is relatively low given that only one crossing will be closed and a majority of the crossings will be either replaced or rehabilitated. • Residents on the 12th Concession of Brant will have reduced accessibility following the closure of the 12th of Brant Bridge.
	(D)	Moderate	• Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. . • Impact is greatest to residents living on the 12th of Brant or adjacent to the Dudgeon Bridge as both river crossings will be eventually closed.
	(E)	Moderate to High	• Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. • Impact is greatest to residents living on Brant Elderslie Road as both river crossings will be eventually closed.

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)	Moderate	• Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. • Impact is greatest to residents living on the Greenock Brant Road as both river crossings will eventually be closed.
	(G)	Moderate to High	• Some impacts to traffic movement are anticipated during construction but will be short lived. Crossings will be replaced with higher capacity structures resulting in improvements to the overall transportation network within the study area. • Impact is greatest to residents living on the Greenock Brant Road and adjacent to the McCurdy bridge as all of these river crossings will be eventually closed.
Cultural • Heritage	(A)		• Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12th of Brant bridges are being replaced or rehabilitated. • Fewer impacts than other options as three of the structures are being rehabilitated.
	(B)		• Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12th of Brant bridges are being replaced or rehabilitated. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.
	(C)		• Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12th of Brant bridges are being replaced or rehabilitated. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.
	(D)		• Moderate impacts to cultural heritage values are anticipated given that both the McCurdy and 12th of Brant bridges are being replaced or rehabilitated. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.
	(E)		• Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(F)		• Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.
	(G)		• Highest impact to cultural heritage values given that only one structure will be rehabilitated and three structures will be closed. • Consideration should be given to retaining structures, once they are closed to vehicular traffic, for use as recreational or pedestrian crossings.
Economic • Municipal	(A)	Moderate	• Moderately expensive option for all partners.
	(B)	Moderate	• Least expensive option for Arran-Elderslie, which results in higher costs for Brockton and the County.
	(C)	Moderate to High	• One of the most expensive option for all partners. Potential impacts to County and local municipal infrastructure budgets. • Projects would be implemented over multiple years to help defray costs.
	(D)	Moderate	• One of the least expensive options for County and Brockton. Moderately expensive option for Arran-Elderslie.
	(E)	Moderate	• One of the least expensive options for County and Brockton. Moderately expensive option for Arran-Elderslie.
	(F)	Moderate to High	• One of the most expensive option for all partners. Potential impacts to County and local municipal infrastructure budgets. • Projects would be implemented over multiple years to help defray costs.
	(G)	Moderate	• One of the least expensive options for County and Arran-Elderslie. Moderately expensive option for Brockton.
Technical • Transportation	(A)	Low	• Fewer bridge closures with this option will minimize impacts to residents.
	(B)	Moderate	• Closure of the Big Irwin and McCurdy bridges will impact residents living on the Brant-Elderslie Road.
	(C)	Low	• Fewer bridge closures with this option will minimize impacts to residents.
	(D)	Moderate	• Closure of 12th of Brant and Dudgeon Bridges will impact residents in the south portion of the study area.

Environmental Component	Option	Level of Effect	Impact Considerations (Implementation and Operational Activities)
	(E)	High	• Closure of three bridges will have a greater impact on residents and the overall transportation network.
	(F)	Moderate	• Closure of Watson's and 12th of Brant will impact residents located adjacent to these two structures.
	(G)	High	• Closure of three bridges will have a greater impact on residents and the overall transportation network.

3.6 Preliminary Transportation Analysis

3.6.1 Background

Paradigm Transportation Solutions Inc. were retained to conduct a transportation analysis on various outcomes associated with the Master Plan. Impacts, and benefits, to the existing transportation network, which will result from implementation of various Master Plan alternatives, were examined to identify those options which will have the biggest effect on existing residents located within the study area.

3.6.2 Methodology

A variety of outcomes for the 6 primary bridges included in the study were selected by the Steering Committee formed in conjunction with the study. The options included combinations of bridge replacements, closures or rehabilitations. The options were then evaluated based on the following criteria in order to identify the preferred transportation alternative:

- Daily travel demand.
- Number of residents affected.
- Number of residents on a cul-de-sac.
- Travel distance.
- Available alternate routes.
- Emergency vehicle response time; and
- Agricultural equipment accessibility.

3.6.3 Preliminary Results

Each option was scored on a value from 1 to 7 based on how it performed relative to the other options. The better an option performed, the higher value it received. The maximum score that an option could receive was 42. In the end, the option(s) with the highest overall score was determined to be the best in regards to the transportation network. Table 3.9 illustrates the results of the analysis which resulted in Options A & C receiving the highest scores.

Table 3.9
Preliminary Transportation Criteria Analysis Scoring

Transportation Criteria	A	B	C	D	E	F	G
Daily Travel Demand	7	7	7	7	7	7	7
# of Residents Affected	7	3	7	5	2	5	1
Cul-de-sac Residents	7	4	7	3	1	5	2
Alternate Routes & Travel Distance	7	3	7	4	3	5	1
Emergency Vehicles	7	2	7	5	4	3	1
Agricultural Accessibility	7	3	7	5	2	4	1
Total	**42**	**22**	**42**	**29**	**19**	**29**	**13**

3.7 Preliminary Identification of a Preferred Solution

As an outcome of the preliminary assessment of alternatives which is described in Section 3 of the report and summarized in Table 3.7, and the results of the traffic analysis, the steering committee indicated an initial preference for Option A and Option C to present to the County Highways Committee for additional input. The individual components of these two options are summarized below:

Structure	**Option A**	**Option C**
Concession 20 Bridge	Rehabilitate	Rehabilitate
Watson's Bridge	Rehabilitate	Rehabilitate
Big Irwin Bridge	Rehabilitate	Replace
Dudgeon Bridge	Replace	Replace
McCurdy Bridge	Replace	Replace
12th of Brant Bridge	Eventually Close	Eventually Close

The only difference between the two options is the outcome associated with the Big Irwin Bridge. With Option A the Big Irwin is rehabilitated and with Option C the Big Irwin is replaced. Every other aspect of the two alternatives is exactly the same except for cost. Total estimated construction costs associated with Option A are $6,693,400.00, while estimated construction costs for Option C are $8,066,400.00.

3.7.1 County Highways Committee – September 13th, 2012

The Bruce County Highways Committee is a sub-committee of County Council which provides recommendations to County Council on matters related to County roadways and associated structures. Several members of this committee also sit on the project steering committee which was formed to help guide study investigations. Following the selection of Options A & C as the preliminary preferred Options, the information was presented the County Highways Committee on September 13, 2012 for their review and input.

Some committee members expressed concern over the anticipated closure of the 12th of Brant Bridge which was associated with Options A & C and asked that a timeline for the bridge be established with associated repairs to maximize the bridge's useful life. The committee also asked for a further review of the Dudgeon Bridge as well as information on the anticipated future ownership of each of the bridges. The Highway Committee Chair called for an additional meeting of Steering Committee meeting to be held to respond to these requests.

3.7.2 Steering Committee Meeting – September 18th, 2012

The project Steering Committee met again on September 18th to review the results of the September 13th Highway Committee's meeting and to discuss the additional information which was identified for review. This information is summarized below.

a) Bridge Timeline and Repair Forecast

Table 3.10
Bridge Timeline and Repair Forecast:
Dudgeon & 12th of Brant Bridges

	Dudgeon Bridge		12th of Brant Bridge	
2014	Riprap north abutment	$12,000	Repair concrete deck	$22,000
2014	Repair north pier	$18,000	Replace 6 deck beams	$ 9,000
			Repair approach guiderail	$ 3,000
2018	Overlay south decks	$22,000	Replace 6 deck beams	$ 9,000
2018	Repair concrete parapets	$24,000	Repair corroded trusses	$40,000
2022	Deck soffit patch repairs	$20,000	Replace 6 deck beams	$ 9,000
2022	Repair corroded trusses	$15,000	Repair vehicle strike damage	$18,000
2026			Close bridge to traffic	
2028	Close bridge to traffic			
Total		$111,000		$110,000

b) Future Bridge Ownership

Table 3.11
Future Anticipated Ownership of Study Area Bridges

Structure	Current Ownership	Proposed Modification	Proposed Ownership
Watson's	County	Rehabilitation	County
Big Irwin	County	Rehab/Replace	County
Little Irwin	County	No Change	County
Dudgeon	County	Replace	Brockton
Gregg	County	No Change	Brockton
McCurdy	County	Replacement	County
12th of Brant	County	Retire	Brockton
20th Concession	Brockton	Rehabilitation	Brockton

c) Analysis of Results

The steering committee members reviewed the new data and concluded the following in regards to the new information:

- Questioned whether traffic volumes on the Greenock-Brant Road justify the estimated cost of approximately two million dollars to reconstruct the Dudgeon Bridge crossing.
- Regular repairs to the Dudgeon and 12th of Brant Bridges, estimated at $100,000/bridge, would allow approximately 15 years of continued use for both structures.

The committee reexamined traffic volumes previously collected within the study area. It was apparent that volumes recorded along the east/west corridors currently exceed those along north/ south routes. Traffic volumes recorded on the 12th Concession, which are illustrated on Figure 2.5a of the Paradigm traffic assessment (Appendix 'E') range between 105 – 268 vehicles per day (vpd) while volumes recorded along the Greenock-Brant Road, where the Dudgeon Bridge is located, range between 40 – 74 vpd.

Given this information, the committee proposed a new Option to be presented to the Highways Committee for consideration. The new alternative included the eventual closure of the Dudgeon Bridge and rehabilitation of the 12th of Brant, while leaving all other outcomes the same as Option C. The primary components of the new alternative, Option H, are outlined below.

Structure	**Option H**
Concession 20 Bridge	Rehabilitate
Watson's Bridge	Rehabilitate
Big Irwin Bridge	Replace
Dudgeon Bridge	Retire
McCurdy Bridge	Replace
12th of Brant Bridge	Rehabilitate

c) Anticipated Costs

Table 3.12
Estimated Costs and Timelines for Implementation of Option H

Year	Project	Bruce County	Arran-Elderslie	Brockton	Total
2013	Watson's Rehab	$419,000.00	-	-	$419,000.00
2014	Rebuild Big Irwin	$1,617,200.00	$142,900.00	$142,900.00	$1,903,000.00
2015	Rehab 12th of Brant	$815,000.00	-	-	$815,000.00
2015	Rebuild McCurdy	$2,547,000.00	$197,000.00	$197,000.00	$2,941,000.00
?	Close Dudgeon	$100,000.00	-	-	$100,000.00
?	Rehab 20th Conc.	-	-	$416,000.00	$416,000.00
Total		$5,498,200.00	$339,900.00	$755,900.00	$6,594,000.00

c) Bruce County Highways Committee Meeting – September 20th, 2012

The new alternative, Option H, was presented to the County Highways Committee at their September 20, 2012 meeting for input prior to being presented to the two lower-tier municipal councils for their review and comment. Upon further consideration of the costs and timelines for eventual closure of the Dudgeon and 12th of Brant bridges associated with this option, the committee recommended a slight revision to Option H which would propose the eventual closure of the 12th of Brant and Dudgeon bridges in approximately 15 years. During the intervening years the bridges would be evaluated on a regular basis and repairs undertaken in order to keep the structures open as long as possible and operating at a similar load limit to the current posting.

Table 3.12 illustrates the revised costs and timelines associated with the revised version of Option H.

Table 3.13
Estimated Construction Costs for Revised Option H

Year	Project	Bruce County	Arran-Elderslie	Brockton	Total
2013	Watson's Rehab	$419,000.00	-	-	$419,000.00
2013	Repair 12th of Brant	$34,000.00	-	-	$34,000.00
2013	Repair Dudgeon	$30,000.00	-	-	$30,000.00
2014	Rebuild Big Irwin	$1,617,200.00	$142,900.00	$142,900.00	$1,903,000.00
2015	Rebuild McCurdy	$2,547,000.00	$197,000.00	$197,000.00	$2,941,000.00
?	Rehab 20th Conc.	-	-	$416,000.00	$416,000.00
Total		$4,647,200.00	$339,900.00	$755,900.00	$5,743,000.00

3.7.3 Presentation to Municipal Councils

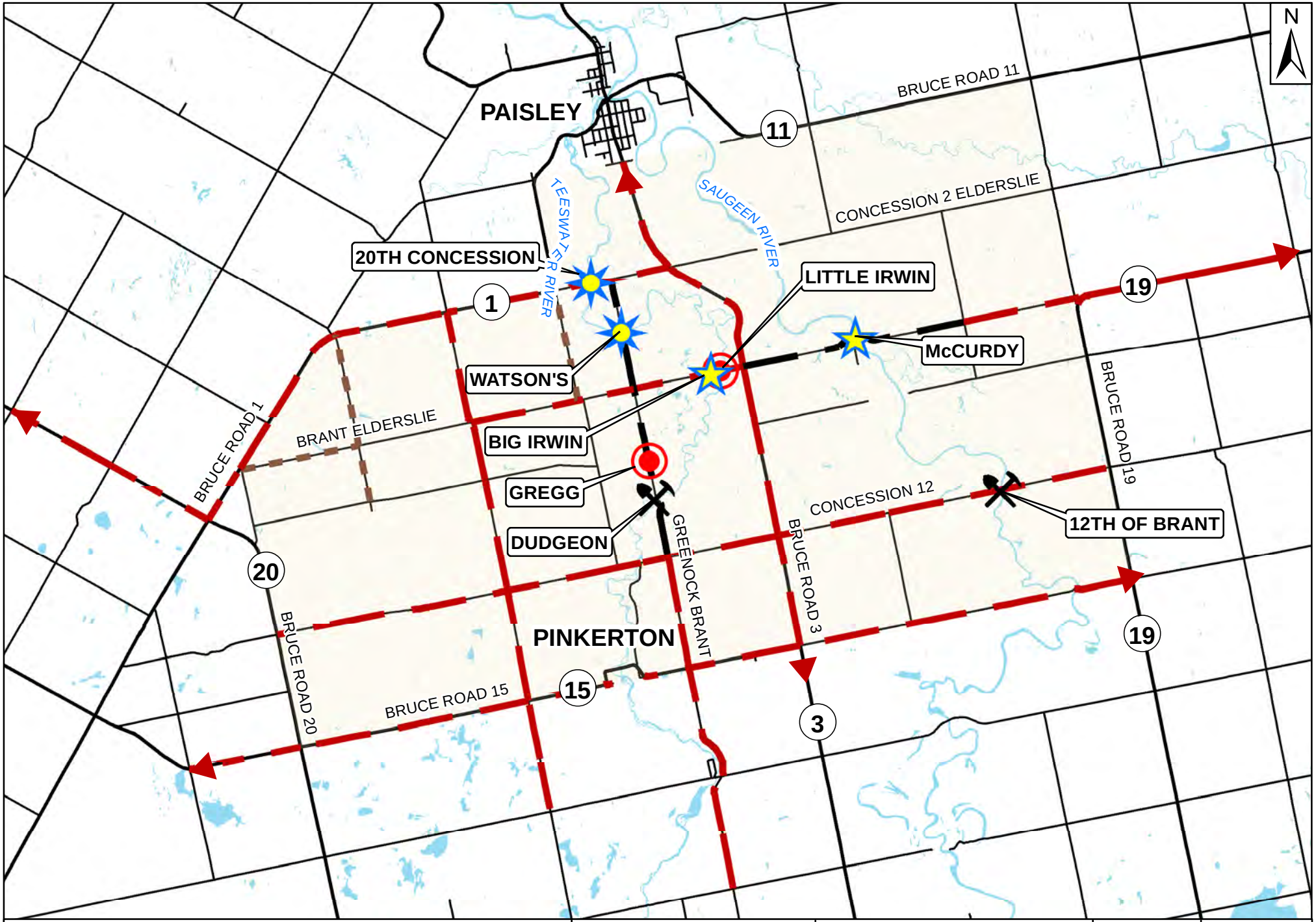
On September 24, 2012 the County Engineer attended the Brockton and Arran-Elderslie Municipal Councils to review the Master Plan process and seek input on the preliminary preferred alternative recently selected by the County Highway's Committee and Master Plan Steering Committee. Following a brief presentation on the Master Plan process, the following comments and questions were brought forward by the two councils:

- Concern over the future ownership of the two bridges to be retired, given that no substantial improvements to the structures are proposed in conjunction with the Master Plan;
- Concerns over anticipated costs to Brockton and Arran-Elderslie that are associated with replacement of the McCurdy Bridge;
- Concern over repairs needed in the short-term to the 12th of Brant Bridge.

A copy of the meeting notes from the presentations are included within Appendix 'H'. Both councils agreed to move forward with revised Option H as the preliminary preferred option to be taken to the public for input at a public meeting to be held later this fall. Revised Option H is illustrated on Figure 3.4.

3.7.4 Revised Transportation Analysis

After selection of revised Option H as the preliminary preferred alternative, a final version of the transportation analysis was requested from the traffic consultants which would include an analysis of the new option. This information will be examined, in conjunction with input received from the general public following the final public meeting, before confirming the selection of the preferred alternative and finalizing the Master Plan process. A copy of the revised Transportation Analysis is included within Appendix 'F'.


N
PAISLEY
BRUCE ROAD 11
11
TEESWATER RIVER
SAUGEEN RIVER
CONCESSION 2 ELDERSLIE
20TH CONCESSION
1
LITTLE IRWIN
19
McCURDY
WATSON'S
BRUCE ROAD 19
BRUCE ROAD 1
BRANT ELDERSLIE
BIG IRWIN
GREGG
CONCESSION 12
12TH OF BRANT
DUDGEON
GREENOCK BRANT
BRUCE ROAD 3
20
BRUCE ROAD 20
PINKERTON
19
BRUCE ROAD 15
15
3
LEGEND
BRIDGE (NO CHANGE)
REHABILITATION
CORRIDOR
REPAIR/EVENTUAL CLOSURE
REPLACE
CUL DE SAC
WINTER NON-MAINTENACE
BMROSS
engineering better communities
BRUCE COUNTY INFRASTRUCTURE MASTER PLAN
IMPLEMENTATION OPTIONS
REVISED OPTION: H
DATE
OCT. 10, 2012
PROJECT No.
11101
SCALE
1:89,000
FIGURE No.
3.4

4.0 CONSULTATION PROGRAM

4.1 Public Consultation

The components of the public consultation program developed for this Class EA are briefly summarized in Section 3.4.2 and documented in more detail within this section. Copies of related correspondence are included within Appendix 'G'.

4.2 Notice of Study Initiation

The County of Bruce issued a Notice of Study Initiation for the Master Plan on October 5, 2011. The notice introduced the purpose and intent of the Bridge Infrastructure Master Plan process, listed the structures that were being included in the assessment (illustrated via an attached key plan), and provided information on the time and location of the first Public Information Meeting. The Notice of Commencement was advertised in the October 5, 2011 and October 12, 2011 issues of the Walkerton Herald Times, the Shoreline Beacon, the Sun Times, the Kincardine News and the Paisley Advocate. The notice was also circulated to all property owners on a roadway connected to one of the affected structures. A copy of the initial notice is included in Appendix 'G' of this report.

4.3 October 19, 2011 Public Meeting

A public meeting was arranged to introduce the Master Plan project to members of the general public as well as adjacent property owners, and to solicit their input on possible outcomes associated with the various structures being considered. The meeting was held Wednesday October 19, 2011 at the Community Center in Paisley, which is located immediately north of the project study area. The meeting included an open house component, a formal presentation, and a question and answer session.

The general purpose of the meeting was to provide audience members with the following:

- A summary of the Master Plan Class EA process.
- Results of Cultural Heritage Assessment completed by Golder Associates.
- Results of the Natural Environment Characterization Report completed by NRSI.
- A description of the bridge alternatives being considered by the Technical Steering Committee and Municipality, as well as other mitigation measures being considered;
- A brief summary of future actions needed to complete the process.

Approximately 42 residents and stakeholders attended the meeting. Notes can be found in Appendix 'G' along with a copy of the presentation material. Table 4.1 presents a summary of comments received as a result of the public meeting and other notification components of the initial phases of the Master Plan process.

Table 4.1
Summary of Public Comments:
Notice of Commencement and First Public Meeting

Agency/Individual	Comments/ Concerns	Response/Action Taken
Resident R.R. # 1 Paisley Oct. 31, 2011 (via email)	- Build replacement for McCurdy one Sideroad north on Conc. 2A of Elderslie. - Approaches to river are superior to town line and roads on either side of river are much better.	- Information noted and filed
Resident Brant-Eld. Townline Nov 3, 2011 (correspondence via e-mail)	- Recently purchased 60 Acre farm SW of Big Irwin Bridge and plan to start orchard and vineyard - Require direct access to Bruce Road 3. - Husband works for Health Centre and needs quick access to hospital for emergencies. - Cost and impact of turnaround on neighbour and their use of road if bridge closed. - Impact on future bus route for kids.	- Clarified some of the comments made and then filed information.
Resident Sideroad 5 Greenock Nov. 4, 2011 (via email)	- Wants to ensure that winter travelling conditions are considered in study. - C.R. 1 north from Conc. 20 is notoriously bad for whiteouts and drifting snow. The Concession 20 bridge provides an alternate route to C.R. 3 - Consider alternate routes people may take due to winter conditions	- Comments noted and filed
Resident Bruce Rd. 1 Nov. 7, 2011 (comment sheet)	- Lived in area all their lives. Concerned with potential closure of the Brockton Bridge on Concession 20. - Road is used extensively in winter when C.R. 1 cannot be travelled due to winter storm conditions. - Bridges need to be restored or repaired, not closed. - Advertise next meeting in the Brockton Buzz.	- Comments noted and filed
Resident Conc. 18 Nov. 8, 2011 (comment sheet)	- Lives adjacent to “No Winter Maintenance Road”. Only access to Paisley is Watson’s or Big Irwin. - Fire/Emergency Response is of primary concern to this ratepayer.	- Comments noted and filed.
Resident Bruce Rd. 1 Nov 28, 2011 (via mail)	- Leave Bridge on Conc. 20; many people use this bridge, especially in the winter as a safer route into Paisley. - New bridge with road built up and widened is the answer. - A bigger sign to Paisley is needed, many people miss the turnoff.	- Comments noted and filed
Resident, Bruce Rd. 1 Nov 28, 2011 (via mail)	- Works in Walkerton and uses Bridge on Concession 20 to avoid winter conditions on other roads in the area	- Comments noted and filed
Resident, Bruce Rd 1 Nov 28, 2011 (via mail)	- Uses the road that Concession 20 Bridge is on to go to Walkerton.	- Comments noted and filed

4.4 Review Agency and Stakeholder Circulation

Input into the Class EA process was solicited from government review agencies and identified stakeholders by way of direct mail correspondence. Agencies and organizations that might have an interest in the project were sent an information package detailing the purpose of the Master Plan process, a description of the affected bridges and a general location plan of the project study area. Photographs of the 8 bridges were also incorporated into the location plan. The package was circulated to 21 separate review agencies and stakeholder groups on September 22, 2011. These parties were asked to comment on the project on or before October 28, 2011. Federal and provincial agencies responsible for Aboriginal affairs were also circulated details on the Class EA and were requested to advise if Aboriginal communities may be potentially impacted by this project.

Appendix 'H' contains a copy of the information circulated to the review agencies and stakeholder groups, as well as a list of those parties requested to comment on this project. The appendix also includes a copy of the request to the Aboriginal agencies and a list of the specific agencies solicited for input. Formal written correspondence from the review agencies is also provided. Table 4.2 summarizes the comments received.

Table 4.2
Summary of Review Agency and Stakeholder Comments:
Notice of Commencement Phase

Review Agency	Summary of Comments	Action Taken
SVCA November 3, 2011 (via email)	- Ont. Reg 169/06 applies to the Teeswater and Saugeen Rivers as well as tributaries of these rivers. Approval from SVCA will be required - Flooding impacts associated with bridge replacements will be examined. Potential increases in backwater flood elevations will be examined closely and will require analysis. - Impacts to fish habitat will be reviewed to determine if DFO authorization required. Timing window for in-water work is July 15 – Sept. 15 for both rivers - Two aquatic SAR potentially present. NRSI Report should be sent to SVCA for review. - Sediment and erosion control required. Enhanced protection may be required if proposed works will aggravate bank erosion.	- Forwarded to Project Engineer and County.
Rob Bonderud Paisley Fire Chief Nov. 4, 2011 (via email)	- Emergency response times will be affected by possible bridge closures. - Winter road closures could exacerbate response times in conjunction with bridge closures. - Need to consider response times for all the possible bridge closures. - McCurdy would have the biggest impact on response times as there is no crossing of the Saugeen on 2A or the 14th Concession.	- Asked for clarification on which bridges fire vehicles can safely cross at present.

Review Agency	Summary of Comments	Action Taken
Doug Smith Director of Emergency Services/Chief of EMS County of Bruce Nov. 4, 2011 (via email)	- Concur with response from Paisley Fire Chief that any bridge closures could affect their response time. - Paisley responds from one location, so they are most affected. - County EMS can respond from Chesley, Walkerton or Port Elgin, depending on who has the fastest response time, so they may not be affected by individual bridge closures.	- Comments noted and filed.
Brenda Campbell Transportation Systems Administrator Student Transportation Service Consortium of Grey-Bruce (via email)	- Currently 2 bus routes cross some of the bridges included in the study. - Routes 88 and 297 would be affected. - Big and Little Irwin and McCurdy are only bridges not currently used (bus route maps attached).	- Comments forwarded to County and Transportation Consultant for analysis.
Sam Martin Mennonite Community (via Vernon Weppler)	- Concerned with future closure of McCurdy Bridge as this would impact their ability to travel	- Comments forwarded to County
Paul Bradley Kincardine OPP Jan 6, 2012 (via email)	- No record of incidents with any of the bridges included in the study	- Comments noted

Rob Bonderud
Paisley Fire Chief
Jan 7, 2012
(via email)
	- GVRW of their response vehicles is as follows:
	  - Rescue: 20, 680 lbs
	  - Tanker: 16, 793
	  - Pumper: 36, 220
	- At these weights, Big Irwin and 12th of Brant should not be traversed
		- Comments noted and filed

4.5 First Nations Consultation

i) Background Review

There are no known Aboriginal communities or reserves in the immediate vicinity of the subject lands. However, as directed by the MOE in their correspondence dated December 5, 2006, a number of federal and provincial agencies were contacted at the start of the Master Plan process to determine if there was an aboriginal interest in the project study area. Responses were received from two branches of Indian & Northern Affairs Canada advising of new consultation procedures which provided various sources to assist the proponent in identifying the appropriate aboriginal communities for consultation. Utilizing this process, four aboriginal communities were identified in conjunction with this project as follows: Chippewas of Saugeen First Nation, Chippewas of Nawash Unceded First Nation, Historic Saugeen Métis, and Great Lakes Métis Council

ii) Initial Consultation Phase

Responses were received from the Historic Saugeen Métis (HSM) and the Saugeen Ojibway Nation (SON). SON represents two Aboriginal Communities being the Chippewas of Saugeen First Nation and the Chippewas of Nawash Unceded First Nation. Information packages detailing study investigations were prepared and circulated to both Aboriginal Communities for review and comment. A summary of comments received are included below.

Table 4.3
Summary of First Nations Consultation:
Initial Consultation Phase

Aboriginal Community	Summary of Comments	Action Taken
Doran Ritchie, SON Feb 21, 2012 (via phone)	- Concerned with potential impact of the project on native fish and plant species. - Would provide more comments as the project evolved.	- Forwarded copies of Natural Environment Report and Stage 1 Archaeology Report
Lands and Resources Consultation Coordinator - HSM March 23, 2012 (via email)	- Have an interest in the Natural Environment report and Archaeological report completed in conjunction with the Master Plan.	- Copies of both reports forwarded to HSM for their review.
Doran Ritchie, SON June 29, 2012 (via phone)	- Questioned status of Master Plan - Thought better approach for them was to identify concerns associated with individual structures. - Asked for copies of OSIM reports for each bridge.	- Sent copies of OSIM reports for their information.
Doran Ritchie, SON Sept. 26, 2012 (via phone)	- Asked after status of Master Plan and selection of the preliminary preferred. - Said he would be unavailable for most of October but would like to select a date to meet to discuss impacts associated with Option H. - Asked if October 26th would work for a meeting date. Suggested meeting in Chesley as this was central for most attendees.	- Confirmed that October 26 would work for a meeting date.

iii) October 26, 2012 Meeting with SON

Following selection of the preliminary preferred Master Plan Option, a meeting was arranged with SON representatives to review the components of this option and provide additional input on potential impacts associated with future implementation. A fisheries biologist from Natural Resources Solutions Inc. also attended the meeting to provide technical input on potential impacts to fish and aquatic habitat. The meeting was attended by SON and SON's consultants specializing in fisheries and terrestrial habitats, representatives from the County of Bruce, BMROSS and NRSI.

During the meeting a process was discussed for moving forward with the consultation process. SON agreed to provide estimates, supplied by their specialists, for a background review of the Big Irwin and McCurdy Bridge sites, which were the first bridge replacement projects associated with the Master Plan, which would then be considered by the County of Bruce. A copy of the meeting notes are contained within Appendix 'H'.

iv) Master Plan Completion Phase

To facilitate the final design of the Big Irwin and McCurdy Bridges, detailed aquatic and terrestrial habitat assessments will be required at each bridge site. Estimates for the completion of aquatic and terrestrial reviews of the Big Irwin and McCurdy Bridge sites by the SON's specialists were forwarded to the County of Bruce in early 2013. The work plans and cost estimates were examined by County staff and reviewed by representatives of Natural Resource Soluction Inc. (NRSI) to ensure that the scope of their assessments were adequate to address current federal and provincial guidelines regarding species at risk as well as other sensitive features.

In April 2013, the County of Bruce retained the services of SON's terrestrial specialist to complete the on-site investigations at both the Big Irwin and McCurdy Bridge sites in order to identify potential aboriginal sensitivities present within terrestrial and aquatic habitats potentially impacted by the proposed Master Plan projects. Representatives from the Saugeen Ojibway Nation may also be present at the sites during the field reviews to ensure that any aboriginal sensititivies that may be present are identified. Copies of correspondence related to this outcome are included within Appendix 'H'.

4.6 November 21, 2012 Public Meeting

A second public meeting was scheduled for the fall of 2012 to review the results of the Master Plan process and present the preliminary preferred alternative selected in conjunction with the plan to members of the general public as well as adjacent property owners. The meeting was held on Wednesday November 21, 2012 at the Paisley Community Center and included an open house component, a formal presentation, and a question and answer session. The general purpose of the meeting was to provide audience members with the following:

- A summary of the Master Plan Class EA process.
- A description of the various bridge alternatives which were considered by the Steering Committee during the review of alternatives phase of the Master Plan.
- A description of the preliminary preferred alternative as well as anticipated costs associated with the implementation of individual projects.
- A brief summary of future actions needed to complete the process.

Approximately 40 residents and stakeholders attended the meeting. Notes can be found in Appendix 'G' along with a copy of the presentation material. Table 4.3 presents a summary of comments received as a result of the public meeting and other notification components of the final phase of the Master Plan process.

Table 4.4
Summary of Review Agency and Stakeholder Comments:
Second Public Meeting Phase

Review Agency	Summary of Comments	Action Taken
Steve Lustig Transportation and Purchasing Consortium Oct 17, 2012 (via email)	- Wanted to know the difference between a repair and a rehabilitation. - Wondered if bridges to be closed would be provided with a large turnaround capable of accommodating a plow or 42 foot school bus.	- Provided a formal response to his questions.
Stu Andrew MNR Oct 22, 2012 (via email)	- Received letter regarding Master Plan - Asked if SVCA was involved in review of the project - Advised that they would not get directly involved in review as long as SVCA was providing comments.	- Confirmed that SVCA had provided input.
Bill Armstrong MOE Nov. 9, 2012	- Reviewed draft Master Plan and found it to be thorough, well documented and well presented. - Suggested that the First Nations section should include a statement regarding their concerns/ interests as well any outcomes associated with the consultation efforts.	- Comments noted and filed.
SVCA November 12, 2012 (via mail)	- Comments previously provided regarding the Master Plan still apply. - Once information related to individual bridge projects is ready, please forward to their office for review.	- Comments forwarded to Engineer and County.
Rob Bonderud Paisley Fire Chief Nov. 20, 2012 (via email)	- Unable to attend the public meeting. - If bridges are to be closed, their response times to affected properties will be increased. - Please keep them appraised of the outcome.	
Secretary/Treasurer Bruce & Grey F OA Nov. 20, 2012 (via email)	- Thought that some of their members will be in attendance at the meeting. - Thinks plan looks fabulous. - Great job of creating a plan that doesn't immediately close any bridges.	- Comments noted and filed.
Co-owner Cowan Canoe & Kayak Livery Nov. 21, 2012 (comment sheet)	- Suggested that improved parking and river access be provided at the McCurdy and 12th of Brant crossings in conjunction with the project. - Provided additional general comments on canoe access points along the Saugeen River.	- Comments forwarded to Bruce County Tourism Dept.
Residents R.R.#1 Paisley Dec. 3, 2012 (via email)	- Public Meeting presentations showed that a lot of thought and analysis went into the selection of alternatives and final recommendations. - While no one wants their bridge to close, thought preferred alternative was a fair compromise. - Good to see that 12th of Brant and Dugeon will be repaired and kept open as long as possible. - Suggested that cul-de-sacs be built in advance of bridge closings due to reduced load postings. - Would like to see improved river access point at McCurdy, similar to that constructed at the Nagg's.	- Comments noted and filed.

5.0 EVALUATION OF THE PRELIMINARY PREFERRED ALTERNATIVE

5.1 Framework of Analysis

Following the selection of revised Option H as the preliminary preferred alternative, a study framework was developed to further evaluate the potential impacts of implementing this Master Plan option. The purpose of this review was to assess the environmental interactions resulting from the construction and operation of the preferred alternative and to determine if the identified interactions would generate potential environmental impacts. The assessment of the preferred alternatives incorporated these activities:

- Assessment of the construction and operational requirements of the proposed works.
- Consultation with the public, stakeholder groups and government agencies.
- Prediction of the environmental interactions between the proposed works and the identified environmental components.
- Identification of specific environmental features that may be impacted, in a significant adverse manner, by the proposed works.
- Evaluation of the potential impacts of the project on the specific environmental features, including residual effects following mitigation.

The following sections of the report summarize the findings of the evaluation process.

5.2 Identification of Potential Impacts

5.2.1 General

In reviewing the various assessment criteria identified in Section 3.4 of this report and additional comments provided during the public consultation program, a number of specific environmental elements were identified which could be adversely affected by the implementation of the preferred Master Plan alternative. Potential impacts can be classified into two general categories; (1) construction related impacts, being impacts that are generally short term in nature and generally related to physical alterations at the bridge sites, and (2) long term impacts, which are generally related to implementation of the preferred option and typically affect cultural and social aspects of the environment.

The table below outlines the potential impacts of specific components of bridge construction on the identified environmental elements. Specific mitigation measures for the identified impacts are discussed in the following sections. The table identifies impacts directly related to bridge reconstruction and rehabilitation which are generally short-term in nature and of limited duration. Impacts of a greater magnitude and duration (traffic volume, cultural, social impacts) are also reviewed in the following section.

Table 5.1
Construction Related Environmental Effects

	Environmental Components / Key Project Works and Activities	Geology and Hydrology Resources	Aquatic Resources	Significant Environmental Features	Cultural Heritage Resources	Social Environment	Economic Environment	Technical Environment
1	**Construction Component**							
	Contractor Mobilization to the site	○	○	○	○	●	○	○
	Establishment of Temporary Storage Areas	○	●	○	○	●	○	○
	Site Clearing	○	●	○	●	○	○	○
	Installation of Sediment Control Devices	○	●	○	○	○	○	○
	Traffic Control Plan Implementation	○	○	○	○	●	○	○
	Excavation	●	●	○	●	●	○	●
	Removal of Existing Structure	○	●	○	●	○	○	○
	Dewatering	●	●	○	○	●	○	●
	Construction of Bridge Abutments & Piers	●	●	○	●	●	○	●
	Reconstruction of Approach Roads	○	○	○	●	●	○	●
	Grading	○	●	○	○	●	○	○
	Site Restoration (seeding/topsoil)	○	○	○	○	○	○	○

● Potential for adverse effect ○ No adverse effect expected

5.3 Impact Assessment and Mitigation

5.3.1 Potential Adverse Impacts

Based upon the findings of the environmental effects analysis (Table 3.7) and the environmental interactions analysis (Table 5.1), the preliminary preferred option has the potential to adversely impact upon a number of specific environmental features. They are as follows:

- Traffic Movement/Accessibility
- Aquatic Habitat and Fisheries
- Economics
- Cultural Heritage Values

The potential impacts to each identified feature are described in this section of the report and measures to mitigate the impacts are also presented. As noted above, potential impacts have been categorized as either short term or long term and reviewed accordingly. The selection of mitigation measures was based upon consideration of three broad approaches to mitigation; avoidance, minimization of adverse effects and compensation.

5.3.2 Traffic Movement – Short Term

During construction of various components of the preferred alternative, access across bridge structures under construction will be limited or closed completely. Where a crossing is being replaced, traffic will be detoured onto adjacent local roads until the new crossing is complete. Bridges scheduled for rehabilitation may also be closed for some periods, although restrictions will typically be of a shorter duration. For all potential road and bridge closures, appropriate signage would be provided prior to the road closure and throughout the construction period.

The overall impact of these anticipated short term closures is expected to be minor in nature, considering the minimal traffic volume evident at the various bridge sites and the availability of suitable detour routes in the vicinity of the crossings. Ultimately, each affected crossing will be replaced with an improved river crossing with fewer capacity restrictions.

5.3.3 Traffic Movement – Long Term

(a) Traffic Volume

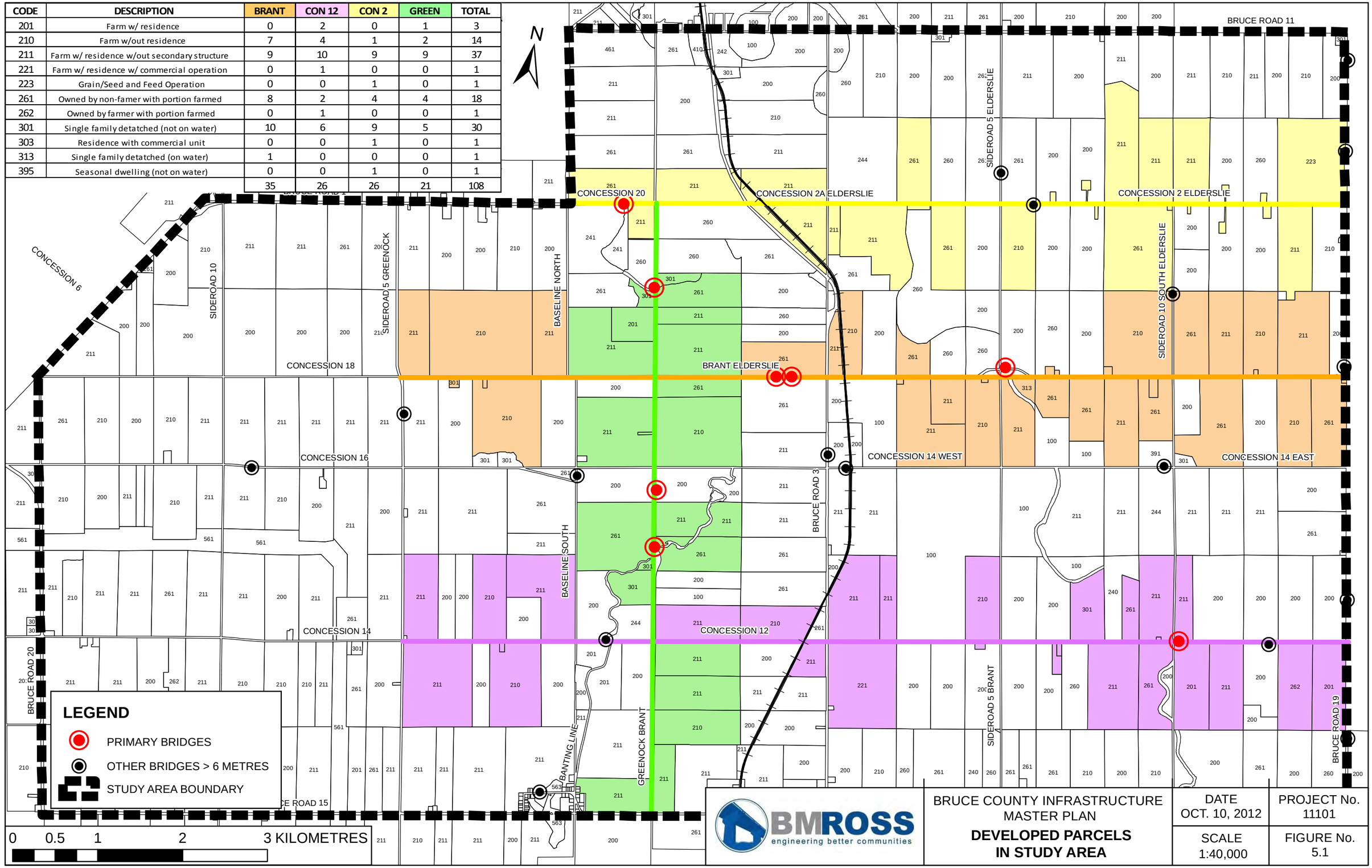
All of the primary bridges which comprise the Bridge Infrastructure Master Plan study are single lane steel truss bridges with restricted load capacities. Upon completion of the project, those bridges that are scheduled for replacement will be designed to accommodate 2 lanes of traffic and have no load restrictions. Although none of the structures are currently located on primary transportation corridors, the improvements to the bridge crossings and approach roads may result in increased traffic volumes along the affected stretch of road over the long term. Given the close proximity of numerous county roads adjacent to the study area, it is not anticipated that traffic volumes will increase substantially as a result of the proposed upgrades.

(b) Bridge Closures

At the outset of the Bridge Infrastructure Master Plan process, the possibility that some of the structures under consideration may ultimately be closed permanently to vehicular traffic was presented as a possible Master Plan outcome. Due to the close physical proximity of the subject bridges, and the relatively low traffic volumes experienced in the study area, it is not anticipated that the proposed closures will have a significant impact on the regional transportation network.

As part of the Master Plan investigation, property data was examined along the affected road corridors in order to quantify the number of properties potentially impacted by a future road closure. Developed properties located on each corridor were highlighted, while vacant or forested lands were not. This information is illustrated on Figure 5.1 (attached) and was also utilized during the traffic analysis. The data indicates that the Brant-Elderslie corridor has the greatest number of developed properties, while the Greenock-Brant corridor has the least.

CODE	DESCRIPTION	BRANT	CON 12	CON 2	GREEN	TOTAL
201	Farm w/ residence	0	2	0	1	3
210	Farm w/out residence	7	4	1	2	14
211	Farm w/ residence w/out secondary structure	9	10	9	9	37
221	Farm w/ residence w/ commercial operation	0	1	0	0	1
223	Grain/Seed and Feed Operation	0	0	1	0	1
261	Owned by non-famer with portion farmed	8	2	4	4	18
262	Owned by farmer with portion farmed	0	1	0	0	1
301	Single family detatched (not on water)	10	6	9	5	30
303	Residence with commercial unit	0	0	1	0	1
313	Single family detatched (on water)	1	0	0	0	1
395	Seasonal dwelling (not on water)	0	0	1	0	1
		35	26	26	21	108



BMROSS engineering better communities

BRUCE COUNTY INFRASTRUCTURE MASTER PLAN

DEVELOPED PARCELS IN STUDY AREA

DATE OCT. 10, 2012

PROJECT No. 11101

SCALE 1:40,000

FIGURE No. 5.1

Although the proposed road closures are reinforced by this data as well as the recorded traffic volumes referenced earlier in this report, some impacts will be unavoidable. Residents living in close proximity to the bridges or on a connecting road link will experience the greatest impacts to long term travel times and accessibility. The impact will be greater on east/west travel corridors because there are fewer crossings of the Saugeen River, requiring longer detours. As noted above, consideration was given to the length of detours and the number of properties potentially affected by a proposed closure, when considering the various bridge replacement and closure options. The preferred option which was ultimately selected was felt to result in few long term impacts to local transportation routing when evaluated in conjunction with other environmental factors such as economics, cultural heritage values, and environmental affects.

To mitigate impacts associated with future bridge retirements, the County of Bruce has committed to undertaking repairs at the Dudgeon and 12th of Brant Bridges in order to keep the crossings open to vehicular traffic as long as possible. Repairs will initially be completed during the 2013 construction season and then continue on a four year schedule until the deterioration reaches a point where the structure must be closed to traffic. Turnarounds will be constructed in advance of the bridge closures to provide residents with a suitable location to turn their vehicles around. Construction of the 12th of Brant turnarounds are scheduled for spring of 2013 in advance of the proposed bridge repairs, which will require a temporary closure of the crossing for several weeks.

5.3.4 Aquatic Habitat

(a) Bridge Construction

Implementation of the preferred alternative will involve the construction of two new bridges. These new bridge crossings include the McCurdy located on the Saugeen River and the Big Irwin crossing on the Teeswater River. It is anticipated that both crossings will require construction of new pier(s) within the river channel resulting in a loss of fish habitat at that location. For each of the bridge replacement options being considered, the extent of in-stream work required will result in temporary disruption to the channel during construction of the in-water pier and removal of the former structure. To minimize the extent of impacts, detailed aquatic habitat assessments will be conducted prior to construction to identify critical habitat features at each of the bridge sites and to assist with the development of a work plan which will avoid impact to these areas and ensure impacts are minimized as much as possible. All in-water construction will be timed to occur during periods of low flow, during approved timing windows established by the Ministry of Natural Resources in consultation with the Saugeen Valley Conservation Authority. Upon completion of the proposed works, the river bed and any adjacent habitat disturbed in conjunction with the construction will be restored to pre-existing conditions. Should it be determined that a harmful alteration, disruption or destruction (HADD) of fish habitat will occur as a result of the works, an authorization from the Federal Department of Fisheries and Oceans (DFO) may be required.

(b) Approach Road Reconstruction

In conjunction with bridge reconstruction activities, approach roads on either side of the bridges will also require reconstruction in order to match wider bridge decks and address existing horizontal and vertical deficiencies. If occurring in close proximity to the channel, this may create the potential for sediment runoff into the watercourse. To minimize the extent of potential impacts, detailed erosion and sediment control plans will be established in order to isolate the work area from the channel during construction. Sediment control measures will be monitored during the entire construction period and maintained until the project is complete to ensure they continue to work effectively. All disturbed areas will be restored following construction with a suitable seed mixture.

(c) Species at Risk (SAR)

The Natural Environment Characterization Report identified a number of SAR potentially present within the project work area. Should any of these species be identified during subsequent surveys or during construction activities, representatives from the Ministry of Natural Resources will be contacted immediately. Two aquatic species at risk, the pugnose shiner and rainbow mussel, were identified by the Saugeen Valley Conservation Authority as potentially being present with the Teeswater and Saugeen River systems, respectively. As noted above, additional investigations will be undertaken at each of the bridge sites being replaced, prior to construction, to determine if these, or other SAR species, will be potentially impacted by the proposed construction.

5.3.5 Terrestrial Habitat

As discussed in Section 2.5, a preliminary terrestrial habitat assessment was completed at each of the bridge sites to identify the presence of any significant or sensitive species which would potentially be impacted by proposed bridge reconstruction. Although no terrestrial features of significance were identified as being present during the field review, a more detailed analysis of anticipated terrestrial impacts at McCurdy and Big Irwin will be undertaken in conjunction with the aquatic surveys discussed above. The assessments will confirm the absence of sensitive terrestrial plants or communities which may be impacted by construction and also screen for the presence of plant species which may be importance to aboriginal communities.

5.3.6 Economic Impacts

Implementation of the preferred Master Plan components is anticipated to cost between six and seven million dollars in total to the County and its two municipal partners. This represents a significant financial burden. Several measures have been identified which could mitigate the potential economic impacts of the proposed works. They are as follows:

- **Project Phasing.** The Infrastructure Master Plan is intended to be implemented over the next 20 years. This will allow the County and local municipalities an opportunity to finance the project over an extended period and plan in advance for future capital expenditures.

- **Grant Programs**. The federal and provincial governments routinely introduce grant programs to assist smaller communities with the construction of infrastructure projects, such as the Canada-Ontario Municipal Rural Infrastructure Fund (COMRIF) initiative. The County of Bruce or the Municipality's of Brockton and Arran-Elderlsie may be able to access future funding programs to subsidize the capital works costs of the Infrastructure Master Plan or individual components of the project.

- **Capital Works Financing**. The study partners could apply for debt financing through the Ontario Strategic Infrastructure Financing Authority (OSIFA) loan program (coordinated by Infrastructure Ontario). OSIFA provides long-term, low-interest financing to municipalities for capital infrastructure projects.

5.3.7 Cultural Heritage Resources

(a) Structural Heritage

The cultural heritage assessment completed by Golder Associates identified the heritage values associated with each of the subject bridges. The McCurdy and 12th of Brant Bridges rated the highest with scores of 75 each. Although both of these structures have local and even regional value from a heritage perspective, neither of the structures was identified as being provincially rare and have not been designated for preservation by local municipal or county councils. The McCurdy Bridge is proposed for replacement as part of the preliminary preferred option while the 12th of Brant structure will be eventually closed to vehicular traffic and then ultimately removed. A detailed heritage assessment will be completed for each of the structures being significantly altered as part of Master Plan implementation. Heritage recommendations forthcoming from the reports will be considered during the detailed engineering design stage.

(b) Archaeological Resources

The Stage 1 Archaeological Assessment indicated that Stage 2 field work would need to be completed for each structure where the proposed work would result in the alteration of previously undisturbed native soils. Accordingly, Stage 2 assessments will be required for the Big Irwin and McCurdy Bridges to ensure that buried cultural resources are not disturbed in conjunction with the proposed construction. Copies of the reports can be found within Appendix 'E' (Archaeological Report) and Appendix 'F' (Cultural Heritage Assessment).

c) Aboriginal Cultural Heritage

As noted in Section 5.3.5 above, detailed site assessments being completed at the Big Irwin and McCurdy Bridge sites in support of the detailed design stage for these structures, will include screening for terrestrial and aquatic species of importance to aboriginal communities. Consultants who are familiar with aboriginal sensitivities have been retained to examine areas adjacent to the bridge sites potentially impacted by construction and identify any species present which may be of importance to these communities.

5.3.8 Impacts to Navigation

The Saugeen River serves as a popular route for recreational water craft (canoes/kayaks) with a river access point currently present on the west river bank at McCurdy's Bridge. This access point will not be accessible during construction but will be reconstructed in conjunction with the proposed bridge reconstruction project. Navigable openings will be maintained at all times during construction and warning signs will be placed up and downstream of the crossings to warn of construction. A formal authorization will also be obtained from Transport Canada pursuant to the Navigable Waters Protection Act.

6.0 CONCLUSIONS AND PROJECT IMPLEMENTATION

6.1 Master Plan Study Conclusion

Based upon the findings of the environmental impact evaluation and input received from agencies, stakeholders and the general public following the final public meeting, no significant impacts were identified with revised Option H that could not be adequately mitigated. In this regard, implementation of the proposed Master Plan projects appears to be appropriate for the study area and should not result in significant adverse environmental effects (particularly if the mitigation measures are incorporated into the construction plan). The merits of this option were also seen to substantially outweigh those identified for the other alternative solutions considered during the Master Plan process.

6.2 Selection of a Preferred Alternative

Given the foregoing, Revised Option H was selected as the preferred solution to the identified problem. This option was presented to, and supported by, the County Highways Committee at their April 18, 2013 meeting. The works associated with the preferred alternative are illustrated on Figure 3.4.

6.3 Approvals

Implementation of Master Plan projects will be subject to the receipt of all necessary approvals. Following a review of existing legislation, it was determined that two formal approvals will be required to permit construction of the proposed works. This section of the report identifies the applicable legislation and summarizes the intent of the associated approval process.

a) Conservation Authorities Act

Implementation of the preferred option involves construction on lands regulated by the Saugeen Valley Conservation Authority (SVCA). In accordance with the Conservation Authorities Act, applications will be submitted to the SVCA for approval prior to construction. Hydrology reports will also be prepared and submitted in support of the proposals. The application will define measures to protect sensitive lands during construction in order to minimize the negative impacts of the project on the natural features of the area. Site restoration and post-construction enhancements to disturbed areas will also be presented.

b) Federal Fisheries Act

The works associated with the preferred alternative may be subject to the federal *Fisheries Act*. In accordance with established procedure, the SVCA will review the project on behalf of the Department of Fisheries and Oceans (DFO) to determine if bridge construction activities may result in a harmful alteration, disruption or destruction (HADD) of fish habitat. If it is determined that the project has the potential to result in a HADD, a compensation plan will be required before the DFO issues authorization for the project to proceed.

c) Navigable Waters Protection Act

The Saugeen and Teeswater Rivers are classified as navigable waterways and will therefore be subject to the Navigable Waters Protection Act (NWPA). In accordance with the NWPA requirements applications will be submitted to Transport Canada in order to obtain approval for the proposed works. The application will set out the measures proposed to minimize the effects of the project on waterway access and safety. Transport Canada may require additional measures be incorporated into the construction plan as part of the approvals process.

d) Ontario Heritage Act

As recommended in conjunction with the Cultural Heritage Assessments completed by Golder Associates, detailed Structural Heritage Assessments may be required for those structures being significantly altered in conjunction with the Master Plan.

e) Stage 2 Archaeological Assessments

Part VI of the Ontario Heritage Act establishes guidelines for archaeological assessments. In accordance with these guidelines and recommendations forthcoming from the Stage 1 Archaeological Assessment, Stage 2 assessments will be required for those projects that will result in disturbances to previously undisturbed native soils in the vicinity of the bridge sites.

f) Ministry of Natural Resources

The Ministry of Natural Resources administers approvals subject to the Lakes and Rivers Improvement Act, the Endangered Species Act and the Public Lands Act. Portions of the proposed bridge reconstruction activities may be subject to one or more of these pieces of legislation. Consultation with the Ministry will occur during the detailed design stage for the Big Irwin and McCurdy Bridges to ensure that all necessary permitting and approval documentation is obtained prior to construction.

6.4 Implementation Timeline

Projects identified for implementation through the Master Plan process have been categorized into a general implementation timeline, based primarily upon the state of deterioration of each of the bridges and resources available to implement each component of the plan.

Table 6.1 illustrates the anticipated timeline for implementation of each of the individual projects included as a component of the Master Plan.

Table 6.1
Implementation Timeline:
Preferred Master Plan Alternative – Revised Option H

Year	Master Plan Project Component	Class EA Schedule
2013	Repairs to 12th of Brant & Dudgeon Bridges	A
2013	Rehabilitation of Watson's Bridge	A+
2014	Construction of new Bridge at Big Irwin	B
2014	Finalize Schedule 'C' EA for McCurdy Replacement	
2015	Construct new Bridge at McCurdy	C
2026-2028	Close 12th of Brant and Dudgeon to Vehicular Traffic	A+
?	Rehabilitate 20th Concession Bridge	A+
?	Remove 12th of Brant and Dudgeon Trusses	B

The timeline proposed above is based upon the current condition of the bridges and anticipated county and municipal funding. It will be important to monitor the condition of the bridges over the implementation phase of the Master Plan and make adjustments when necessary to address changing conditions which may affect public safety.

6.5 Anticipated Costs

The Master Plan will be implemented over a 15-20 year time frame with project costs shared between the County of Bruce and the two municipal partners, Arran-Elderslie and Brockton. Table 6.2 illustrates anticipated costs to each project partner over the implementation timeline.

Table 6.2
Anticipated Project Costs

Year	Project	Bruce County	Arran-Elderslie	Brockton	Total
2013	Watson's Rehab	$ 419,000.00	-	-	$ 419,000.00
2013	Dudgeon/12th of Brant Repairs	$ 64,000.00	-	-	$ 64,000.00
2014	Rebuild Big Irwin	$ 1,617,200.00	$ 142,900.00	$ 142,900.00	$ 1,903,000.00
2015	Rebuild McCurdy	$ 2,547,000.00	$ 197,000.00	$ 197,000.00	$ 2,941,000.00
2018	Dudgeon/12th of Brant Repairs	$ 95,000.00	-	-	$ 95,000.00
2022	Dudgeon/12th of Brant Repairs	$ 62,000.00	-	-	$ 62,000.00
?	Rehab 20th Concession	-	-	$ 416,000.00	$ 416,000.00
2026-2028	Retire Dudgeon & 12th of Brant	$ 200,000.00	-	-	$ 200,000.00
Total		$ 5,004,200.00	$ 339,900.00	$ 755,900.00	$ 6,100,000.00

6.6 Recommendations

The following represent the key study recommendations developed following the evaluation of alternatives phase of the Master Planning process:

1. Revised Option H be implemented as the preferred long-term strategy to address deficiencies associated with a series of county-owned bridges located on local municipal roads in central Bruce County.

2. Implementation of the Master Plan will require additional investigations to evaluate the potential environmental impacts of specific projects considered Schedule 'C' activities under the terms of the Class EA document (refer to Table 6.1). Schedule 'A+' and 'B' projects have been approved through the Master Plan process.

3. Implementation of the Master Plan should be conducted with reference to the project phasing strategy detailed in section 6.0 of this report.

4. Impact mitigation measures discussed in Section 5.0 of this report should be incorporated into the detailed construction plans for each proposed activity, as appropriate.

5. The Master Plan should be reviewed on a regular basis to evaluate the accuracy of key assumptions (e.g., rate of deterioration/availability of funding) and to confirm the suitability of the implementation sequence. The Master Plan should be modified, as required, to address changes to the environmental setting and local bridge conditions.

6.7 Class EA Requirements

6.7.1 Master Plan Approval

The Bruce County Bridge Infrastructure Master Plan prepared for central Bruce County was developed following an approved Master Planning process, as set out by the Class EA document. The Master Planning process incorporated the completion of Phases 1 and 2 of the Class EA process. The Master Plan will be approved for implementation subject to successful completion of the Class EA Master Plan Process.

6.7.2 Additional Class EA Investigations

(a) Schedule C Activities

As an outcome of this assessment, a series of projects have been identified to implement the Master Plan. These projects are classified as Schedule 'A', A+, 'B' or 'C' activities under the terms of the Class EA document. Schedule 'A', 'A+', and 'B' activities have been assessed in conjunction with the current Master Plan process and do not require additional Class EA review prior to implementation. However additional environmental assessment will be required prior to replacement of the McCurdy Bridge, as this project is a Schedule 'C' activity.

Table 6.1 summarizes the proposed activities and the Class EA Schedule associated with implementation of specific phases of the Master Plan.

(b) Schedule B Activities

Detailed engineering drawings will not be completed for Schedule 'B' activities until the proposed activity is scheduled for implementation (refer to Section 6.3). To provide project stakeholders with an opportunity to review the detailed designs proposed for these structures, preliminary engineering drawings will be posted on the Bruce County website in advance of construction. Adjacent property owners will be advised through a direct mail-out that the drawings have been posted for review. This would apply to reconstruction of the Big Irwin Bridge as well as removal of the 12th of Brant and Dudgeon Bridge structures.

(c) Schedule A+ Activities

Schedule' A+' activities are pre-approved but require some form of public notification prior to implementation. For 'A+' activities identified in conjunction with the Master Plan, a Notice will be mailed to adjacent property owners in advance of construction advising of the timing for the work and providing general details on the proposed works. This would apply to rehabilitation of the Watson's and Concession 20 bridges as well as closure of the 12th of Brant and Brant-Greenock roads to vehicular traffic.

6.7.3 Requirements for Master Plan Completion

The following activities are required in order to complete the formal Class EA Master Plan process:

- Issue a Notice of Study Completion for the Master Plan which will also service as a Notice of Completion for Schedule B projects.
- Make Master Plan Report available for public review in conjunction with publication of the Notice of Study Completion.
- Obtain feedback from public, stakeholders and agencies.
- Make the revised Master Plan report available for public/agency review.
- Address outstanding issues resulting from the Notice of Completion.
- Advise the County and the Ministry of the Environment (MOE) when the Master Plan process is complete.

6.7.4 Final Public Consultation

A Notice of Study Completion was recently circulated to local residents, stakeholders and government review agencies. The notice identified the preferred Master Plan alternatives and provided the process for appeal of the Schedule B and C activities approved in conjunction with the process (i.e., a Part II Order request to the Minister of the Environment prior to the conclusion of the review period) if there are unresolved environmental issues.

The following summarizes the distribution of the notice.

Contents:	Identification of preferred Master Plan solution, key project components
Issued:	April 24, 2013
Placed In:	Walkerton Herald Times, the Shoreline Beacon, the Sun Times, the Kincardine News and the Paisley Advocate. (April 24 and May 1, 2013)
Distributed To:	21 review agencies, adjacent property owners.

The 30-day review period for the Notice will conclude on May 24, 2013.

7.0 SUMMARY

This report documents the Master Plan process which was conducted by the County of Bruce to resolve the deficiencies identified with a cluster of county-owned bridges located on local municipal roadways in central Bruce County.

The Master Plan process included an extensive background review of the study area in order to characterize and identify potential impacts associated with the natural, cultural and built environments. Specialized studies were conducted in each of these areas including a Natural Environment Characterization Report, a Stage 1 Archaeological Assessment, a Structural Heritage Impact Assessment and a Transportation Analysis. In order to involve the general public and adjacent property owners in the process, two public meetings were held during the course of the Master Plan process to seek input on the proposed outcomes. Agencies and stakeholders were also engaged through a direct mail-out. The outcome of the Master Plan process, which identified a preferred implementation option for each structure included in the study, being to replace, rehabilitate or eventually close the crossing, was reached following a detailed analysis of a range of potential Master Plan options.

The Bridge Infrastructure Plan developed through the Master Planning process will require the construction of major infrastructure works (e.g., new bridge construction, bridge rehabilitation, bridge closures and reconstruction of approach roads), and will be implemented over a fifteen to twenty year time frame. The Master Plan sets out a series of recommendations for project implementation, including a proposed timeline for construction and anticipated capital costs for each of the project partners. Replacement of the McCurdy Bridge will require additional Class EA investigation prior to completion. All other projects identified in conjunction with the Master Plan have been reviewed in conjunction with the Class EA process and are therefore pre-approved.

All of which is respectfully submitted.

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Per _____
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Per _____
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