APPENDIX

C HERITAGE IMPACT ASSESSMENT (HIA) REPORT

CITY OF HAMILTON (DUNDAS), ONTARIO

HERITAGE IMPACT ASSESSMENT (HIA) REPORT

ENVIRONMENTAL ASSESSMENT – KING STREET WEST (DUNDAS) BRIDGE – BRIDGE 248

HERITAGE IMPACT ASSESSMENT (HIA) REPORT

KING STREET WEST (DUNDAS) BRIDGE – BRIDGE 248

CITY OF HAMILTON (DUNDAS), ONTARIO
PROVINCE OF ONTARIO

REVISED REPORT

PROJECT NO.: 161-09178-00
DATE: NOVEMBER 2017

WSP

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1 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

WSP Canada Inc. (WSP) was retained by the City of Hamilton to provide a Heritage Impact Assessment (HIA) report for the King Street West (Dundas) Bridge (Bridge 248) located in the City of Hamilton (Dundas), in the Province of Ontario. The City is not intending to impact the remnants of the Gore Paper Mill. As such, those elements and lands are excluded from this study and must be addressed as a separate HIA. The Cultural Heritage Evaluation Report (CHER) completed for the structure (Stantec 2017) indicated that the structure will require an HIA in the event that removal and/or modifications are proposed for this structure and that, specifically, an HIA must be completed when changes are anticipated to the heritage attributes identified for the bridge.

1.2 HISTORICAL CONTEXT

1.2.1 STUDY AREA SPECIFIC HISTORY

As a contributory document to the Environmental Assessment (EA) process, this report relies on contemporary studies completed as components of this EA, in addition to follow up research. The history of the area has been well researched and documented by Jacqueline Fisher (Historic Horizon 2016) in her archaeological assessment report. Her report notes the following:

> Flamborough Township was initially divided into 200 acre farm lots laid out in Concession rows. The Study Area is located on parts of Lots 10 to 13, Concession 1 and Lots 9 & 10, Concession 2 of West Flamborough (Illustrated Historical Atlas of Wentworth County, 1875; Figure 6). Concession 1 straddles the Niagara Escarpment and includes a portion of the town of Dundas (amalgamated with Hamilton in 2001), as well as a small area that remained part of West Flamborough until recent municipal amalgamations.
>
> At the beginning of the 19th century, Dundas grew around the Dundas Mills on lower Spencer Creek, and several early settlers recognized the potential for industry using the water power of the stream.
>
> Early mills were built along the creek both above and below the Escarpment. Dundas (initially called Cootes Paradise) was officially named in 1814 and incorporated as a town by 1847. Subdivision in the Study Area was well underway in the 1830s as the town grew (Abstracts to Deeds, West Flamborough). Several radiating roads were built to connect Dundas to Waterloo (now Highway 8), Guelph and York (Toronto). Over the next couple of decades, nearby Hamilton began to develop, and the Great Western Railway was built (early 1850s), causing business to develop quickly in the wider region. Dundas, however, continued to attract industry and business to the area.
>
> Smith's 1846 Gazetteer lists industry on Spencer Creek as including four grist mills, seven saw mills, a carding machine and fulling mill, oil mill, cloth factory, factory making pumps and furniture, fanning mill, chair factory, paper mill, two tanneries, two machinery factories, a millstone factory, a planing mill, a comb factory, a soap and candle factory, two wagon makers, three breweries, and two distilleries. Many of these would have been located in the community of Dundas (Smith 1846:59).

The area of the bridge is defined in its relationship to the early industrialization along Spencer Creek, specifically the original mill complexes.

1.2.2 ROADWAY TRANSPORTATION HISTORY IN ONTARIO

The earliest transportation routes in Ontario consisted of the many waterways and paths utilized by Canada's Indigenous populations. These same routes were utilized by early European explorers during the fur trade: being the most effective way to traverse the tree covered land. It wasn't until the growth of Euro-Canadian settlement that the need for cleared paths suitable for wagon travel that roadways developed.

The earliest roadways consisted of little more than dirt pathways cleared of stumps and boulders to a width that would allow for the passage of wagons and coaches. These roads were often built to varying levels of quality by non-professionals and had a short use-life before becoming pitted and washed out.

The introduction of corduroy roads, consisting of horizontal logs laid along the roadway and covered/chinked with dirt, provided an improvement upon basic dirt roads. They allowed for the construction of roadways over marshy, wet terrain that basic dirt roads could not pass through easily. However, these roads also experienced short periods of use before decaying and becoming impassable.

In the late 1700's there were no formal road workers responsible for the construction and maintenance of roadways. Instead the construction of roads was the responsibility of township citizens and settlers who were required to contribute time, under statutory labour, in road work every year, all of whom were overseen by the local 'Pathmaster'.

Techniques for roadway construction improved throughout the 1800s, with the invention of the plank road (sawed planks of wood laid horizontally) in the 1830s. Similar to the previous corduroy roads, plank roads were prone to decomposition and deterioration. The macadam road (using various gravel sizes) provided better drainage, compaction, slope control, and longevity, but the initial construction cost posed an issue for many roadworks. The costly repair and maintenance of these early roads meant that in the latter half of the 19th century many of Ontario's roadways were in disrepair.

With the arrival of the automobile in Ontario during the late 1800's – early 1900's, and the increased use of the bicycles, resulted in a push for new and improved roadways. The use of cars and bicycles on roadways resulted in the development of improved gravel and macadamized dirt roadways, and the patent of modern tarmac technology in 1901 allowed for improved road conditions and longevity. In 1916 roadways had become of enough importance to warrant the founding of the Department of Public Highways (what would become the Ontario Ministry of Transportation).

The first half of the 20th century saw a number of developments in Ontario roadways, despite the restrictions imposed by the great depression and two world wars. The 1920s saw the formalization of road systems, the passing of the provincial Highway Traffic Act, and the removal of municipal and regional road tolls. By the 1940s preliminary construction on numerous sections of 400 series highways were completed. Over the following decades numerous highway expansions were completed and older dirt roads upgraded to improved tarmac.

1.2.3 BRIDGE CONSTRUCTION HISTORY IN ONTARIO

The history of bridge construction in Ontario coincided roughly with the spread of Euro-Canadian settlers and surveyors and the expansion of Ontario's road systems. These earliest bridges were rudimentary in construction, utilizing the

abundance of large trees available to span waterways and covering the bridge top with a corduroy log cover and dirt flooring. With the decline of suitable large lumber came the introduction of wooden truss bridges.

Wooden truss bridges benefitted from the construction knowledge of early settlers, utilizing King and Queen trusses common in barn construction. The wooden truss bridge enjoyed a long lived popularity in southern Ontario, being commonly used until the 1890s.

Stone arch bridge construction began during the same period as the wooden truss bridges, being used throughout the 1850s to 1880s. However, stone bridges were never as common, due largely to the expensive and time consuming nature of quarrying, transporting, and crafting the raw material. As such stone bridges are more common for larger important bridge crossings and wealthier economic centres.

With the arrival of the railway came the use of iron in bridge construction. Introduced in the 1850s, early iron bridges were constructed using cast iron and were brittle. Later development of wrought iron bridges improved on the tensile strength of the material improving its longevity. Unfortunately, its use in bridge construction was limited to the 1870s and 1880s, as the introduction of steel soon replaced it as the primary material. Steel bridges first start appearing in southern Ontario in the 1870s. Its improved strength over iron made it ideal for construction and it soon became the primary construction material.

Numerous bridge technologies were used in the construction of wooden, iron, and steel bridges in the 1800s. These included the truss (1820s), suspension (1848), and cantilever (1883).

With the reintroduction of concrete as a building material in the 1900s came a more efficient and effective way to construct bridges. The ease of use of concrete meant that the construction of slab style bridges and arch bridges provided a quick and easy method of spanning the many smaller waterways of Ontario. This resulted in the decline of steel in bridge construction, with concrete soon becoming the dominant material. The introduction of steel reinforcing to concrete improved it versatility even more, allowing for its use in larger building projects. The result is the increased use of in in major roadworks throughout the 1940s and 1950s.

The most recent innovation to the use of concrete is the development of pre-stressed concrete. This pre-stressed concrete provides better resistance to cracking and failure and can be either cast in place or pre-formed off site. This versatility has resulted in pre-stressed concrete being the most common material used in bridge construction today.

2 METHODOLOGY

2.1 GUIDELINES

The preparation of this HIA supports the Ontario Heritage Act (2005), references numerous sources of information and is guided by key documents such as the Heritage Toolkit InfoSheet #5: Heritage Impact Assessments and Conservation Plans (2005).

The goal of this report is to:

1. Validate the Recommendations of the CHER for the Structure

Primary and secondary source material was reviewed to give context to the structure. An overview of Dundas and the foundations of the area were completed to address the uses of the land and the development of the area. The study involved a review of documents pertaining to the property including historic maps, aerial photographs and local histories. Existing structures and features have been identified. As part of this task, the area's municipal heritage inventory was reviewed to identify whether or not the properties and structures had been previously identified and/or have been designated under the Ontario Heritage Act. This general review was followed by background research on the structure itself to assess the history of the bridge, highlighting initial design, construction, and modifications. Data from municipal archives, local museums, and information obtained from the Ministry of Tourism, Culture and Sport was used to construct the developmental history of the structure and the associated heritage elements (designer, motif, connection to the locale, etc.). A physical inspection of the property and structure were conducted and the photographs were taken at that time.

The general character of the property is discussed in this report and those aspects of the property to which the listing applies are reviewed and a short Description of Property is provided. Following the description, a Statement of Cultural Heritage Value or Interest will convey why the property is important (if applicable) explaining cultural meanings, associations and connections the property holds for the community (if required) that reflects one of or more of the evaluation criteria.

The Description of Heritage Attributes then describes the key attributes or elements of the property that must be retained to conserve its cultural heritage value or interest (if applicable).

2. Describe the Proposed Development or Site Alteration

Measurement of development or site alteration impact will be made to identify any impact of the development on identified cultural heritage resources and consider the effectiveness of any proposed conservation, mitigation or avoidance measures

3. Summary of Community Engagement

A summary description of the community engagement undertaken as part of the Environmental Assessment will be provided.

4. Summary statement and conservation recommendations

The recommendations of the report are based on an understanding of the physical values of the bridge structure, a documentation of its history through research, and an analysis of its social context, relying on public consultations, comparisons with similar properties and mapping.

5. Images and supporting documentation.

2.1.1 ONTARIO REGULATION 9/06

This HIA is prepared in response to activities which might impact the cultural heritage value or interest of a property or structure based on a determination of heritage value or interest under the *Ontario Regulation 9/06*.

CRITERIA FOR DETERMINING CULTURAL HERITAGE VALUE OR INTEREST

No amendments.

This is the English version of a bilingual regulation.

Criteria

1. (1) The criteria set out in subsection (2) are prescribed for the purposes of clause 29 (1) (a) of the Act. O. Reg. 9/06, s. 1 (1).

(2) A property may be designated under section 29 of the Act if it meets one or more of the following criteria for determining whether it is of cultural heritage value or interest:

1. The property has design value or physical value because it,
   - i. is a rare, unique, representative or early example of a style, type, expression, material or construction method,
   - ii. displays a high degree of craftsmanship or artistic merit, or
   - iii. demonstrates a high degree of technical or scientific achievement.
2. The property has historical value or associative value because it,
   - i. has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community,
   - ii. yields, or has the potential to yield, information that contributes to an understanding of a community or culture, or
   - iii. demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community.
3. The property has contextual value because it,
   - i. is important in defining, maintaining or supporting the character of an area,
   - ii. is physically, functionally, visually or historically linked to its surroundings, or
   - iii. is a landmark. O. Reg. 9/06, s. 1 (2).

Transition

2. This Regulation does not apply in respect of a property if notice of intention to designate it was given under subsection 29 (1.1) of the Act on or before January 24, 2006. O. Reg. 9/06, s. 2.

3 DESCRIPTION OF PROPERTY

3.1 REGISTERED/DESIGNATED HERITAGE SITES

The structure is not currently registered or designated. It is adjacent to known heritage properties.

3.2 KING STREET WEST (DUNDAS) BRIDGE

The original structure was likely constructed around 1930 under Contract 26-139 and consisted of a single span cast-in-place reinforced concrete T-beam bridge. The structure spans 10.06 m and is 10.74 m wide with six T-beams (girders) and a curb to curb width of 7.32 - 7.52 m. The deck thickness is 216 mm between the T-beams. The abutments and wing walls are constructed of mass concrete gravity retaining walls. The bridge carries two lanes of north south traffic over Spencer Creek.

In 2004 the bridge underwent rehabilitation under Contract PW-03-20 (H) which included replacement of the exterior girders, barriers, sidewalk, top of wing walls, bearing pads, abutment diaphragms and the deck between the easternmost and westernmost girders, as well as rehabilitation to interior girders, bearing seats and new asphalt (MMM 2015).

The *City of Hamilton Bridge Master Plan Heritage Bridge Inventory Review* (Stantec 2015) notes the following:

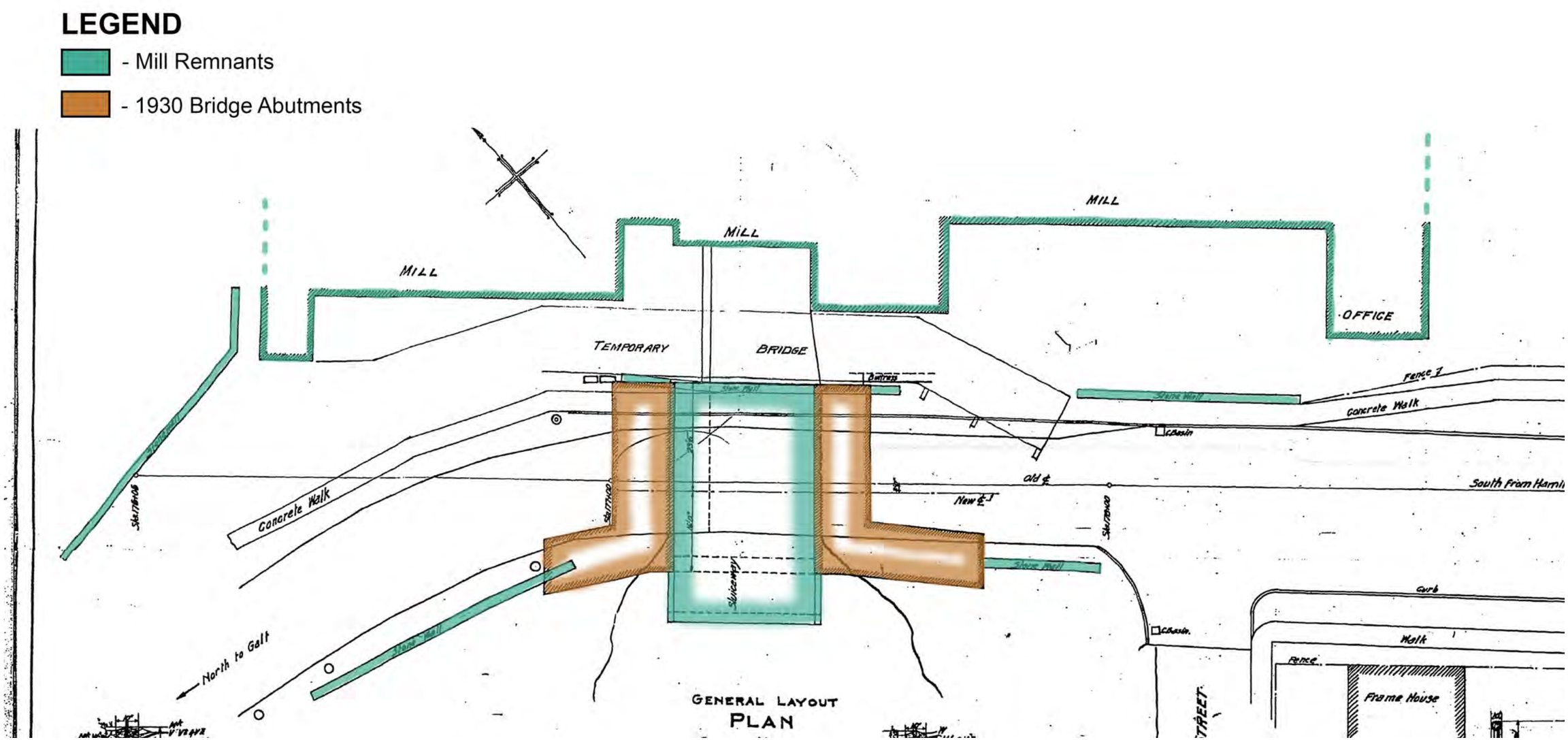
> The bridge carries King Street West over Spencer Creek at the former site of Fisher's Mill in operation from 1863 until 1930. Mill ruins are evident north of the site adjacent to Dundas Falls situated immediately north of the bridge. The bridge is a replacement of an earlier structure.

Investigations show that the abutments are concrete and the girders (beams) are prestressed concrete. In addition, the structure spans over a man-made channel with a sluice weir located directly west of the structure and a spillway to the east. Figure 1 (p.7) shows the location of the bridge structure in relation to the mill remnants as drawn on the 1926 design for the bridge. The alignment remains unchanged to this day with deterioration being the only alteration.

3.2.1 DESCRIPTION OF PROPERTY

A property visit to the bridge site was completed to gain first-hand knowledge of its geography, topography, and examine the structure. Two inspections of the property and its periphery were conducted - the first on October 20, 2016, and the second on November 3, 2016. Photos were taken on November 3, when the weather allowed for better visibility of land and structural features.

Field notes and photographs of the property were taken during the inspection. The photograph locations and directions were noted and all photographs were catalogued.



PROJECT:
Heritage Impact Assessment:
King Street West (Dundas) Bridge - Bridge 248

CLIENT:
City of Hamilton

PROJECT NO.:
161-09178-00

DATE:
11/15/2017

DRAWN BY:
JAS

CHECKED BY:
SJ

3.2.2 DESIGN AND CONSTRUCTION

Structure Name	King Street West (Dundas) Bridge (Bridge 248)	Road Name	King Street West (Highway 8)
Location	Crossing of King Street West/Highway 8 and Spencer Creek, just north of the intersection with Bond Street	Road Type	Municipal
Municipality	City of Hamilton (Dundas), formerly Flamborough	Owner	City of Hamilton
Bridge or Culvert	Bridge	Overall Structure Width (m)	10.74
Structure Type	Rect. T-Beams/Girders	Roadway Width (m)	7.32-7.52
Span (m)	9.87, Single Span	Total Deck Length (m)	11.60
Waterway	Spencer Creek (Non-Navigable)	Total Deck Area (sq.m)	125.60
Direction of Structure	North-South	Requirement for Cher (Stantec 2015)	Bridge is situated directly adjacent to the Fisher's Mill ruins and is associated with the adjacent Dundas Falls and Fisher's Mill Park, founded in memory of the milling operation. East of the bridge is 397 King Street West, a registered property.
Year Built/Rehabilitated	~1930/2004 Drawings Dated 1926		
Construction Period	1900-1930	Designer/Construction Firm	Department of Public Highways - Ontario

3.2.3 COMPARATIVE ANALYSIS

In absence of specific information on the bridge design, it was not possible to conduct a comprehensive comparative analysis that includes the King Street West (Dundas) Bridge. From knowledge of similar structures, there is no indication that the King Street West (Dundas) Bridge has elements that would be described as significant from a design or construction perspective.

Stantec completed the following comparative analysis:

> "Stantec reviewed the City of Hamilton's Bridge Location List to complete a comparative analysis for the King Street West Bridge with other bridges in the city. This analysis was completed to measure the rarity or unique attributes of the bridge. In addition, the dates of construction and the bridge types were compared to determine if the King Street West Bridge is an early example or unique style of bridge. The comparative analysis focuses on the main structure subcategory and main structure sub-type of structures.
>
> The City's Bridge List identifies the King Street West Bridge as a Beam/Girder bridge with a Rectangular Beams/Girders subtype. The Bridge Location List indicates that the King Street Westis one of three Beam/Girder Bridges with Rectangular Beams/Girders in the City of Hamilton. These bridges range in date from 1930 to 2006. Built in 1930, the King Street West Bridge is the oldest bridge of this type in the City of Hamilton.
>
> In addition to the construction date, the Bridge Location List also provides information regarding the total deck length for Beam/Girders with Rectangular Beams/Girders. These types of bridges range in length from 11.6 to 36.5 meters. The King Street West Bridge has a total deck length of 11.6 metres and is the shortest bridge of this type in the City of Hamilton. The Mount Albion Road (West Structure) is longest structure of this type with a total deck length of 36.5 metres.
> While the Rectangular Beam/Girder subtype is relatively rare in the City of Hamilton, Beam/Girder bridges are the most common bridge type in the City. The Bridge Location List identifies that there are 87 Beam/Girder bridges in the City with build dates that range from 1860 (Woodhill Road Bridge) to 2011 (Parkdale Avenue South Bridge). Span lengths for Beam/Girder bridges range from 5.5 metres (Brock Road Bridge and Woodburn Road Bridge) to 1,434 metres (Burlington Street Overpass). Built in 1930 and with a total deck length of 11.6 metres, the King Street West Bridge is the 16th earliest Beam/Girder bridge and 72nd longest Beam/Girder bridge in the City of Hamilton.
>
> Based on this information, the King Street West Bridge is the earliest and shortest Beam/Girder Bridge with a Rectangular Beams/Girder subtype in the City of Hamilton. When compared more generally with Beam/Girder Bridges, the King Street West Bridge is the 16th earliest and 72nd longest bridge of this type in the City of Hamilton."

WSP agrees with this analysis, however find the general nature of it to be difficult to directly apply to the King Street West Bridge. The Stantec analysis details only with the generality of a design type that bridges were assigned to rather than the design specifics for any particular bridge. Hence, as no design comparison is made the direct application of this analysis is of minimal value.

3.2.4 PREVIOUS ASSESSMENT

In 2017, Stantec completed a Cultural Heritage Evaluation Report (CHER) for Bridge 248, also referred to as the King Street West Bridge. The bridge was evaluated against O. Reg. 9/06 and the Hamilton Bridge Guideline. The bridge was found to have CHVI under O. Reg. 9/06 and have moderate heritage value as a Class C structure as per the Hamilton Bridge Guideline. The scoring from the Hamilton Bridge Guideline relates to the 1930 build date (12), use of concrete (8), unusual connection to the surrounding context (10), remnants of the Gore Paper Mill (3), and historical associations (13).
As a Class C bridge with CHVI, Stantec (2017) noted that the King Street West Bridge would require an HIA in the event that removal and/or modifications are proposed for this structure. Specifically, an HIA must be completed when changes are anticipated to the heritage attributes identified for the bridge, which include:

- The original board formed concrete abutments
- Concrete sluiceway
- Remnants of the Gore Paper Mill, including but not limited to:
  - Low stone walls
  - Stone channel (former mill race)
  - Ruins associated with the Gore Paper Mill located on the northwest side of the bridge

Also notable is the following statement (Stantec 2017):

> In addition to consideration of heritage attributes of the King Street West Bridge, the presence of a protected property adjacent to the bridge should be considered in determining the need for an HIA. Immediately adjacent to the bridge site is 397 King Street West, a property included on the City of Hamilton's Register of Cultural Heritage Value or Interest as a registered (non-designated) heritage property. Where a change is proposed to 397 King Street West as part of the proposed undertaking associated with the King Street West Bridge, the effects of that change should be assessed in an HIA.

3.2.5 STATEMENT OF CULTURAL HERITAGE VALUE OR INTEREST

The Cultural Heritage Evaluation Report, King Street West Bridge Site 248 (Stantec 2017) notes the following:

> "The King Street West Bridge is a Beam/Girder bridge with Rectangular Beams/Girders. It was built in 1930 and is the earliest Beam/Girder Bridge with Rectangular Beams/Girders in the City of Hamilton. This bridge was extensively rehabilitated and only the board formed concrete abutments remain of the original bridge.
>
> While the bridge itself has been modified, the contextual setting has remained remarkably intact since 1930. Specifically, the original bridge drawings demonstrate that the bridge was designed to connect to the low stone walls and stone channel (a former mill race) built for the Gore Paper Mill. The low stone walls, stone channel, and sluiceway depicted in the original bridge drawings remain in situ and have not been disturbed by either the original construction or subsequent rehabilitation of the King Street West Bridge. The original drawing specify that the exact angles of the wing walls were to be determined on site so that the stone walls and buttresses could be retained. In this way, the bridge was designed with the purpose of preserving the features of the mill.
>
> The King Street West Bridge was constructed after the Gore Paper Mill was demolished and the Dundas District High School was built. It was constructed to replace the original bridge that carried King Street West over Spencer Creek. The King Street West Bridge itself does not have any known associations with a theme that is significant to the community of Dundas or City of Hamilton but the landscape setting of the bridge is historically associated with the Gore Paper Mill and the Fisher family. The Gore Paper Mill was in operation during the late 19th and early 20th centuries. Spencer Creek was channelized to form a mill race for the Gore Paper Mill by the beginning of the 20th Century. While the mill was demolished in the late 1920s, the ruins of the mill and the stone channel (former mill race) remain in place.
>
> In addition to the historical association with the former mill, the King Street West bridge is also historically associated with R.M. Smith, who was the Chief Engineer for the bridge. R.M. Smith was the last Deputy Minister for the Ontario Department of Public Highways (from 1928 to 1931) and the first Deputy Minister for the Ontario Department of Highways (from 1931-1943).

> The King Street West Bridge itself does not define, maintain, or support the character of the area but the contextual setting of the bridge, including the low stone walls, stone channel (former mill race), ruins associated with the Gore Paper Mill, and concrete sluiceway support and maintain the late 19th century and early 20th century character of the area. These landscape features maintain the historical associations of the bridge setting with the history of mill industry along Spencer Creek and communicate this history to the local community."

WSP largely concurs with the statements made by Stantec in their report for the cultural values of the bridge. However, WSP evaluates the differences between their assessments further in Section 4 below. Most notably for the statement of cultural heritage value, Stantec places a connection to R.M. Smith for the bridge. R.M. Smith is one of the most significant figures for the early design and creation of the highway system in Ontario. However, the connection to this bridge structure is tenuous. The copy of the design provided to WSP has the designer's name cut off in the corner. R.M. Smith and SL. Squire are the approvers of the design; Smith being the Chief Engineer at the Department of Public Highways in 1926 and Squire as the Deputy Minister. Neither would have had an overly active role in the design of this specific bridge and both would have approved all designs in 1926. Hence, the connection with Smith and Squire could extent to all infrastructure constructed over a number of years in Ontario. Considering the context, WSP does not feel that a strong connection exists between Smith and this bridge structure.

4 EVALUATION

4.1 KING STREET WEST (DUNDAS) BRIDGE

Table 1: Ontario Regulation 9/06 Evaluation – King Street West (Dundas) Bridge

CATEGORY	CRITERIA	COMMENTS
Design/ Physical Value	Is a rare, unique, representative or early example of a style, type, expression, material or construction method	No
	Displays a high degree of craftsmanship or artistic merit,	No
	Demonstrates a high degree of technical or scientific achievement	No
Contextual Value	Is important in defining, maintaining or supporting the character of an area	Yes
	Is physically, functionally, visually or historically linked to its surroundings	Yes
	Is a landmark	No
Historical/ Associative Value	Has direct associations with a theme, event, belief, person, activity, organization or institution that is significant to a community	Yes
	Yields, or has the potential to yield, information that contributes to an understanding of a community or culture	No
	Demonstrates or reflects the work or ideas of an architect, artist, builder, designer or theorist who is significant to a community	No

4.1.1 DESIGN/PHYSICAL VALUE

It is WSP's opinion that the King Street West (Dundas) Bridge does not demonstrate significant design or physical value. Bridge elements are consistent with other structures of its type. The CHER (Stantec 2017) notes the cultural heritage value of the original board formed concrete abutments. However, a review by structural engineer William Van Ruyven indicates that the use of concrete and formwork in this style was common and would not be considered to have significant historical value. WSP's opinion conflicts with the opinion of Stantec for the bridge. A comparison of the conflicting elements follows.

The Stantec CHER of the bridge structure noted the following:

> "Specifically, the original bridge drawings demonstrate that the bridge was designed to connect to the stone walls and channel constructed to form a mill race for the Gore Paper Mill. The low stone walls, stone channel (former mill race), and sluiceway depicted in the original bridge drawings remain in situ and have not been disturbed by either the original construction or rehabilitation of the King Street West Bridge.
>
> Accordingly, this bridge has design value as the earliest Beam/Girder bridge with Rectangular Beams/Girder in the City of Hamilton and due to its unusual, site-specific connection to the surrounding landscape." (Stantec 2017:XX).

WSP does not agree with the two points put forward by Stantec as part of the design/physical value for Bridge 248. The design value of the presence previous mill remnants do not place physical value on the bridge itself but rather the mill remnants separately. It is important to define what physical layer to which the mill remnants belong and what layer the bridge belongs to. There is no physical part of the mill complex which is part of the bridge. The bridge structure itself incorporates no element which could be considered part of the mill complex. The bridge structure is an intrusive element on the physical remnants of the original mill and simply reuse the original embankments as part of their base. Reuse of the embankments and basis of the original bridge would have been expedient rather than removing them and constructing an entirely new base. If a concerted effort to retain and incorporate the design elements of the mill the structure had been made it would have been designed to incorporate elements of the original structure. Instead, the 1920s design displaced all of the elements of the original bridge to put in place a standard bridge structure of the time whilst reusing the embankments. The practice of reuse of original embankments is not uncommon (Scotty Pattyson, P.Eng., Personal Communication, Nov 15 2017) or of design/physical heritage value.

The second argument put forth by Stantec was that the bridge was an early example in the local area of this type of bridge. By their own data this is the 16th earliest and 72nd longest Beam/Girder bridge within the City of Hamilton. Using the City of Hamilton Bridge list again they state that it is the shortest and oldest Rectangular Beam/Girder bridge in the city (Stantec 2017:5.9). The argument that a bridge is early and hence has value is predicated on the bridge being an example of the evolution of the typology of structure. Typically early typologies show a change over from an earlier style representing a blend between approaches and styles. The value in retaining an early structure is too illustrate and preserve the blend/evolution in styles. For this bridge to have early design value it must reflect this change. However, the standardization of bridge structures at this time did not lead to strong evolutionary changes in thought or design for these structures (Scott Pattyson, P.Eng. Personal Communication Nov 15 2017). By the time of this bridge's placement in 1930, the form was fixed and this bridge does not show early design value as a result. In addition, subsequent rehabilitation of the structure has removed many of the elements of the original bridge except for the board formed concrete abutments and some of the girders. This rehabilitation has greatly altered the primary physical characteristics of a beam/girder design; the beams and girders themselves.

4.1.2 CONTEXTUAL VALUE

The King Street West (Dundas) Bridge demonstrates contextual value as it it contributes to heritage character of the area. It contributes a sense of place representative of 19th and early 20th century landscapes through its massing and placement within the landscape. The contribution of the bridge to the landscape, and the significance of the historic landscape needs to be more fully studied in a wider study of the adjacent property and potential heritage resources; particularly the Gore Mill.

4.1.3 HISTORICAL/ASSOCIATIVE VALUE

The King Street West (Dundas) Bridge demonstrates historical or associative values as it has known associations with historic themes or events, namely the Gore Mill complex. Remnants of the Gore Paper Mill, include but not limited to the low stone walls, stone channel (former mill race) and the ruins associated with the Gore Paper Mill located on the northwest side of the structure. A bridge structure was located here and tied to the use of the mill for a considerable portion of the 19th and early 20th century. The current structure post-dates the mill's active period, however, the new bridge is considered to be a minor change in mass and size to the original bridge structure. The 1930 bridge also only impacted its direct footprint, leaving the context and other features associated with the bridge intact.

4.1.4 ANALYSIS

The King Street West (Dundas) Bridge has been determined to have elements of moderate cultural heritage value or interest based on the contextual and associative values outlined in Table 1. The heritage attributes associated with the cultural heritage value of the bridge are as follows:

1. Contribution of the massing of the bridge and original embankments to the 19th and early 20th century character and context of the landscape. (The landscape context that the bridge contributes to needs to be defined by further study of the area in a subsequent project).
2. Association with the probable heritage resource of the Gore Mill remnants, particularly in reuse of elements of the original bridge (Heritage attributes of the Mill to be defined).

This analysis differs from Stantec's heritage attributes in the understanding of what constitutes the current bridge structure and the mill remnants. WSP considers them to be separate physical entities and separate physical layers on the landscape. Hence, while WSP considers the mill remnants of probable cultural heritage value, we do not consider them to be a part of the bridge structure. The difference being while the bridge is located partially on the mill remnants they are physically separate and, outside of the embankments, are not a required part of the bridge structure.

5 PROPOSED UNDERTAKING AND MITIGATION

5.1 KING STREET WEST (DUNDAS) BRIDGE

5.1.1 PROPOSED UNDERTAKING

The King Street West (Dundas) Bridge 248 Municipal Class Environmental Assessment will examine option to rehabilitate the existing bridge by incorporating heritage and EA requirements and confirm the need to replace (remove) the existing bridge and construct a new bridge downstream with a re-alignment of King Street. Should the structure not be removed, a detailed delamination survey completed in 2015 identified that the bridge is in need of extensive rehabilitation work.

As such, the proposed undertaking for the King Street West (Dundas) Bridge may involve the removal or rehabilitation of the structure, to be determined through the EA process.

The Draft Problem/Opportunity Statement for the King Street West (Dundas) Bridge (Bridge #248) Municipal Class EA is defined as follows:

> Based on studies completed by the City of Hamilton, the existing King Street West (Dundas) Bridge (Bridge #248) will continue to deteriorate in the absence of rehabilitation / replacement works. The Bridge is deteriorating in terms of its structural integrity, resulting in increased concern for the safety of bridge users. In its current condition, the Bridge will not be able to function in the future and the bridge structure is in need of major repairs or possible replacement.
>
> This project provides an opportunity for meeting current and future travel demands within the area and maintaining the link between the existing communities of Dundas and Greensville. As well as improving traffic operations and pedestrian safety in the area and giving consideration to the provision of active transportation opportunities.

The four proposed alternative solutions for consideration in this study are as follows:

TABLE 2: ALTERNATIVE SOLUTIONS

	Planning Solutions	Description
Alternative 1	Do Nothing	This alternative has been included to provide a base to which the other alternatives can be compared. Under this alternative, no measures to improve the condition of the bridge are considered (status quo).
Alternative 2	Rehabilitate Existing Bridge	Repair and rehabilitate the existing bridge to address the structural deficiencies.
Alternative 3	Replace Bridge at existing location	Replace existing bridge with new bridge that complies with current design standards (including the provision of active transportation)
Alternative 4	Replace Existing Bridge and Realign King Street West	Remove the existing bridge and construct a new bridge downstream and realign King Street West

5.1.2 IMPACTS

The King Street West (Dundas) Bridge was determined to possess moderate cultural heritage value or interest based on Contextual Value and Historical/Associative Value. The proposed undertaking has the potential to negatively impact cultural heritage values should the structure be removed (without replacement) or relocated to a non-adjacent space. The following examines the impacts based on the alternative solutions proposed.

When determining the potential impacts of a project on a heritage resource it is important to review the heritage attributes of that resource and determine if the nature of the project will cause impacts to its heritage attributes (Parks Canada 2010:3). As this study, and the previous CHER, were only conducted on Bridge 248 and did not review the landscape and properties adjacent to the structure, no determination of the impacts to resources other than the bridge can confidently be made.

Of note for the replacement of this bridge structure is the presence of the remnants of the Gore Mill adjacent to and north of the bridge structure; which from preliminary review would appear to have potential to be considered a heritage resource. As no heritage attributes have been defined for the mill through a detailed study and community consultation, this assessment is taking a zero-impact approach to the physical remnants of the mill structure. Visual and contextual impacts to the mill will be recommended based on a minimal intervention and impact goal.

The Heritage Attributes of Bridge 248 to be considered against the design alternatives are as follows:

1. Contribution of the massing, original embankments to the 19th and early 20th century character and context of the landscape. (The landscape context that the bridge contributes to needs to be defined by further study of the area in a subsequent project).
2. Association with the probable heritage resource of the Gore Mill remnants, particularly in reuse of elements of the original bridge (Heritage attributes of the Mill to be defined).

ALTERNATIVE 1

Alternative 1 is to do nothing to rehabilitate or replace the bridge structure. This would have the lowest impact to the resource in the short term. The landscape and resources would remain in place as they are for a period of time. However, it is noted that the bridge will not be structurally sound for an extensive period of time. At which point the bridge will no longer be in place and could in fact collapse damaging the remnants of the mill. As such this is not a viable alternative from a cultural heritage perspective as it would likely result in uncontrolled damage to the mill remnants and contextual removal of a bridge structure from this location. This alternative has the potential to impact both heritage attributes of the bridge.

ALTERNATIVE 2

Alternative 2 is to rehabilitate the existing bridge to address the structural deficiencies. This alternative is the lowest intervention option. Rehabilitation of the existing bridge, if possible, would retain all of the historical and contextual values of the bridge in place. WSP recommends this approach as the lowest impact to the heritage attributes of this bridge structure and the potential heritage attributes of the Gore Mill remnants should rehabilitation be possible without impacting the embankments or landscape.

ALTERNATIVE 3

Alternative 3 is to replace the existing bridge with a new bridge designed to comply with current standards. As the bridge structure has been found by this study as having no physical/design value the replacement of the structure would have the potential to impact only the historic/associative/contextual values of the bridge. The replacement of the existing bridge structure would not impact those values if the massing and relative location could be maintained by the current design standards and the mill remnants could be minimally physically impacted. The massing of the bridge maintains the current rural 19th and 20th century character of the location. The placement of a larger structure would impose a late 20th or early 21st century character on the landscape of the area and hence impact the heritage attribute 1 of the bridge and potentially the mill remnants.

ALTERNATIVE 4

Alternative 4 is to remove the existing bridge from this location, realign King Street and construct a new bridge at another location. This Alternative would most strongly impact the context of the bridge within the landscape. As a bridge has been located here on all mapping since the first mill was created, the removal of the bridge from this location would impact the contextual understanding of its landscape as outlined by Heritage Attribute 1. If a realignment was to be proposed the location would have to be a minimal change in location to maintain the context of the bridge within the landscape. In addition, as with Alternative 3 the new bridge would need to be of the same massing. The realignment would also have the potential to alter the mill remnants and low stone walls along the roadway. These impacts would need to be studied under a HIA for the Gore Mill and adjacent properties.

5.1.3 MITIGATION

The review of the alternative options proposed against the heritage attributes of the bridge structure results in intial recommendation of Alternative 2 – Rehabilitation of the current structure. The rehabilitation of the structure would cause the lowest impact to the heritage attributes by keeping the existing massing and likely result in the least impact to the physical mill remnants.

Alternative 3, if done appropriately, is of equal standing with Alternative 2 for impacts to the heritage attributes of the bridge. The key factors for an appropriate replacement structure would be the retention of all physical assets of the mill, including those within the embankments of the current bridge structure and the maintaining of the massing of the current bridge while conforming the new bridge to current design standards. Should both of those objectives be achievable by a replacement for the bridge, then the impact of Alternative 3 would be equivalent to Alternative 2.

If the decision is made proceed with Alternative 2, 3 or 4, it is recommended that the City undertake full recording and documentation of the existing structure in situ prior to rehabilitation or removal.

Where a change is proposed to either the Remnants of the Gore Paper Mill (including but not limited to the low stone walls, stone channel (former mill race), and ruins associated with the Gore Paper Mill located on the northwest side of the bridge) or to heritage property designated as 397 King Street West, the effects of that change should be assessed in an HIA.

6 CONSULTATION

6.1 OPEN HOUSE

An open house was held on February 1, 2017 to share information about the project and to solicit public comment. We received 24 comments altogether from residents and one comment from a local group as a collective body for a total of 25. Eighteen of these comments were provided at the PIC and the remaining seven (7) were via email. Two questions were asked:

Do you feel that the bridge is associated with heritage values and if so, why?
How does the bridge fit into the story of the area's history?

There was a range of comments from those who felt the bridge was associated with heritage values (6 responses). One individual felt that the bridge should be retained, but stone added to the façade to have it "blend in". Another felt that the bridge is associated with the "entrance to the town and passage over Spencer Creek" and that it "fit into the story of other structures such as mill and structures to the north and Grave stone and park to the south". The emphasis on the structure's location and its association with past events was conveyed in these responses. Of the six responses, most felt the relocation of the bridge was an option.

The other respondents felt that the structure itself was not connected with heritage values or chose not to respond to the question regarding its value. Instead, those individuals focused on other concerns, such as the impact of realignment on the nearby Chinquapin Oak, the potential for increased speed and safety of vehicles with the straightening of the turn, amongst others.

The primary concern is that of the loss of greenery and of road safety after the curve is removed. Residents are interested in the conservation of the native trees at Fisher Mill Park, specifically the Chinquapin Oak. They would like for this aspect of the park to remain and if it must be removed would opt for replanting these trees to retain historical value of the area. They also prefer that the soccer fields remain intact.

Majority of residents who commented agree that if the curve is reduced, this will result in increased speeds of traffic and potentially major accidents. Residents have voiced that safe facilities accommodating pedestrians and cyclists alike should be implemented within the area.

Alternative #3 and Alternative #4 have stood out as favourable options among those who provided feedback.

Six of 24 residents identified the bridge as having historical values, three residents said no and the remaining did not respond to the question.

The structure does not appear to be important, but its positioning is. The association with area history and heritage elements (association with mills, old wall, and the Chinquapin Oak, etc.) form the stronger narrative.

6.2 CITY OF HAMILTON HERITAGE STAFF REVIEW

An initial draft report outlining the conclusions included in this report was sent to the City of Hamilton Heritage Staff for review and comment. The following comments were received:

Staff have reviewed the Cultural Heritage Evaluation Report (CHER) for Bridge 248 (Dundas). Unlike the scope of the archaeological assessment noted above the scope Cultural Heritage Evaluation Report was limited to Bridge 248.

The report concludes that the Bridge possesses contextual and associates value, as it is associated with the historic mill complex and contributes to the character of the area.

Three alternative options were explored:

- *Rehabilitate the existing bridge;*
- *Replace bridge in the existing location; and,*
- *Replace bridge and realign King Street West.*

The current bridge, constructed in 1930 is a replacement of an earlier bridge. Remains of the earlier bridge can be found to the west of the current bridge. As such the current location is in close proximity but not the exact location of the original (or earlier) bridge.

As the bridge itself is not considered to have significant design value, replacement of the bridge with another bridge would maintain the historical value of a connection across the Spencer Creek River. Contextual value is present given its location to the historic mill complex, however, given that the bridge is not in the original location, the proposed realignment of King Street West would not have a significant impact on the contextual value as long as the a new bridge remains in close proximity.

As such, staff of the opinion that any of the above noted alternatives would be acceptable based on the bridge's cultural heritage value. Should the bridge be replaced, however, staff require thorough photo documentation of the existing bridge.

Beyond the scope of the bridge itself, staff do note that that section of Highway 8 coming down from the escarpment is a historic transportation route. Notably there are some historic walls surrounding properties and along the escarpment edge (see pictures) ***[page following].*** *These are significant features that contribute to the character of this historic transportation route. Should future infrastructure improvements be planned along Highway 8, these historic walls should be maintained and appropriately protected.*

Historic Walls, Image 1

Historic Walls, Image 2

7 RECOMMENDATIONS AND CONCLUSIONS

Based on the results of research, site investigation, and application of the criteria from Ontario Regulation 9/06, the King Street West (Dundas) Bridge was determined to have elements of moderate cultural heritage value or interest based on the contextual and associative values, but not design/physical value.

Based on the evaluation of the structure in conjunction with the feedback from the public, Alternative 3 (Replacement of the Bridge at the existing location) is the most preferred option. Maintaining an association with this location with the construction a new bridge of similar massing and minimally impacting the mill remnants will satisfy the heritage concerns.

Based on the conclusions of this study the following recommendations are made:

- A bridge design be implemented that conforms to the current design standards and addresses the needs of transportation at this location while maintaining the overall massing of the existing bridge.

- It is recommended that the City undertake full recording and documentation of the existing structure in situ prior to removal of the existing bridge structure

- It is recommended that all elements related to the Remnants of the Gore Paper Mill be protected from impacts associated with the removal of the existing structure and the placement of the new bridge.

- Where a change is proposed to either the Remnants of the Gore Paper Mill (including but not limited to the low stone walls, stone channel (former mill race), and ruins associated with the Gore Paper Mill located on the northwest side of the bridge) or to heritage property designated as 397 King Street West, the effects of that change should be assessed in an HIA.

8 BIBLIOGRAPHY

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MMM Group Ltd.

2015 Spencer Creek Bridge Field Investigation Memorandum

Stantec

2015 *City of Hamilton Bridge Master Plan Heritage Bridge Inventory Review. Original Report.*

2017 *Cultural Heritage Evaluation Report, King Street West Bridge Site 248. Original Report.*

Provincial Standards and Resources

Ontario Heritage Tool Kit
http:// www.culture.gov.on.ca/english/heritage/Toolkit/toolkit.ht

Ontario Ministry of Tourism, Culture and Sport: Heritage Conservation Principle's for Land Use Planning
http://www.culture.gov.on.ca/english/heritage/info_sheets/info_sheet_landuse_planning.htm

Ontario Ministry of Tourism, Culture and Sport: Eight Guiding Principles in the Conservation of Historic Properties
http://www.culture.gov.on.ca/english/heritage/info_sheets/info_sheet_8principles.htm

Ontario Ministry of Culture, Tourism and Sport: Archaeological Assessments
http://www.mtc.gov.on.ca/en/archaeology/archaeology_assessments.shtml

Municipal Heritage Bridges Cultural, Heritage and Archaeological Resources Assessment Checklist (Revised April 11, 2014)

Ontario Heritage Act (2005)

Ontario Heritage Bridge Guidelines (2008)

Reference Guide on Physical and Cultural Heritage Resources (1996)

Guidelines for Preparing the Cultural Heritage Resource Component of Environmental Assessments (1992).

National and International Standards and Resources

Canadian Register of Historic Places
http://www.historicplaces.ca/visit-visite/rep-reg_e.aspx

Parks Canada Standards and Guidelines for the Conservation of Historic Places in Canada
http://www.pc.gc.ca/docs/pc/guide/nldclpc-sgchpc/index_E.asp

Parks Canada National Historic Sites of Canada
http://www.pc.gc.ca/progs/lhn-nhs/index_e.asp

International Council of Monuments and Sites (ICOMOS): Appleton Charter
http://www.international.icomos.org/charters/appleton.pdf

9 IMAGES

King Street West (Dundas) Bridge

Image 1: View looking north from Bond St S across Fisher's Mill Park towards the bridge.

Image 2: View looking northeast from Bond St S.

Image 3: View looking northwest from King St W at Fisher's Mill Park towards the bridge.

Image 4: View looking northeast at District Lofts Condos at 397 King St W, adjacent to the bridge.

Image 5: View of the bridge looking north along King St W.

Image 6: View of a plaque in Fisher's Mill Park, south of the bridge.

Image 7: View looking northwest at the south side of the bridge.

Image 8: View looking north at the south side of the bridge

Image 9: Old structures on the south side of the bridge on the east side of Spencer Creek.

Image 10: View of Spencer Creek on the south side of the bridge.

Image 11: View of the bridge from the southeast bank.

Image 12: View of the bridge from the southeast bank.

Image 13: View of the bridge from the southeast bank.

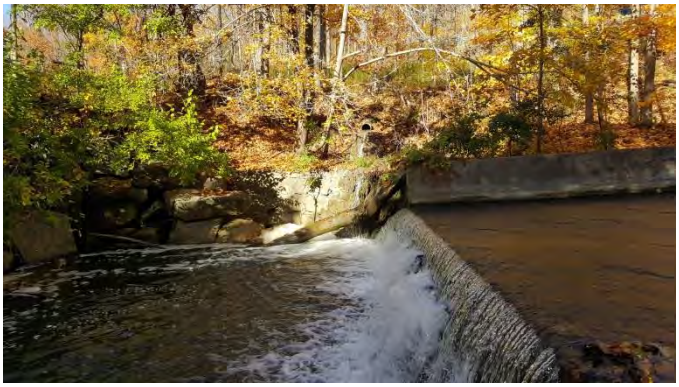


Image 14: View of the Spencer Creek from the southeast bank.

Image 15: View of the bridge from the southeast bank.

Image 16: View of the underside of the bridge from the southeast bank.

Image 17: View under the bridge from the southeast bank.

Image 18: View of the southeast side of the bridge.

Image 19: View of the bridge from the southeast bank.

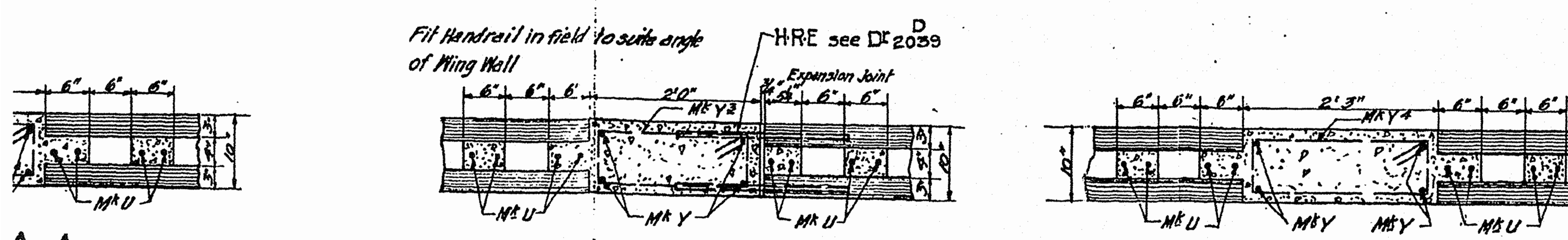
Image 20: Old structure on the southeast side of the bridge.

Image 21: Old Structure

Image 22: Old Structure

Image 23: Old Structure

Image 24: Old Structure



A-A

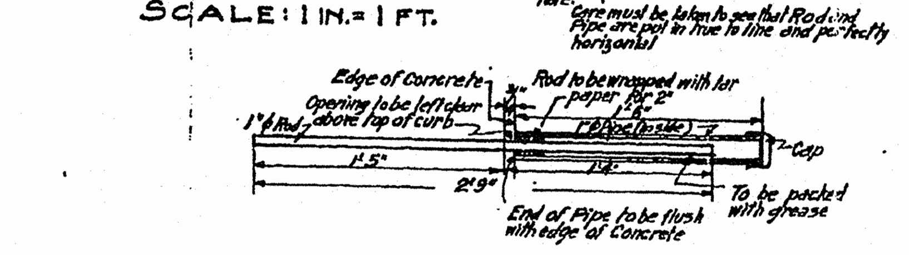
SECTION AT B-B
SCALE: 1 IN. = 1 FT.

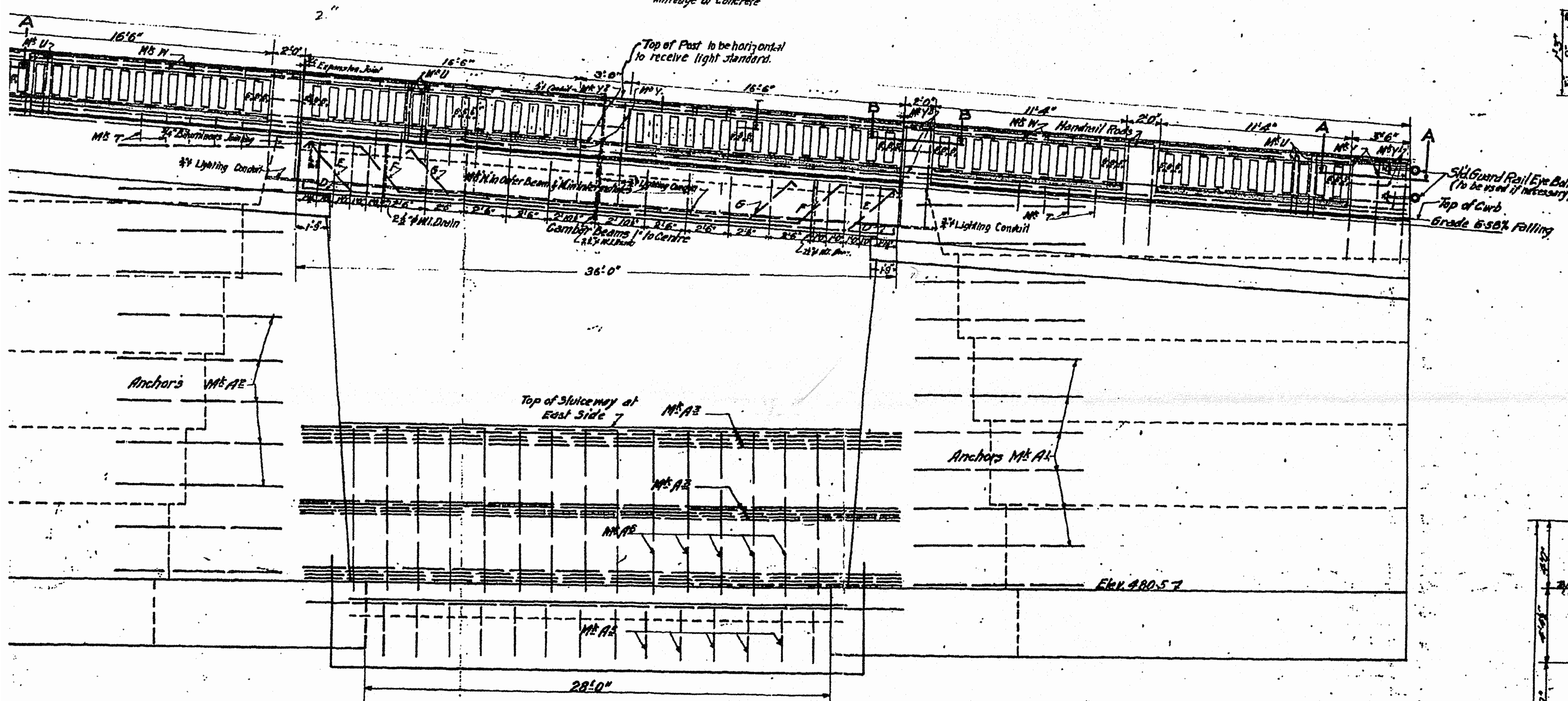
SECTION AT C-C

Fit Handrail in field to suite angle of Wing Wall

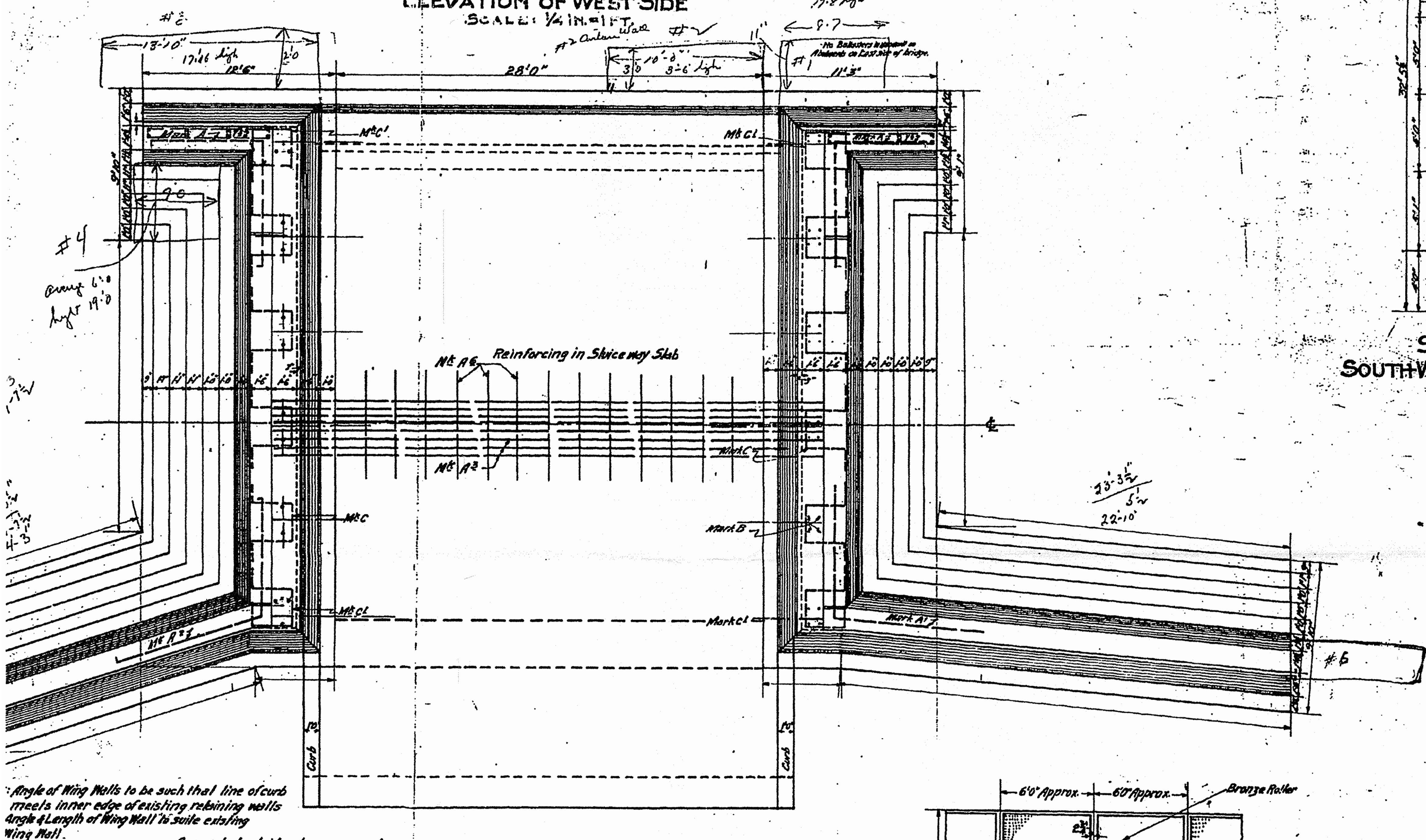
H.R.E. see Dr 2039 D

Note: Care must be taken to see that Rod and Pipe are put in true to line and perfectly horizontal





ELEVATION OF WEST SIDE
SCALE: 1/4 IN. = 1 FT.

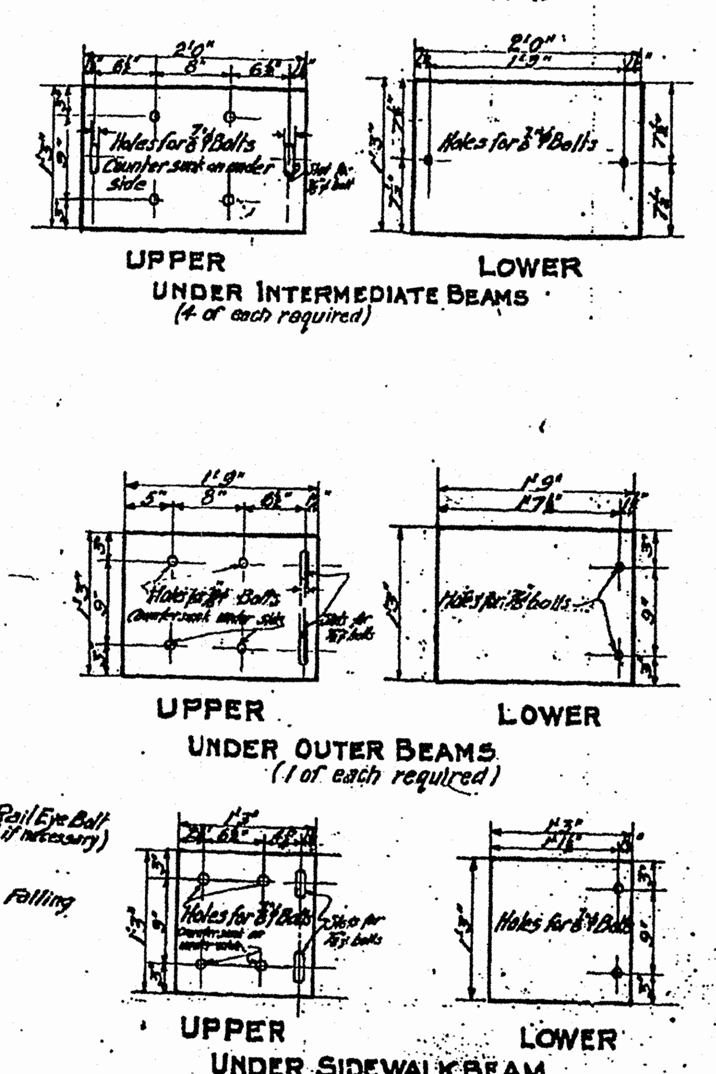


Angle of Wing Walls to be such that line of curb meets inner edge of existing retaining walls. Angle & Length of Wing Wall to suite existing Wing Wall.

Apron to be laid out on ground

PLAN
SCALE: 1/4 IN. = 1 FT.

DETAILS OF BEARING PLATES
SCALE 1" = 1 FT.

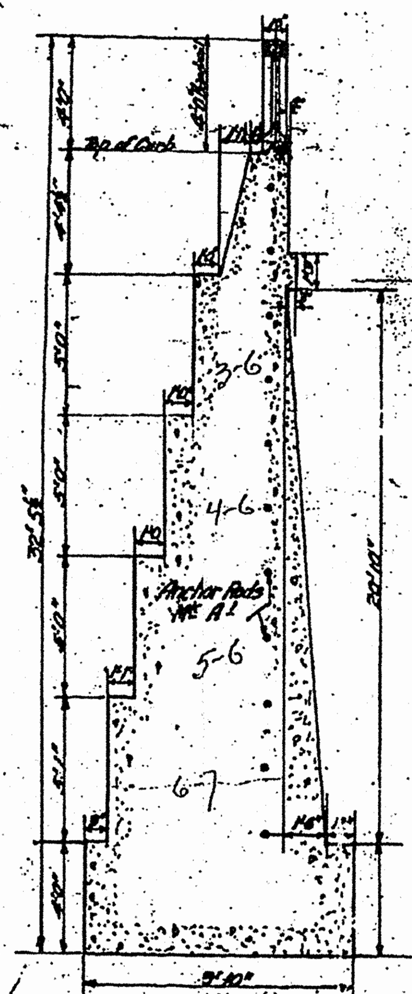


UPPER — LOWER
UNDER INTERMEDIATE BEAMS
(4 of each required)

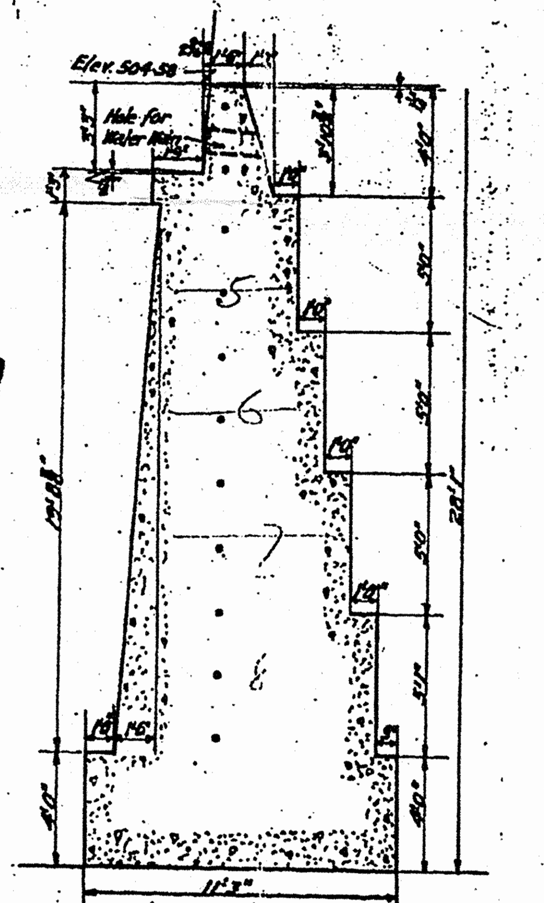
UPPER — LOWER
UNDER OUTER BEAMS
(1 of each required)

UPPER — LOWER
UNDER SIDEWALK BEAM
(1 of each required)

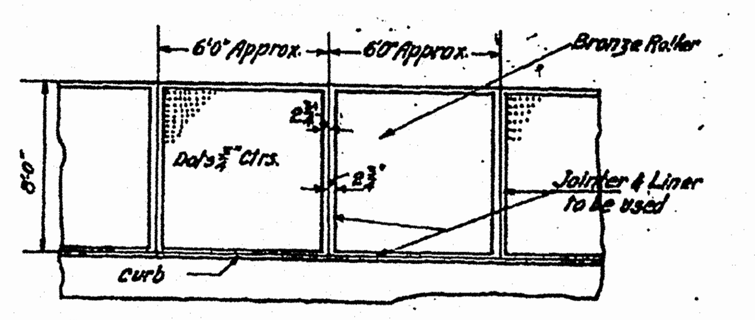
Anchor Bolts Required:
24 - 7/8" x 1'0" countersunk heads
12 - 7/8" x 1'3" with nuts and washers (Washers 6"x3"x 3/8")
Swedge or thread bottom of all bolts
NOTE: All plates to be 1/2" thick.



SECTION OF SOUTHWEST WING WALL



SECTION OF



DETAIL SHOWING CONCRETE FINISH ON BRIDGE SIDEWALK
SCALE: 1/4 IN. = 1 FT.

TABLE REINFORCING STEEL

MARK	NUMBER	SIZE	LENGTH	REMARKS	DETAIL
A	22	3/4"φ	14'6"	Anchors in East Side 11 in North 11 in South	
A1	11	3/4"φ	18'6"	Anchors in S.W. Wing Wall & Abutment	
A2	11	3/4"φ	18'6"	Anchors in N.W. Wing Wall & Abutment	
A3	114	1"φ	36'0"	In E. & Inter. Footgs, Curtain wall & Sluiceway Floor @ 9" c.c.	Straight
A4	15	1"φ	17'0"	In Curtain Wall	
A5	17	1"φ	9'0"	In West Footing	
A6	26 / 8	1/2"φ	26'0 / 10'0	Temp'rs Rods Sluiceway Floor under Bridge @ 2'0" c.c.	Straight Bend to fit in field
A7	32	1"φ	31'6" may vary	In Sluiceway Apron West & West Footing @ 9" c.c.	Straight
A8	14	1"φ	3'0"	In Inter. Footg. Vertical into Floor	Straight
B	24	1"φ	3'0"	Vert. in Br. Seat & Beams at Fixed End	Straight
C	16	3/4"φ	12'0"	Around Bolts in Br. S. Int. Bms	
C1	8	1/8"φ	12'0"	" " " Outer "	
D	10	1 1/8"φ	36'4"	2 In each Roadway Beam	
E	10	1 1/8"φ	38'8 5/8"	2 " "	
F	10	1 1/8"φ	38'3 1/2"	2 " "	
G	5	1 1/8"φ	25'9 1/2"	1 " "	
H	2	1"φ	36'4"	2 In each S.W. Beam	
J	1	1"φ	38'2"	1 In " "	
K	19	1/2"φ	8'2 1/2"	Stirrups in S.W. Beam	
L	19	1/2"φ	7'4"	" E. Roadway Beam	
M	57	1/2"φ	7'4"	" Inter "	
N	19	1/2"φ	7'8"	" West "	
O	2	1/2"φ	25'8"	2 In stiffener (Roadway)	Straight
O1	2	1/2"φ	7'4"	2 " S.W. Beam	Straight
P	2	1/2"φ	28'11"	2 In " Roadway	
P1	2	1/2"φ	7'5 3/4"	2 " S.W. Beam	
Q	36	5/8"φ	25'8"	In Roadway Slab altern't with R @ 6" c.c	Straight
R	36	5/8"φ	26'0"	In Roadway Slab altern't with Q @ 6 c-c	
R1	72	5/8"φ	7'2"	In S.W. slab @ 6" c-c	Straight
S	42	1/2"φ	18'6"	Temp'rs in Slab & Curb	Straight
T	76	1/2"φ	5'7"	In Curbs @ 1'6" c-c except in H.R. Posts	
U	214	1/4"φ	3'6"	2 In each Balluster	Straight
V	20	1/2"φ	15'9"	In H.R. & Curb S.W.W. Wall	Straight Bend to fit in field
V1	20	1/2"φ	6'9"	" " N.E. & S.E. W. Wall	"
V2	10	1/2"φ	21'6"	" " N.W. W.W.	"
V3	40	1/2"φ	18'6"	" " on Bridge	"
W	76	3/16"φ	2'4"	In H.R. @ 1'6" c-c except at Posts	
Y	56	3/4"φ	6'0"	In H.R Posts	Straight
Y1	6	3/16"φ	8'8"	3 In each end H.R. Post West side	
Y2	6	3/16"φ	1'3"	3 In " West side "	
Y3	9	3/16"φ	5'8"	3 In - Inter. Post on W.W.	
Y4	12	3/16"φ	6'2"	3 In - H.R. Post on Bridge	
HRE	12			3 In each H.R. Post at Exp'n & Fixed Ends	See Drawing No 2039 D
Z	10	3/4 x 3" Bar	8'6"	5 on each side under Pipes	
Y5	9	3/16"φ	7'8"	In N.E. Wing Wall	
Y6	9	3/16"φ	6'10"	In S.E. Wing Wall	

Replacement 9'-2" long Mark R1A

Back-fill under Sluiceway and behind Abutments with old masonry abutments and earth, and to be solidly compacted.
Back-fill behind Abutments to be puddled.
Details subject to change in the field.
Crushed stone concrete to be used throughout.
Depth of Foundations subject to revision by Engineer.
If soft footings are encountered or if footings are carried more than one foot below depth shown on plan, the approval of the Bridge Engineer must be obtained before any concrete is poured.
3-2 1/2"φ Drains to be placed in face of each abutment above sluiceway floor.
3-2 1/2"φ Wrought Iron Drains to be placed in each side of bridge floor.
Beams, slabs & curbs to be poured in one continuous operation.
To be built in accordance with the D.P.H.O. General Specifications for Concrete Highway Bridges, 1920.
One man stones to be placed at all breaks between pours.
All Steel of Less than 3/4"φ to be bent in the field.

CONTRACT No 26-139

QUANTITIES

Mass Concrete (Abutment, Wing Walls, & Sluiceway etc.)	987.41	Cu. Yds.
Reinforced Concrete (Beams, Slab & Curbs)	68.48	" "
Concrete Handrail	136.75	Lin. ft.

PROPOSED BRIDGE IN THE VILLAGE OF DUNDAS

STATION 177 + 25
HAMILTON - KITCHENER PROVINCIAL HIGHWAY

SCALES AS SHOWN

APPROVED:

R. M. Smith — Chief Engineer
[signature] — Deputy Minister

Department of Public Highways - Ontario
Toronto, April 24th 1926
Revised August 23rd 1926 (Handrail detail, Width Abutments, Width Sidewalk, Location Water Mains, Lighting Conduit, Rod. Mk R1A)

Detailed by

D

PLAN Nº 86-W-4 SHT. 2

KING STREET

275+00

280+00

FORMER DUNDAS DISTRICT HIGH SCHOOL (CLOSED) 397

DUNDAS PUC

300 Ø WATERMAIN SUSPENDED UNDER BRIDGE FLOOR

BM

EXISTING 300 Ø WATERMAIN TO BE CLEANED & LINED

EXISTING 300 Ø WATERMAIN TO BE CLEANED & LINED

EXIST. 300 Ø WATERMAIN

EXIST. 300 Ø ST. SEWER

EXIST. 250 Ø ST. SEWER

EXIST. BELL TELE. CONDUIT

EXIST. BELL TELE. CABLE

EXIST. 200 Ø SAN. SEWER

EXIST. 300 Ø GASMAIN

EXIST. 100 Ø GASMAIN

EXIST. 75 Ø CONDUIT

EXIST. 250 Ø SAN. SEWER

EXIST. 50 Ø GASMAIN

EXIST. 100 Ø WATERMAIN

EXIST. 100 Ø GASMAIN

EXIST. 31 Ø GASMAIN

EXIST. 150 Ø WATERMAIN

EXIST. 100 Ø SAN. SEWER

EXIST. 100 Ø S.S.

EXIST. 100 Ø GASMAIN

EXIST. 200 Ø GASMAIN

EXIST. 300 Ø ST. SEWER

EXISTING Ø ROAD PROFILE

NEXT HYDRANT 100± BOND

HEAD ST (Closed)

SPENCER CREEK

CONC SLUICE

6" CSP

12" x 20" CSP

9" x 6'5 CSP

OWRC Test Station

Conc Weir

Sth Wall

Conc Rip Rap

Conc Ret W

Bush

Asph

Mulch

Hedge

Ver.

Shrubs

Sign

F Add

2 SF

1½ FH

WMF

WF

CW

HGS

OLS

OHLS

HGLS

OHT

BF

RF

CB

OB

FH

WV

367

363

361

357

351

349

347

343

358

348

346

344

135

130

125

120

CHAINAGE	EXISTING Ø ROAD ELEVATIONS
1+55.05	136.398
1+64.05	135.636
1+75.02	134.674
1+87.22	134.112
1+96.32	133.35
2+07.60	132.588
2+18.27	131.826
2+28.55	131.064
2+40.82	130.302
2+51.49	129.54
2+60.63	128.778
2+71.00	128.016
2+79.83	127.254
2+90.81	126.492
3+01.17	125.73
3+12.75	124.968
3+23.11	124.206
3+33.17	123.444
3+48.41	122.682
3+69.75	121.92
3+92.30	121.158
4+21.26	120.396
4+50.20	119.889
℄ INTERSECTION KING STREET & BOND STREET	
4+61.20	119.566
4+91.66	118.996

No.	REVISIONS	DATE	INITIAL
1	AS CONSTRUCTED ADDED	89-04-25	R.L.

NOTES:

SCALES
HORIZ.: 1:500
VERT.: 1:100

DIRECTOR

APPROVED
COMMISSIONER OF ENGINEERING

THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH
DEPARTMENT OF ENGINEERING

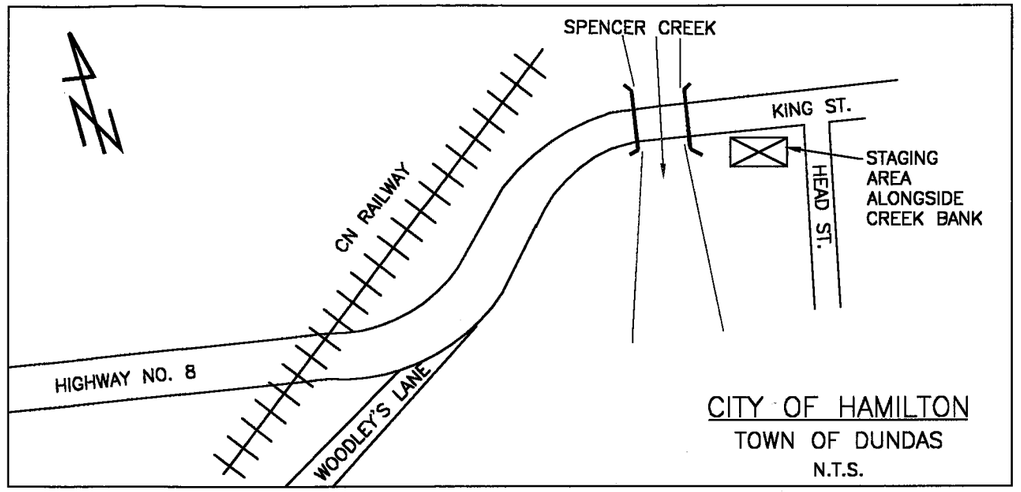
DATE: MAY 7, 1986

PROJECT No. 803-54

KING STREET
WATERMAIN CLEANING & LINING
FROM: RESERVOIR W-H II
TO: ALBERT STREET

DRAWING No. 86-W-4

SHEET 2 OF



SCHROEDER ENGINEERING
CONSULTANTS LIMITED

REGISTERED PROFESSIONAL ENGINEER
K. M. B. Schroeder
02/10/13
PROVINCE OF ONTARIO

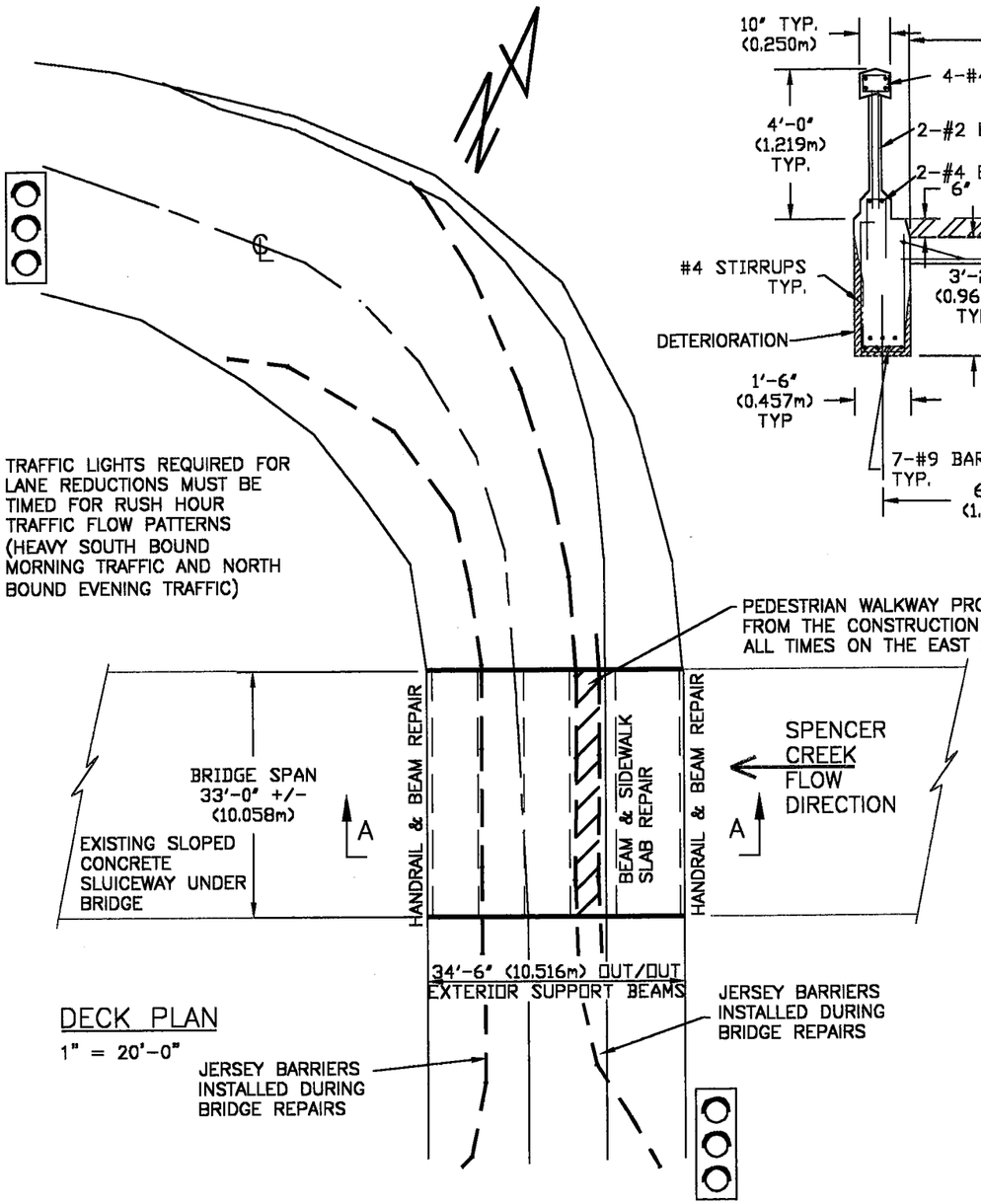
CLIENT:

CITY OF HAMILTON

77 JAMES ST. NORTH
HAMILTON, ONTARIO
L8R 2K3

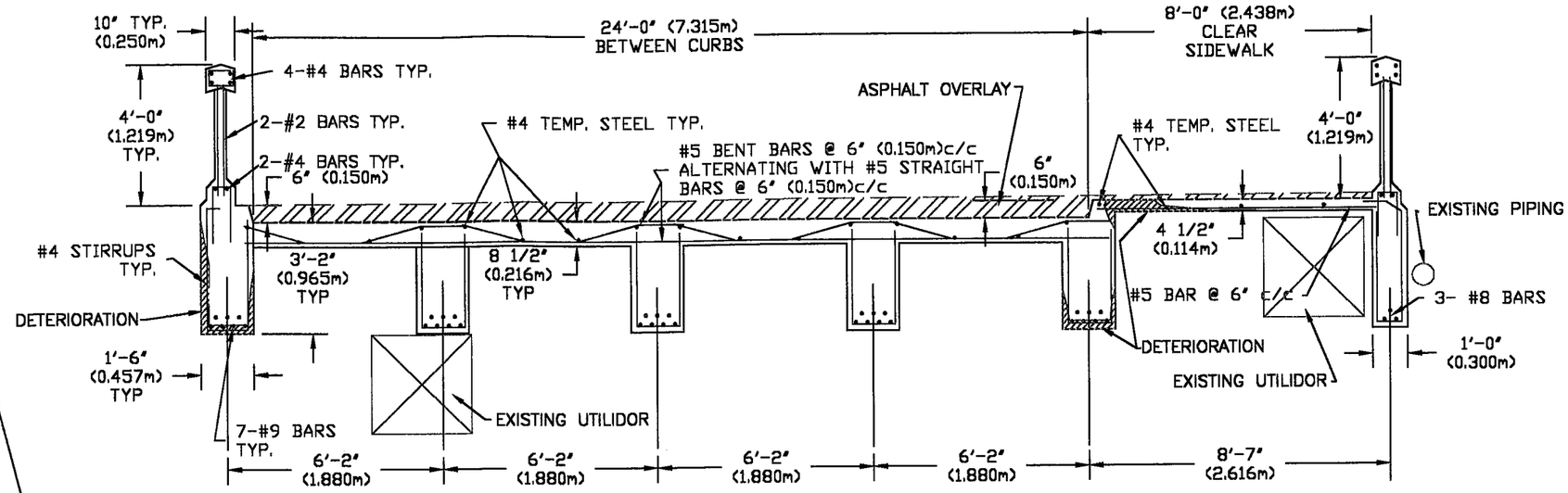
PROJECT:

SPENCER CREEK BRIDGE
AT HIGHWAY NO. 8
DUNDAS, ONTARIO



DECK PLAN

1" = 20'-0"



SECTION A:A

1/4" = 1'-0"

NOTE:
EXISTING ASPHALT SURFACE TO BE MILLED ON THE EAST SIDE TO ALLOW THE CURB TO EXTEND ABOVE THE ROAD DECK BY AT LEAST 2" AND NO ASPHALT TO BE PLACED ON TOP OF NEW SIDEWALK SLAB.

EXISTING UTILIDORS TO BE PROTECTED – UTILITES TO BE NOTIFIED OF WORK IN ADVANCE OF CONSTRUCTION.

PRELIMINARY & PROGRESS DRAWINGS

LEGEND:

~ TRAFFIC SIGNALS

~ CENTRELINE OF BEAMS

~ CENTRELINE OF ROADWAY

~ EDGE OF ROADWAY

NOTES:
SILT CLOTH, PLASTIC, FIBREGLAS OR CANVAS TARPS TO PREVENT DEBRIS ENTERING THE WATER COURSE MUST BE IN PLACE PRIOR TO STARTING REHAB. WORK.

ONE LANE OF VEHICULAR TRAFFIC TO BE MAINTAINED AT ALL TIMES DURING THE COURSE OF THIS CONSTRUCTION.

ALL DIMENSIONS AND DETAILS HAVE BEEN TAKEN FROM PLANS F1/2 AND F2/2, "PROPOSED BRIDGE IN THE VILLAGE OF DUNDAS, STATION 177 + 25", DEPT. OF PUBLIC HIGHWAYS, ONTARIO, DATED APRIL 24, 1926 & REVISED AUG. 23, 1926, DRAWING NUMBER 2049, CONTRACT NUMBER 26-139.

REGISTERED PROFESSIONAL ENGINEER
K. M. B. Schroeder
02/10/13
PROVINCE OF ONTARIO

REV	DATE	DESCRIPTION	BY

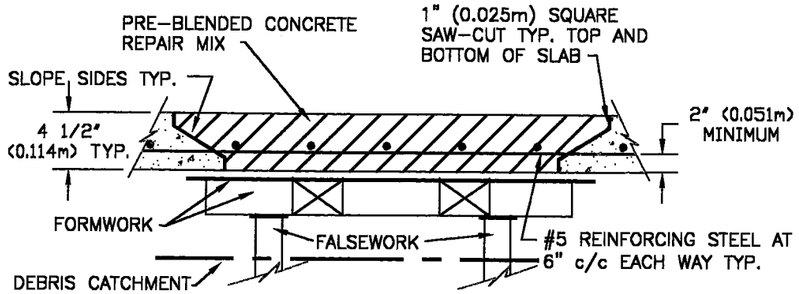
SCHROEDER ENGINEERING
CONSULTANTS LIMITED

SPENCER CREEK BRIDGE AT HWY NO.8

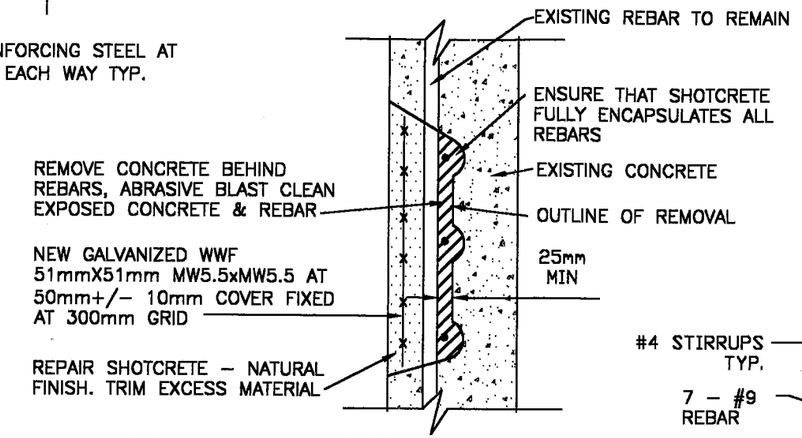
DUNDAS, ONTARIO ~ THE CITY OF HAMILTON

DRAWN	DATE	DWG NO.	REV
TRISH D.	JUNE 28, 2002	0221	

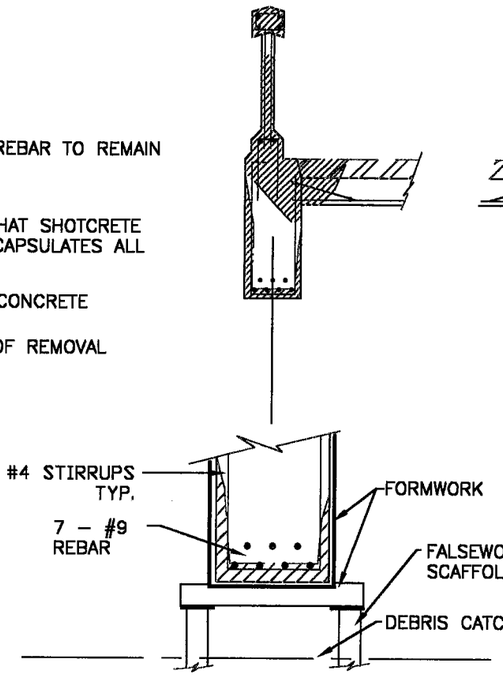
SCALE		SHEET
NOT TO SCALE	SLAB REHAB.	1 OF 4



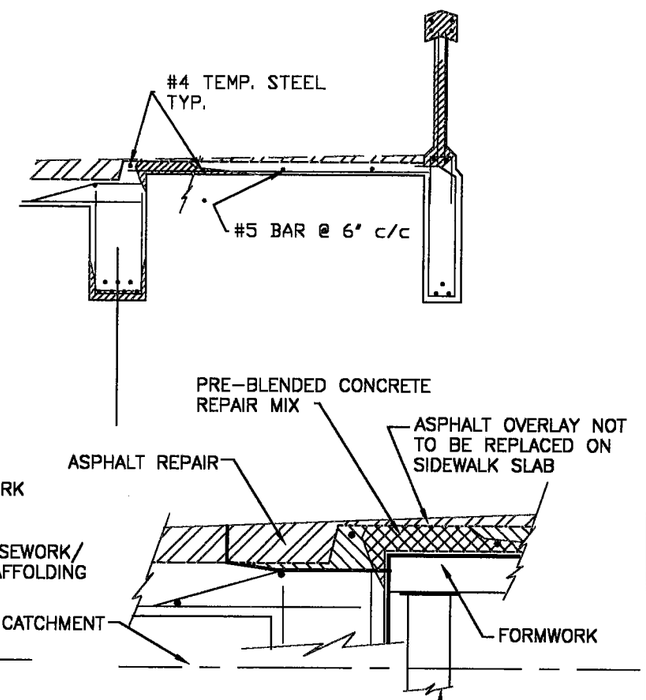
TYP. SECTION AT CONCRETE SIDEWALK SLAB REPAIR



TYP. VERTICAL REPAIR

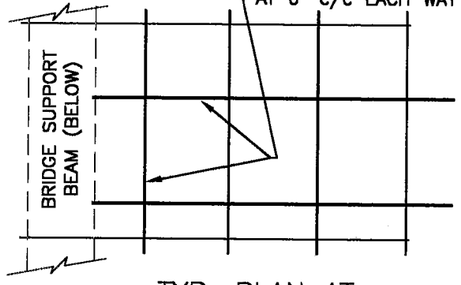


TYPICAL BEAM REPAIR SECTION

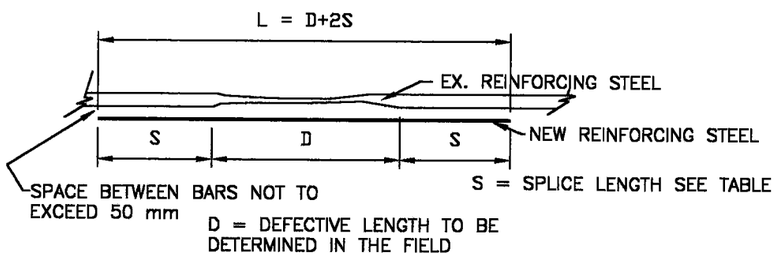


NOTE: SCAFFOLDING CAN BE MOUNTED ON CONCRETE SLUICEWAY UNDER BRIDGE DECK.

TYPICAL CURB REPAIR SECTION



TYP. PLAN AT CONCRETE SIDEWALK SLAB REPAIR



EXISTING BAR SIZE	NEW BAR SIZE	SPLICE LENGTH (S)
#5	1–15M	650mm
#6	1–20M	800mm
#7	1–25M	1100mm
#8	1–25M	1100mm

TYP. SPLICE DETAIL

CORRODED TIE BARS WHICH REQUIRE AUGMENTING WILL BE IDENTIFIED IN THE FIELD AND INSTRUCTED BY THE CONTRACT ADMINISTRATOR

NOTES:
1. CLEAN CONCRETE SURFACE & EXPOSED REINFORCING STEEL. AIR BLAST REPAIR AREA TO REMOVE ALL LOOSE PARTICLES.
2. LAP AND WIRE CONNECT NEW REINFORCING TO EXISTING STEEL.
3. APPLY 2 LAYERS OF FLEXIBLE CEMENTITIOUS REBAR COATING TO FULL CIRCUMFERENCE OF EXPOSED REINFORCEMENT WITHIN 6 HOURS OF CLEANING.
4. SATURATE EXISTING CONCRETE SURFACE WITH WATER FOR A PERIOD OF 1 HOUR PRIOR TO POURING CONCRETE.
5. INSTALL FORMWORK AND POUR PRE–BLENDED CONCRETE REPAIR MIX INTO FORMS, 5000 PSI MINIMUM
6. FINISH, WATER, AND CURE NEW CONCRETE SLAB REPAIR.

PRELIMINARY & PROGRESS DRAWINGS

REV	DATE	DESCRIPTION	BY
1	09/20/02	ADD: SPLICE LENGTHS, VERTICAL SURFACE REPAIR	TD

REGISTERED PROFESSIONAL ENGINEER — K. M. B. Schroeder — 02/10/15 — PROVINCE OF ONTARIO

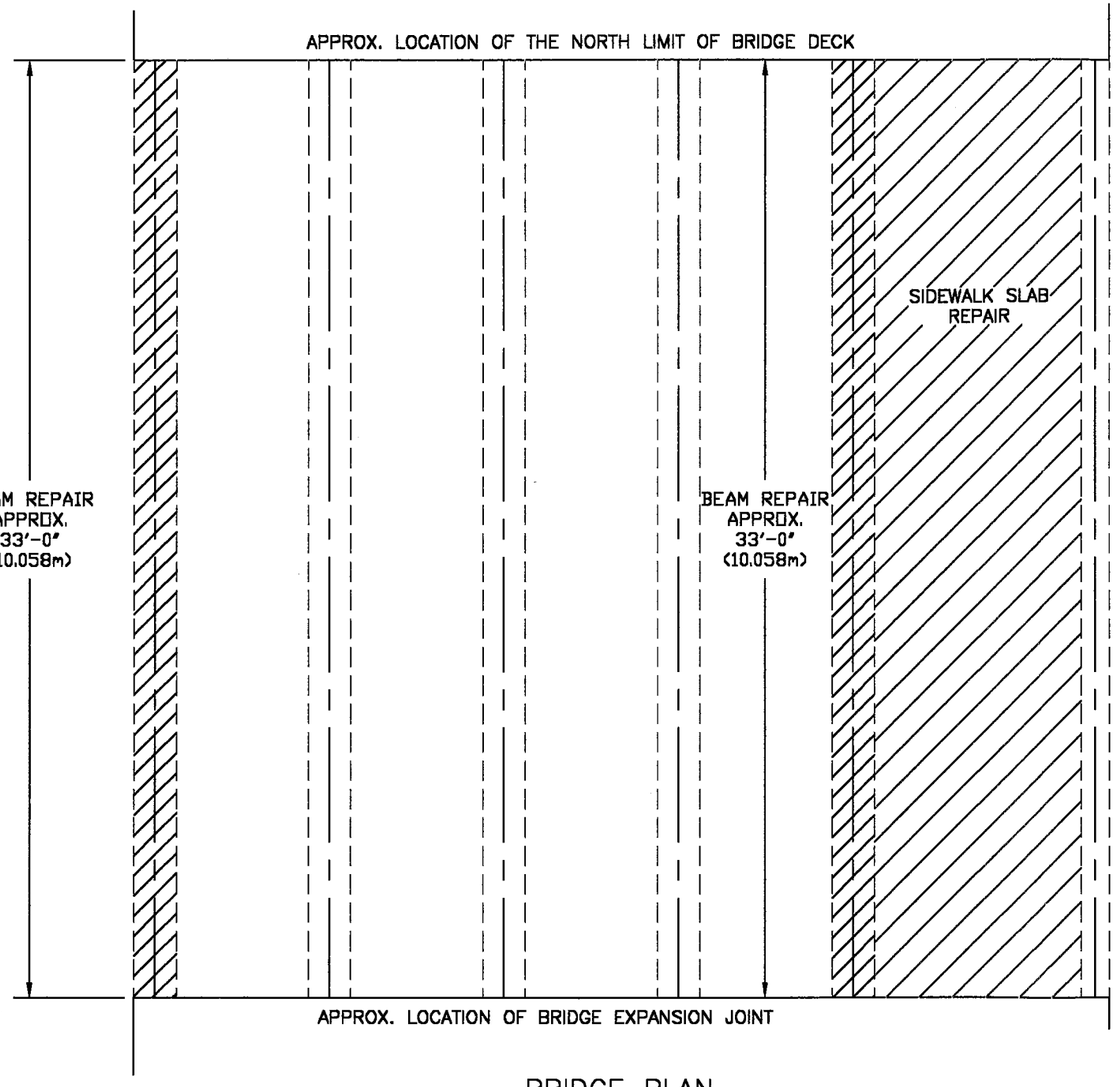
SCHROEDER ENGINEERING CONSULTANTS LIMITED

SPENCER CREEK BRIDGE AT HWY NO.8

DUNDAS, ONTARIO ~ THE CITY OF HAMILTON

DRAWN	DATE	DWG NO.	REV
TRISH D.	JUNE 28, 2002	0221	1

SCALE		SHEET
NOT TO SCALE	SLAB REHAB.DETAILS	2 OF 4



BRIDGE PLAN
EXTENT OF REHABILITATION

SPENCER CREEK FLOW DIRECTION

NOTES:

SIGNAGE – AS PER MTO SPECIFICATIONS, ROADWAY IS TO BE SIGNED "NARROW ROADWAY", "CONSTUCTION ZONE", ETC. TO MEET APPLICABLE CITY OF HAMILTON AND MTO REQUIREMENTS.

CLEARING & GRUBBING – A MINIMUM OF 20'(6m) TO EACH SIDE OF THE BRIDGE.

EXISTING SIGNS TO BE CLEARED OF VEGETATION AND OVERGROWTH OF TREES, ETC.

PRELIMINARY & PROGRESS DRAWINGS

ALL DIMENSIONS AND DETAILS HAVE BEEN TAKEN FROM PLANS F1/2 AND F2/2, "PROPOSED BRIDGE IN THE VILLAGE OF DUNDAS, STATION 177 + 25", DEPT. OF PUBLIC HIGHWAYS, ONTARIO, DATED APRIL 24, 1926 & REVISED AUG. 23, 1926, DRAWING NUMBER 2049, CONTRACT NUMBER 26–139.

REGISTERED PROFESSIONAL ENGINEER
K. M. B. Schroeder
02/10/13
PROVINCE OF ONTARIO

REV	DATE	DESCRIPTION	BY

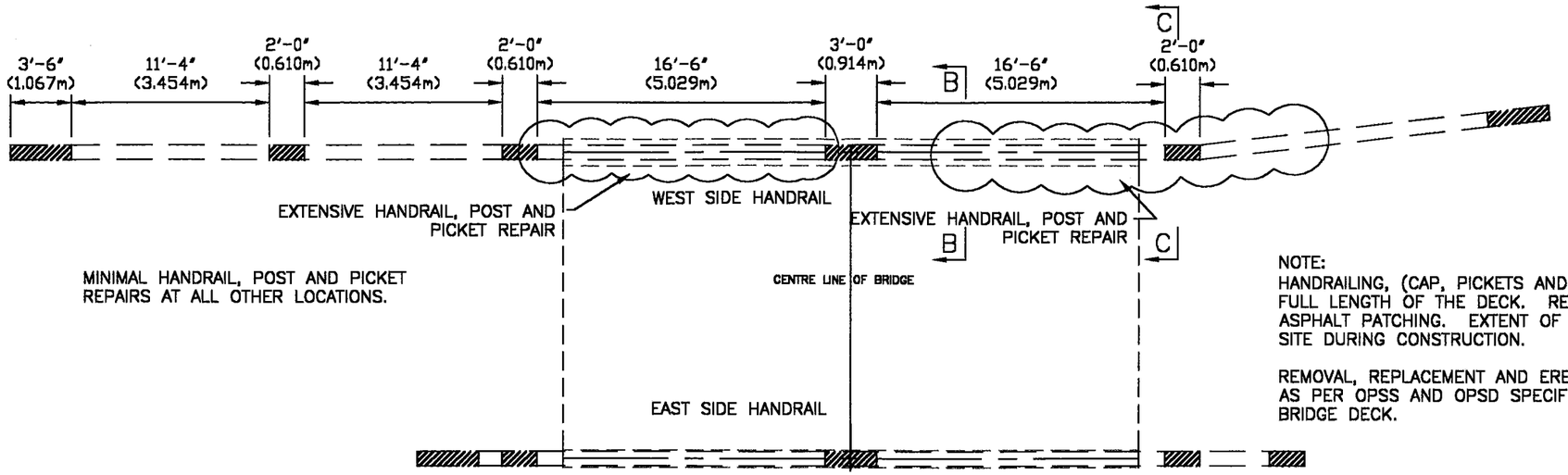
SCHROEDER ENGINEERING
CONSULTANTS LIMITED

SPENCER CREEK BRIDGE AT HWY NO.8

DUNDAS, ONTARIO ~ THE CITY OF HAMILTON

DRAWN	DATE	DWG NO.	REV
TRISH D.	JUNE 28, 2002	0221	

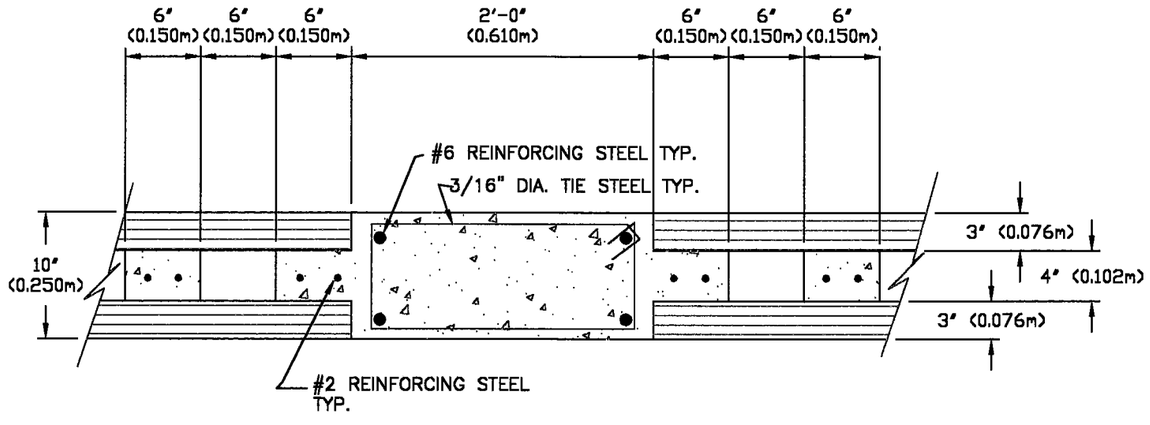
SCALE		SHEET
NOT TO SCALE	OVERVIEW	3 OF 4



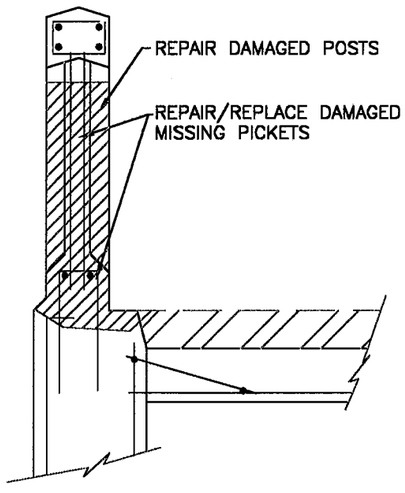
NOTE:
HANDRAILING, (CAP, PICKETS AND POSTS) TO BE REPAIRED FOR THE FULL LENGTH OF THE DECK. REPAIRS MAY INCLUDE ROAD DECK AND ASPHALT PATCHING. EXTENT OF REPAIR WORK TO BE CONFIRMED ON SITE DURING CONSTRUCTION.

REMOVAL, REPLACEMENT AND ERECTION OF NEW STEEL GUARD RAILING AS PER OPSS AND OPSD SPECIFICATIONS OVER THE SPAN OF THE BRIDGE DECK.

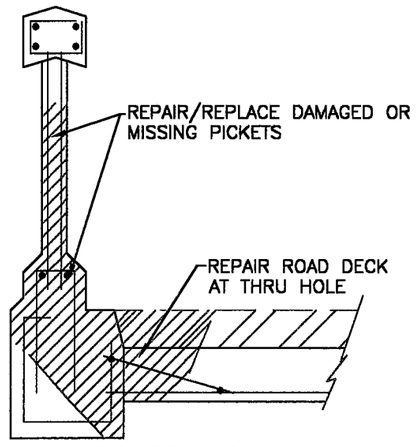
HANDRAILING PLAN
1/8" = 1'-0"



TYPICAL HANDRAIL POST
1" = 1'-0"



SECTION B:B
HANDRAIL & POST REPAIR
1/4" = 1'-0"



SECTION C:C
HANDRAIL REPAIR
1/4" = 1'-0"

REV	DATE	DESCRIPTION	BY

PRELIMINARY & PROGRESS DRAWINGS

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REGISTERED PROFESSIONAL ENGINEER
K. M. B. Schroeder
02/10/13
PROVINCE OF ONTARIO

SCHROEDER ENGINEERING
CONSULTANTS LIMITED

SPENCER CREEK BRIDGE AT HWY NO.8
DUNDAS, ONTARIO ~ THE CITY OF HAMILTON

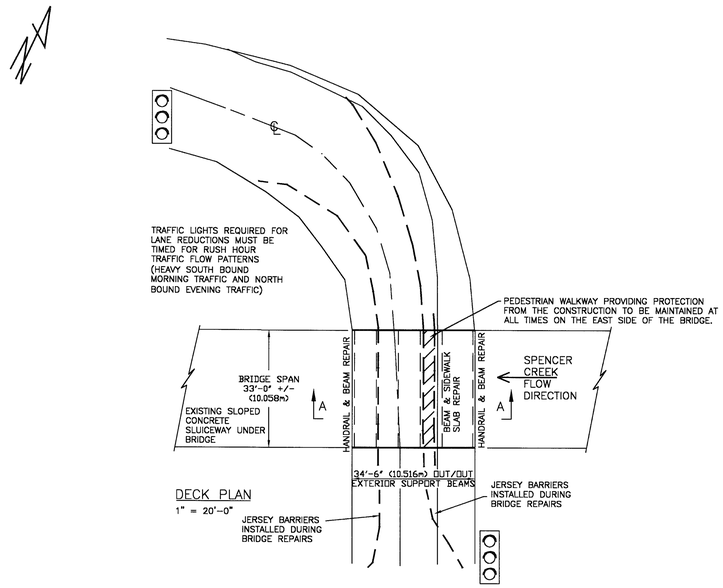
DRAWN	DATE	DWG NO.	REV
TRISH D.	JUNE 28, 2002	0221	
SCALE 1/8" = 1'-0"	HANDRAIL REPAIR	SHEET 4 OF 4	

HIGHWAY #8

HIGHWAY #8

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

CONTRACT No. PW-03-20(H)
DRAWING No. 03-M-04
FILE No.

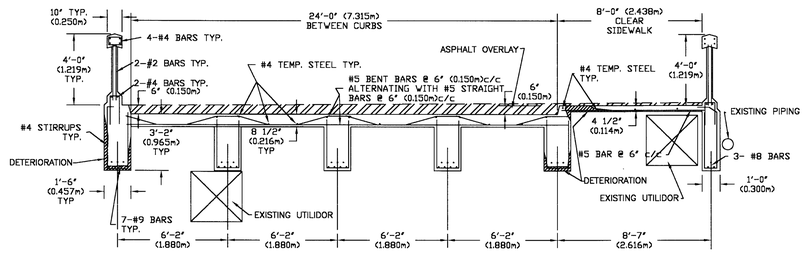


DECK PLAN
1" = 20'-0"

DECK PLAN LEGEND:

~ TRAFFIC SIGNALS

~ CENTRELINE OF BEAMS
~ CENTRELINE OF ROADWAY
~ EDGE OF ROADWAY



SECTION A:A
1/4" = 1'-0"

NOTES:

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EXISTING SIGNS TO BE CLEARED OF VEGETATION AND OVERGROWTH OF TREES, ETC.

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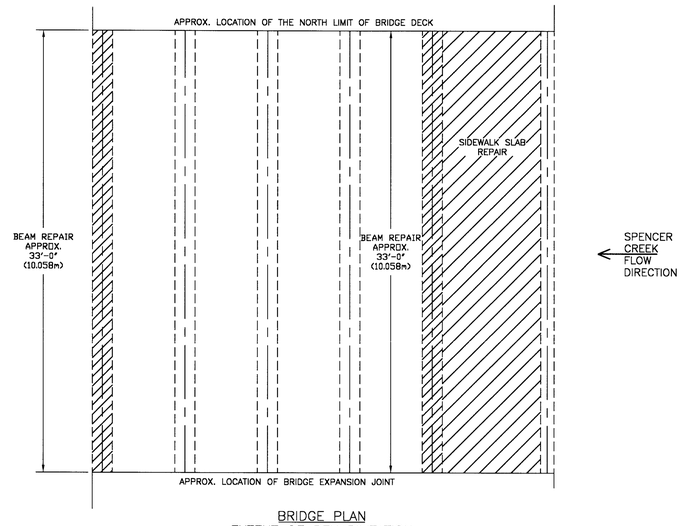
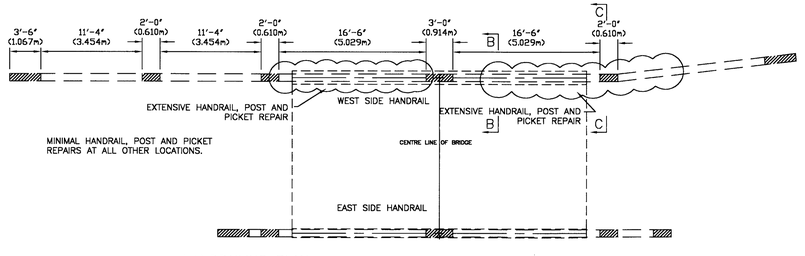


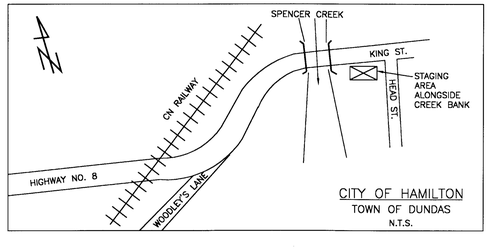
BRIDGE PLAN
EXTENT OF REHABILITATION



HANDRAILING PLAN
1/8" = 1'-0"

12/04/03

12/04/12



CITY OF HAMILTON
TOWN OF DUNDAS
N.T.S.

No.	REVISIONS	INITIAL	DATE
1			

DRAWN BY: name | DATE: MAY 7, 2003

REFERENCE MATERIAL:

ALL DIMENSIONS AND DETAILS HAVE BEEN TAKEN FROM PLANS F1/2 AND F2/2, "PROPOSED BRIDGE IN THE VILLAGE OF DUNDAS, STATION 177 + 25", DEPT. OF PUBLIC HIGHWAYS, ONTARIO, DATED APRIL 24, 1926 & REVISED AUG. 23, 1926, DRAWING NUMBER 2049, CONTRACT NUMBER 26-139.

SCALES
AS NOTED

SCHROEDER ENGINEERING
CONSULTANTS LIMITED
211 COUNTRY CLUB DR.
HAMILTON, ONTARIO
L8K 6B1
TEL: 905-561-7023
FAX: 905-561-7023
schroeder_engineering@yahoo.com

Manager of Construction
Jerry Parisotto, P.Eng.

Manager of Design
Gary Moore, P. Eng.

CITY OF HAMILTON
PUBLIC WORKS DEPARTMENT

HIGHWAY #8
SPENCER CREEK BRIDGE REPAIR

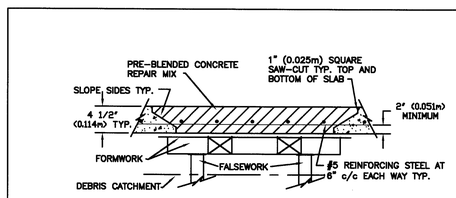
PW-03-20(H)

HIGHWAY #8

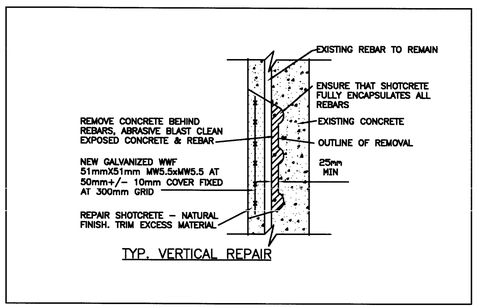
DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED

CONTRACT No. PW-03-20(H)
DRAWING No. 03-M-04
FILE No.

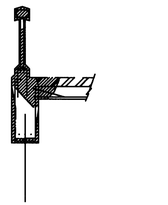
SHEET No. 2 OF 2

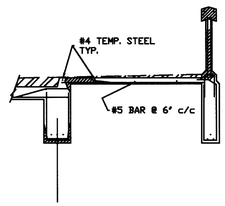


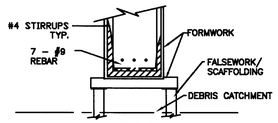
TYP. SECTION AT CONCRETE SIDEWALK SLAB REPAIR



TYP. VERTICAL REPAIR

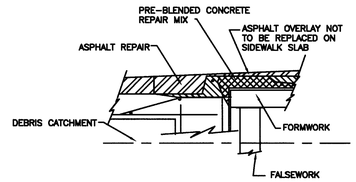




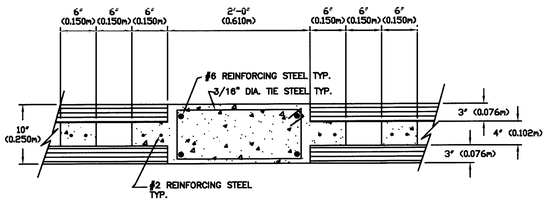


TYPICAL BEAM REPAIR SECTION

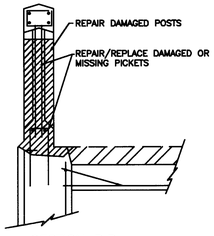
NOTE: SCAFFOLDING CAN BE MOUNTED ON CONCRETE SLUICEWAY UNDER BRIDGE DECK.



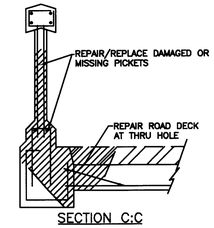
TYPICAL CURB REPAIR SECTION



TYPICAL HANDRAIL POST
1" = 1'-0"



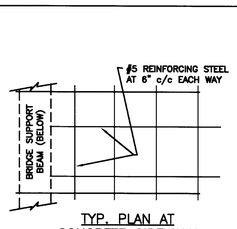
SECTION B:B
HANDRAIL & POST REPAIR
1/4" = 1'-0"



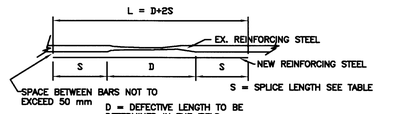
SECTION C:C
HANDRAIL REPAIR
1/4" = 1'-0"

HANDRAILING, (CAP, PICKETS AND POSTS) TO BE REPAIRED FOR THE FULL LENGTH OF THE DECK. REPAIRS MAY INCLUDE ROAD DECK AND ASPHALT PATCHING. EXTENT OF REPAIR WORK TO BE CONFIRMED ON SITE DURING CONSTRUCTION.

REMOVAL, REPLACEMENT AND ERECTION OF NEW STEEL GUARD RAILING AS PER OPSS AND OPSD SPECIFICATIONS OVER THE SPAN OF THE BRIDGE DECK.



TYP. PLAN AT CONCRETE SIDEWALK SLAB REPAIR



EXISTING BAR SIZE	NEW BAR SIZE	SPLICE LENGTH (S)
#5	1-15M	650mm
#6	1-20M	800mm
#7	1-25M	1100mm
#8	1-25M	1100mm

CORRODED TIE BARS WHICH REQUIRE AUGMENTING WILL BE IDENTIFIED IN THE FIELD AND INSTRUCTED BY THE CONTRACT ADMINISTRATOR

TYP. SPLICE DETAIL

NOTES:
1. CLEAN CONCRETE SURFACE & EXPOSED REINFORCING STEEL. AIR BLAST REPAIR AREA TO REMOVE ALL LOOSE PARTICLES.
2. LAP AND WIRE CONNECT NEW REINFORCING TO EXISTING STEEL.
3. APPLY 2 LAYERS OF FLEXIBLE CEMENTITIOUS REBAR COATING TO FULL CIRCUMFERENCE OF EXPOSED REINFORCEMENT WITHIN 8 HOURS OF CLEANING.
4. SATURATE EXISTING CONCRETE SURFACE WITH WATER FOR A PERIOD OF 1 HOUR PRIOR TO POURING CONCRETE.
5. INSTALL FORMWORK AND POUR PRE-BLENDED CONCRETE REPAIR MIX INTO FORMS, 5000 PSI MINIMUM
6. FINISH, WATER, AND CURE NEW CONCRETE SLAB REPAIR.

12/6/03

3/05/12

No.	REVISIONS	INITIAL	DATE
1			

DRAWN BY: name | DATE: MAY 7,2003

REFERENCE MATERIAL:

ALL DIMENSIONS AND DETAILS HAVE BEEN TAKEN FROM PLANS F1/2 AND F2/2, "PROPOSED BRIDGE IN THE VILLAGE OF DUNDAS, STATION 177 + 25", DEPT. OF PUBLIC HIGHWAYS, ONTARIO, DATED APRIL 24, 1928 & REVISED AUG. 23, 1928, DRAWING NUMBER 2048, CONTRACT NUMBER 28-138.

SCALES

AS NOTED

SCHROEDER ENGINEERING
CONSULTANTS LIMITED
211 COUNTRY CLUB DR.
HAMILTON, ONTARIO
L8K 6J1
TEL: 905-561-7023
FAX: 905-561-7023
schroeder_engineering@yahoo.com

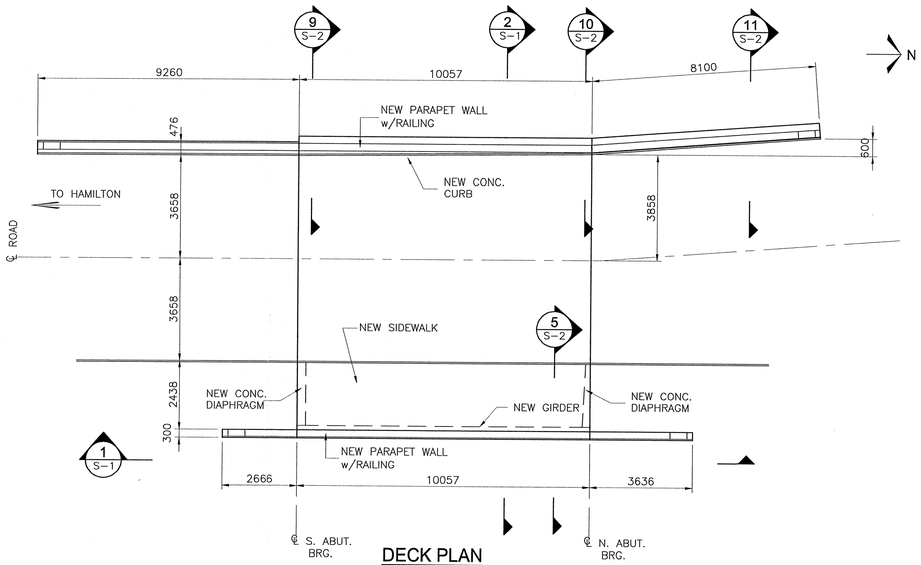
Manager of Construction
Jerry Parisotto, P.Eng.

Manager of Design
Gary Moore, P. Eng.

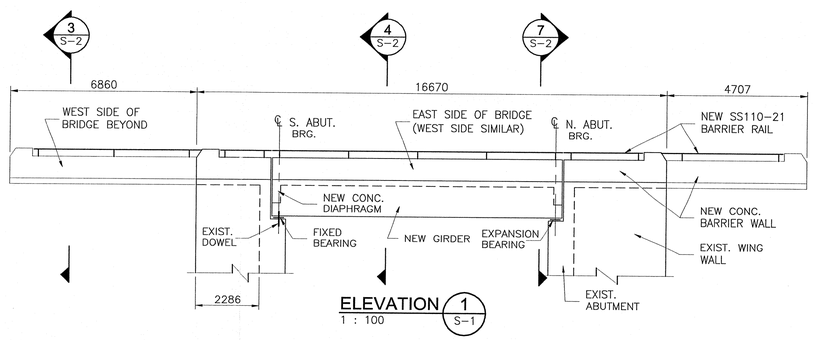
CITY OF HAMILTON
PUBLIC WORKS DEPARTMENT

HIGHWAY #8
SPENCER CREEK BRIDGE REPAIR

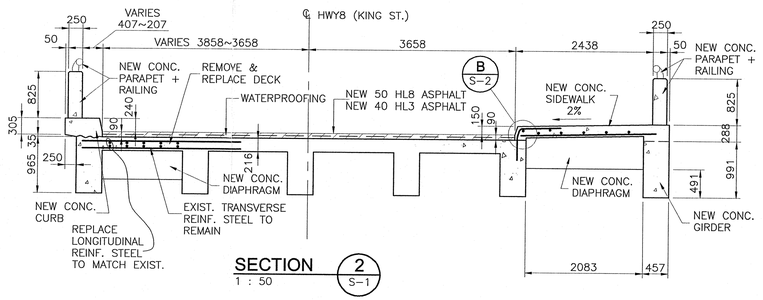
PW-03-20(H)



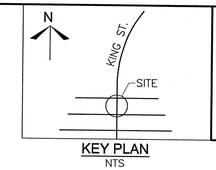
DECK PLAN
1 : 100



ELEVATION 1 / S-1
1 : 100



SECTION 2 / S-1
1 : 50



KEY PLAN
NTS

METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

HWY 8
CONT No
WP-03-20(H)

STRUCTURE REHABILITATION
SPENCER CREEK BRIDGE HWY 8
GENERAL ARRANGEMENT

SHEET 1

SONTERLAN CORPORATION

TABLE 1

BEARING DATA

LOADING TYPE	LOCATIONS AND REQUIREMENTS AT SERVICBILITY LIMIT STATES	
	NORTH ABUTMENT	SOUTH ABUTMENT
DEAD LOAD (kN)	144kN	144kN
TOTAL LOAD (kN)	300kN	300kN
MOVEMENT (mm)	±4mm	±4mm
MAX. SHEAR RATE (kN/mm)	–	–
BEARING TYPE AND SIZE	400 x 300 x 12	400 x 300 x 12
	NATURAL RUBBER	NATURAL RUBBER
NUMBER REQUIRED	2	2

GENERAL NOTES

1. CLASS OF CONCRETE SHALL BE 30 MPa UNLESS OTHERWISE SPECIFIED.
2. REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED. BAR MARKS WITH THE PREFIX C DENOTE COATED BARS.
3. CLEAR COVER TO REINF. STEEL SHALL BE AS FOLLOWS
   SIDEWALK 70 ± 20
   GIRDER 70 ± 20
   REMAINDER 70 ± 20
   UNLESS OTHERWISE NOTED
4. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE EXISTING CONDITIONS AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE REPAIR WORK. THE CONTRACTOR SHALL ALSO VERIFY ALL RELEVANT DIMENSIONS AND ELEVATIONS OF THE EXISTING CONDITIONS.

SEQUENCE OF CONSTRUCTION

STAGE 1:

1. REMOVE EXISTING CONCRETE RAILING, SIDEWALK AND EXTERIOR GIRDER AT EAST SIDE OF STRUCTURE.
2. REMOVE EXISTING CONCRETE RAILING ON WINGWALLS AND DETERIORATED WINGWALL CONCRETE.
3. REPAIR ABUTMENT BEARING SEATS AND INSTALL NEW BEARING PADS.
4. CONSTRUCT NEW CONCRETE GIRDER, SIDEWALK, WINGWALLS, CURB ON WINGWALL AND PARAPET WALL.
5. INSTALL NEW RAILING ON PARAPET WALL.
6. INSTALL WATERPROOFING SYSTEM AND BASE COURSE ASPHALT.

STAGE 2:

1. RELOCATE TEMPORARY CONCRETE BARRIER ON HWY 8 AND PROVIDE TRAFFIC CONTROL.
2. REMOVE EXISTING CONCRETE RAILING AND CURB ON WEST SIDE OF STRUCTURE.
3. REMOVE EXISTING CONCRETE RAILING ON WINGWALLS AND DETERIORATED WING WALL CONCRETE.
4. CONSTRUCT NEW WINGWALLS, CURB ON WINGWALL AND PARAPET WALL.
5. INSTALL NEW RAILING ON PARAPET WALL.
6. INSTALL WATERPROOFING SYSTEM AND BASE COURSE ASPHALT.
7. REMOVE TEMPORARY CONCRETE BARRIERS AND PLACE ASPHALT WEARING (SURFACE) COURSE.

APPLICABLE STANDARD DRAWINGS

OPSD-3906.02 BRIDGE DECK WATERPROOFING
OPSD-3906.03 BRIDGE DECK WATERPROOFING DETAILS

LIST OF DRAWINGS

LICENSED PROFESSIONAL ENGINEER
WILLIAM TESSLER
24/01/04
PROVINCE OF ONTARIO

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
DATE	BY	DESCRIPTION
JAN 04	WT	WEST GIRDER & WEST CURB ON DECK & WING WALL – DETAILS ADDED

DESIGN WT	CHK KM	CODE CHBDC 2000	LOAD CL-625-ONT	DATE NOV2003		
DRAWN CAD	CHK WT	SITE –	STRUCT .	SCHEME .	DWG S-1	

MINISTRY OF TRANSPORTATION, ONTARIO PR-D-707 88-05 PLOT SCALE 1:1
MODIFIED:
DRAWING NAME:
CREATED:

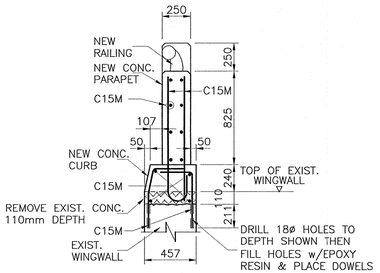
METRIC
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

HWY 8
CONT No
WP-03-20(H)

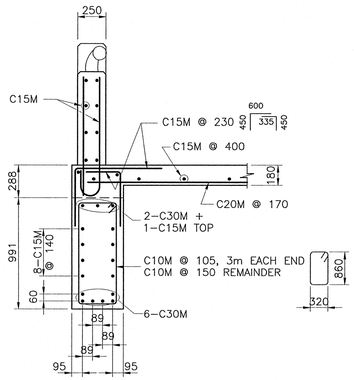
STRUCTURE REHABILITATION
SPENCER CREEK BRIDGE HWY 8
SECTIONS & DETAILS

SHEET 2

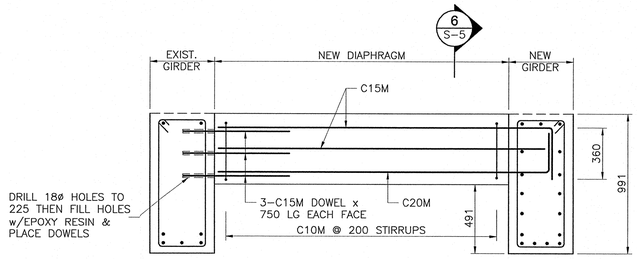
SONTERLAN CORPORATION



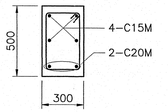
SECTION 3 / S-1
1 : 25
(PARAPET ON WINGWALL)



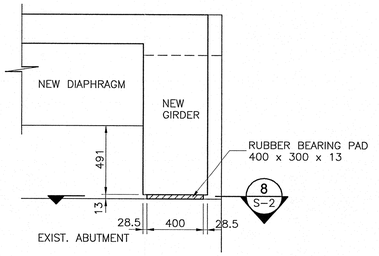
SECTION 4 / S-1
1 : 25



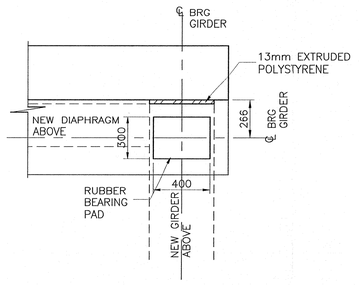
SECTION 5 / S-1
1 : 20
(TYPICAL DIAPHRAGM)



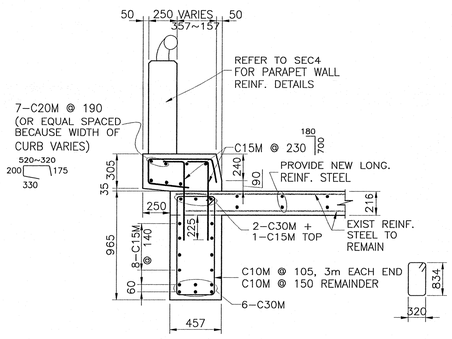
SECTION 6 / S-2
1 : 20



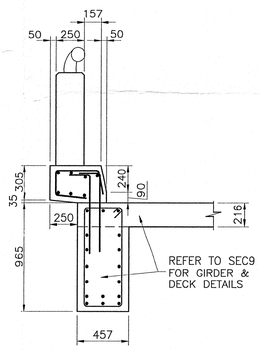
SECTION 7 / S-1
1 : 20



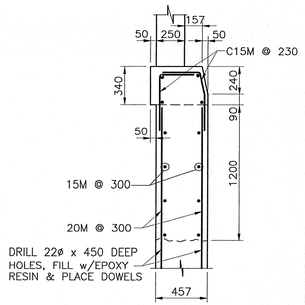
SECTION 8 / S-2
1 : 20
(PLAN)



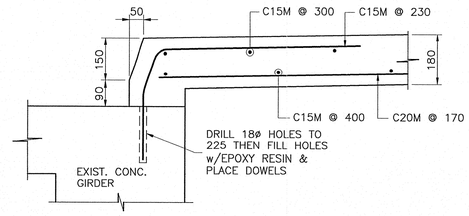
SECTION 9 / S-1
1 : 25
NEW SECTION ON DECK



SECTION 10 / S-1
1 : 25



SECTION 11 / S-1
1 : 25
PARAPET ON WINGWALL (N-W)



DETAIL A / S-1
1 : 10

LICENSED PROFESSIONAL ENGINEER
WILLIAM TESSLER
24/06/03
PROVINCE OF ONTARIO

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS		
JAN 04	WT	WEST GIRDER & WEST CURB ON DECK & WING WALL – DETAILS ADDED
DATE	BY	DESCRIPTION

DESIGN WT	CHK KM	CODE CHBDC 2000	LOAD CL-625-ONT	DATE NOV2003		
DRAWN CAD	CHK WT	SITE --	STRUCT .	SCHEME .	DWG S-2	

MODIFIED:
DRAWING NAME:
CREATED:

PLOT SCALE 1:1 | PR-D-707 88-05 | MINISTRY OF TRANSPORTATION ONTARIO

METRIC

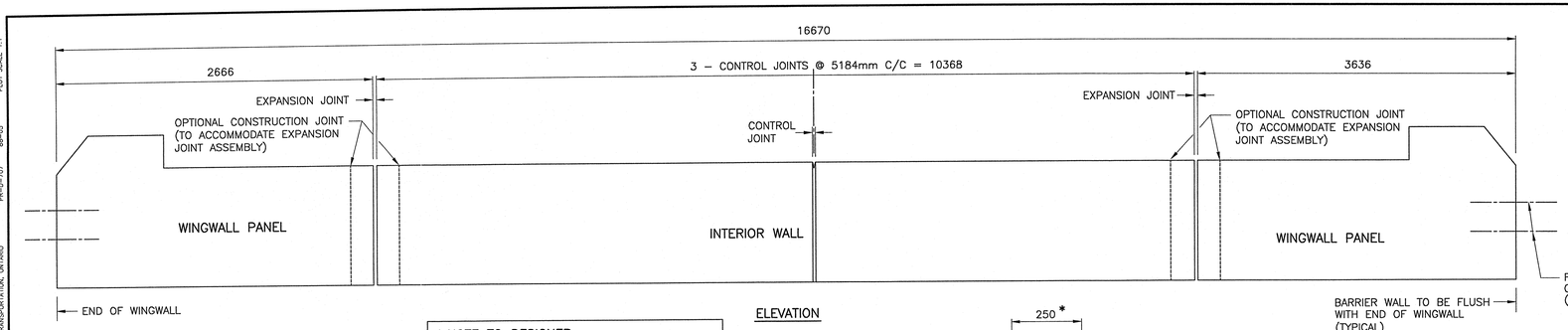
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

HWY 8
CONT No
WP-03-20(H)

STRUCTURE REHABILITATION
SPENCER CREEK BRIDGE HWY 8
PARAPET WALL WITH SIDEWALK AND RAILING

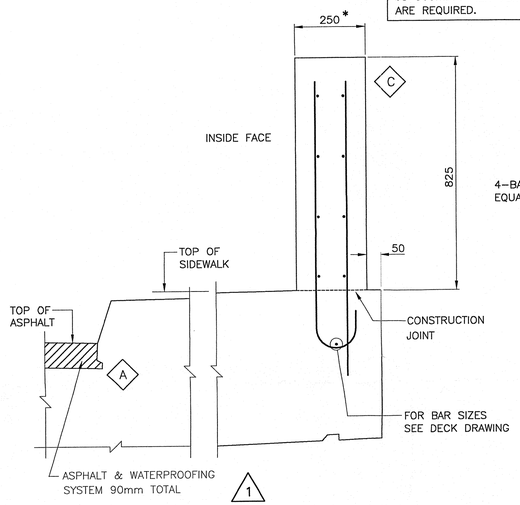
SHEET 3

SONTERLAN CORPORATION

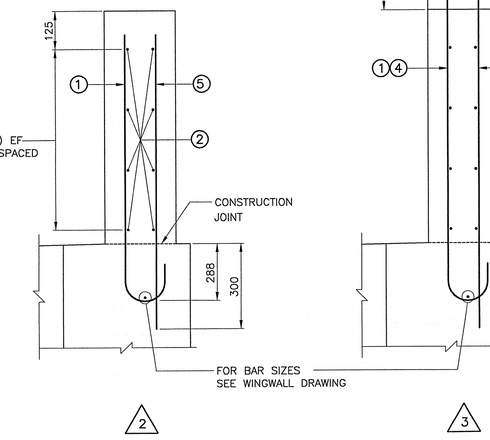


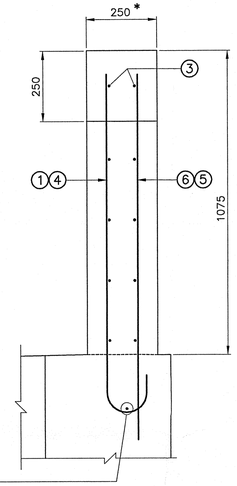
ELEVATION

*** NOTE TO DESIGNER**
INCREASE THE THICKNESS OF THE WALL FROM 250 TO 300mm WHEN 75mm DIA. ELECTRICAL DUCTS ARE REQUIRED.



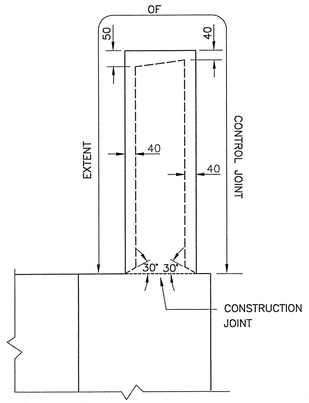
CONCRETE PARAPET ON DECK
TYPICAL DIMENSIONS
(FOR BAR NUMBERS SEE 2)



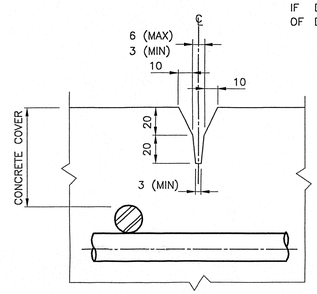


3

CONCRETE PARAPET ON WINGWALL
TYPICAL REINFORCEMENT



EXTENT OF CONTROL JOINT IN PARAPET WALL



CONTROL JOINT DETAIL

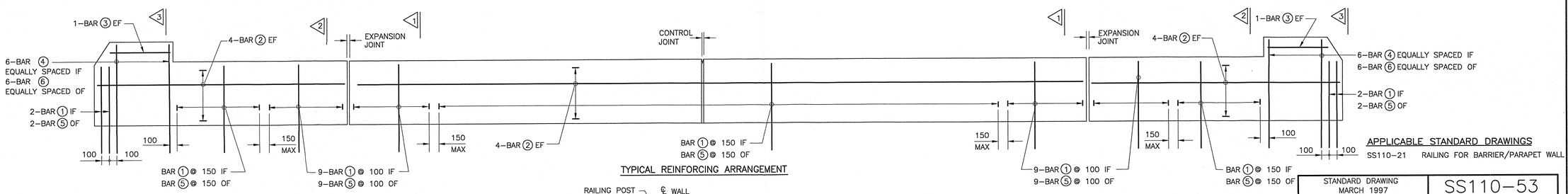
NOTES:
1. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
2. CONCRETE COVER TO REINFORCING STEEL TO ±20mm.
3. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
4. MINIMUM BAR LAP SPLICE TO BE 550mm.
5. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
6. CONTROL JOINT TO BE FORMED.
7. SAWCUTS NOT PERMITTED.
8. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
9. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
10. LEGEND

EF DENOTES EACH FACE
IF DENOTES INSIDE FACE
OF DENOTES OUTSIDE FACE

LICENSED PROFESSIONAL ENGINEER 6.11.03 K. P. MUSCATIC PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER WILLIAM TESSLER PROVINCE OF ONTARIO

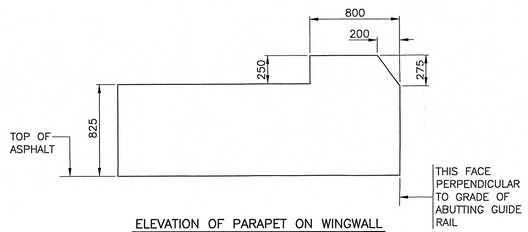
BAR MARK	SIZE	SHAPE
1	C15M	65, 160, 875
2	C15M	STRAIGHT
3	C15M	STRAIGHT
4	C15M	65, 160, 1125
5	C15M	STRAIGHT
6	C15M	STRAIGHT



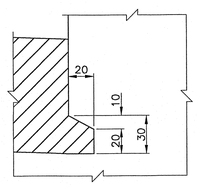
TYPICAL REINFORCING ARRANGEMENT

APPLICABLE STANDARD DRAWINGS
SS110-21 RAILING FOR BARRIER/PARAPET WALL

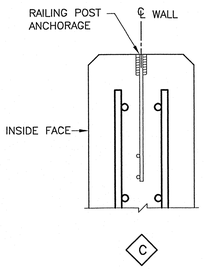
STANDARD DRAWING MARCH 1997	SS110-53
PARAPET WALL WITH S/W & RAILING PERFORMANCE LEVEL 2	



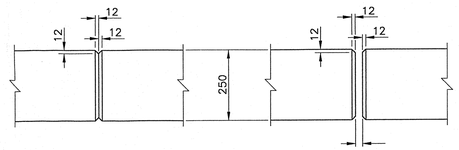
ELEVATION OF PARAPET ON WINGWALL



CHASE DETAIL

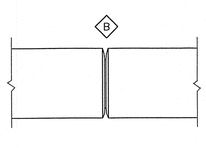


POST ANCHORAGE DETAIL



TYPICAL CONSTRUCTION JOINT

TYPICAL EXPANSION JOINT



TYPICAL CONTROL JOINT

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

REVISIONS			
DATE	BY	DESCRIPTION	
DESIGN WT	CHK KM	CODE CHBDC 2000	LOAD CL-625-ONT DATE NOV2003
DRAWN CAD	CHK WT	SITE –	STRUCT . SCHEME . DWG S-3

MODIFIED:
DRAWING NAME:
CREATED:

METRIC

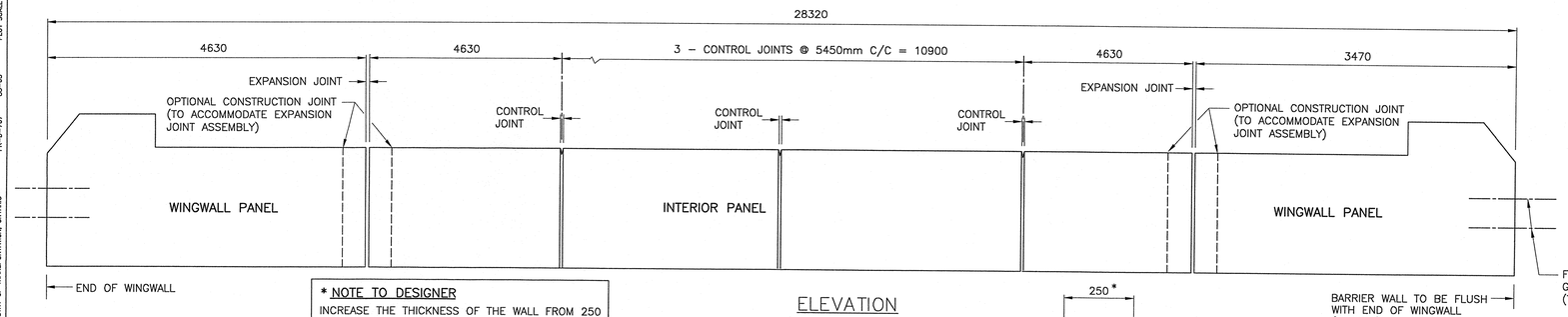
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

HWY 8
CONT No .
WP-03-20(H)

STRUCTURE REHABILITATION
SPENCER CREEK BRIDGE HWY 8
PARAPET WALL WITH CURB & RAILING

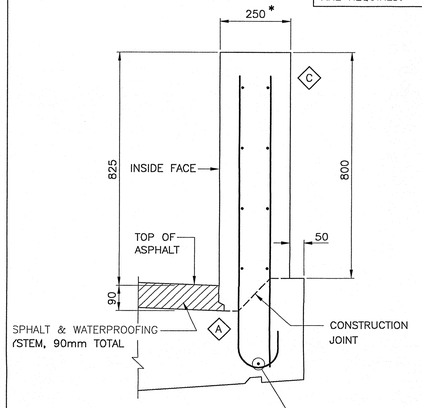
SHEET 4

SONTERLAN CORPORATION



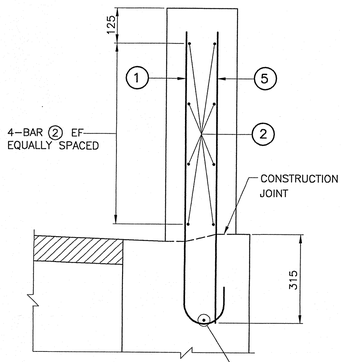
ELEVATION

*** NOTE TO DESIGNER**
INCREASE THE THICKNESS OF THE WALL FROM 250 TO 300mm WHEN 75mm DIA ELECTRICAL DUCTS ARE REQUIRED.



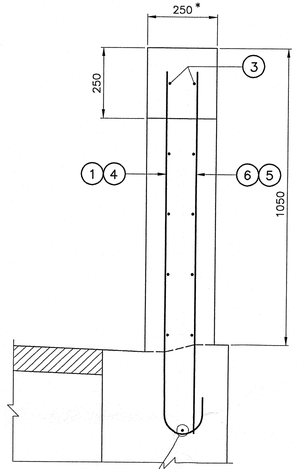
CONCRETE PARAPET ON DECK

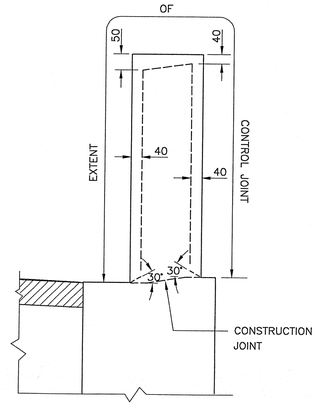
TYPICAL DIMENSIONS
(FOR BAR NUMBERS SEE 2)



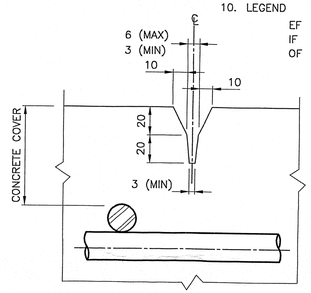
CONCRETE PARAPET ON WINGWALL

TYPICAL REINFORCEMENT





EXTENT OF CONTROL JOINT IN PARAPET WALL



CONTROL JOINT DETAIL

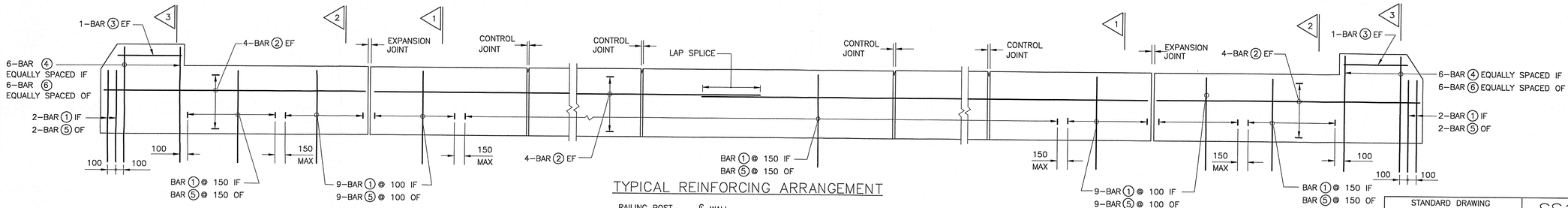
NOTES:

1. CHASE REQUIRED ON HIGH AND LOW SIDE OF CROSSFALL.
2. CONCRETE COVER TO REINFORCING STEEL 70 ±20mm.
3. BAR LAP SPLICE FOR HORIZONTAL REINFORCEMENT MUST NOT LAP THROUGH CONTROL JOINT.
4. MINIMUM BAR LAP SPLICE TO BE 550mm.
5. LENGTH OF HORIZONTAL BAR TO SUIT CONTRACTOR'S OPERATIONS. BAR LENGTHS NEED NOT MATCH DISTANCE BETWEEN CONTROL JOINTS.
6. CONTROL JOINT TO BE FORMED.
7. SAWCUTS NOT PERMITTED.
8. CONTROL JOINT FORM HARDWARE NOT TO BE LEFT IN PLACE.
9. OPTIONAL CONSTRUCTION JOINTS TO BE LOCATED WITHIN LIMITS OF CONCRETE DAMS ON DECK OR BALLAST WALL.
10. LEGEND
    EF DENOTES EACH FACE
    IF DENOTES INSIDE FACE
    OF DENOTES OUTSIDE FACE

BAR MARK	SIZE	SHAPE
1	C15M	65, 160, 965
2	C15M	STRAIGHT
3	C15M	STRAIGHT
4	C15M	65, 160, 1215
5	C15M	STRAIGHT
6	C15M	STRAIGHT

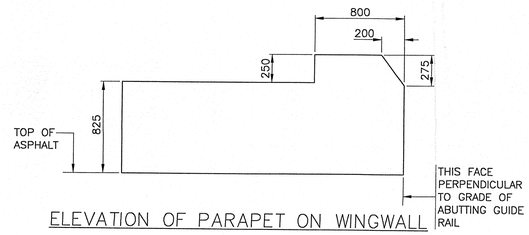
APPLICABLE STANDARD DRAWINGS

SS110-21 RAILING FOR BARRIER/PARAPET WALL

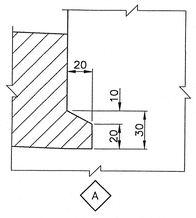


TYPICAL REINFORCING ARRANGEMENT

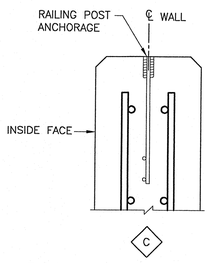
STANDARD DRAWING MARCH 1997	SS110-52
PARAPET WALL WITH RAILING PERFORMANCE LEVEL 2	



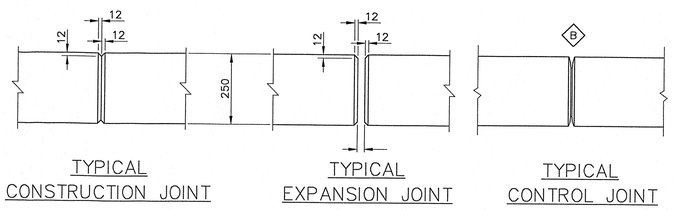
ELEVATION OF PARAPET ON WINGWALL



CHASE DETAIL



POST ANCHORAGE DETAIL



TYPICAL CONSTRUCTION JOINT

TYPICAL EXPANSION JOINT

TYPICAL CONTROL JOINT

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

LICENSED PROFESSIONAL ENGINEER K. P. MUSULPIC PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER WILLIAM TESSLER 06 NOV 03 PROVINCE OF ONTARIO

REVISIONS			
	DATE	BY	DESCRIPTION

DESIGN WT	CHK KM	CODE CHBDC 2000	LOAD CL-625-ONT	DATE	NOV2003		
DRAWN CAD	CHK WT	SITE –	STRUCT .	SCHEME .	DWG S-4		

MODIFIED:
DRAWING NAME:
CREATED:

METRIC

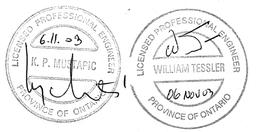
DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN

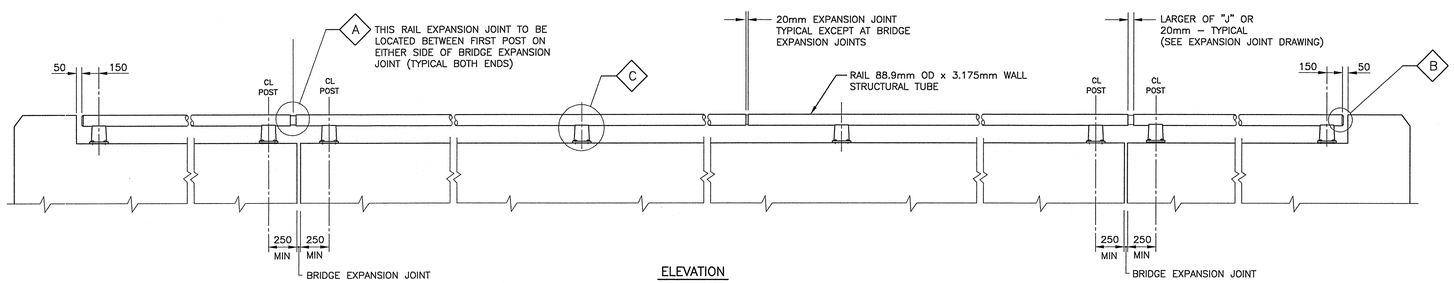
HWY 8
CONT No
WP-03-20(H)

STRUCTURE REHABILITATION
SPENCER CREEK BRIDGE HWY 8
RAILING FOR PARAPET WALL

SHEET 5

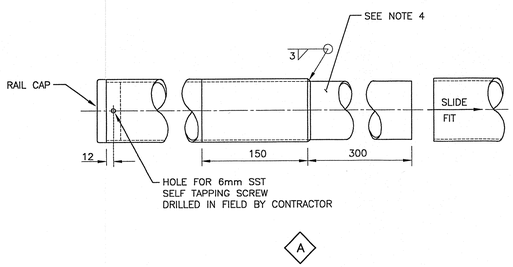
SONTERLAN CORPORATION

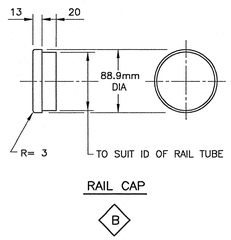


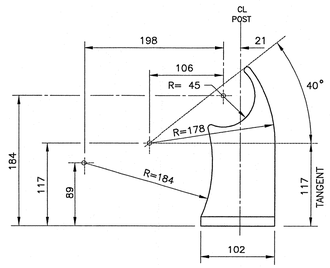


ELEVATION

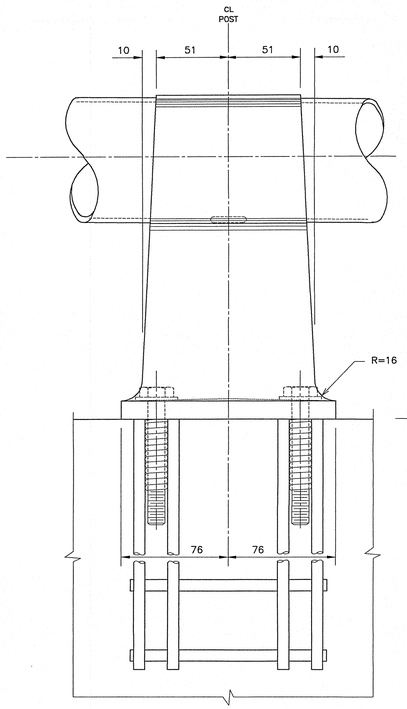
INSIDE FACE SHOWN

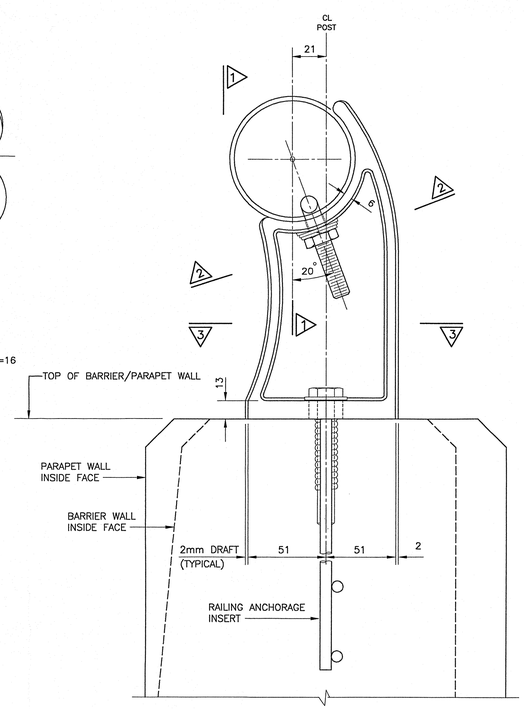




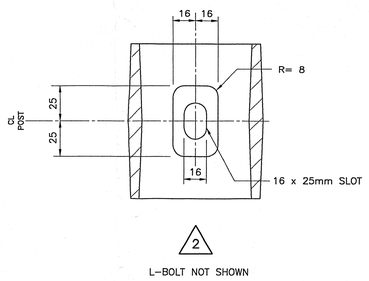


POST DETAILS

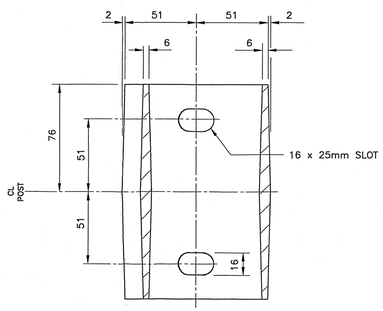


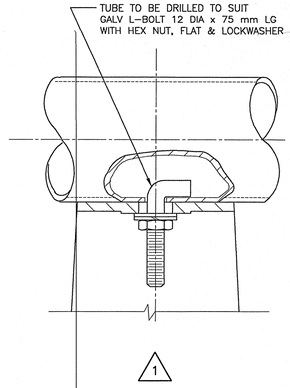


TYPICAL CROSS SECTION



L-BOLT NOT SHOWN





APPLICABLE STANDARD DRAWINGS

OPSD-4019.000 SINGLE RAIL ANCHORAGE INSERTS

STANDARD DRAWING MARCH 1997	SS110-21
RAILING FOR BARRIER/PARAPET WALL	

DRAWING NOT TO BE SCALED
100 mm ON ORIGINAL DRAWING

NOTES:

1. RAIL ELEMENTS SHALL BE STRUCTURAL TUBING SUPPLIED IN ACCORDANCE WITH CSA G40.21-M92 GRADE 350.
2. STEEL IN POSTS SHALL BE CAST STEEL SUPPLIED IN ACCORDANCE WITH ASTM A27-60 GRADE 65-35.
3. RAIL SHALL BE SUPPLIED WITH SPLICE IN LENGTHS OF 6980mm (EXCLUDING SPLICE) EXCEPT AS NOTED.
4. GALVANIZED RAIL TUBING MATING SURFACES TO HAVE A 2 ± 0.5mm GAP ALL AROUND TO ENSURE A SLIDE FIT.
5. POSTS AND RAILS SHALL BE GALVANIZED IN ACCORDANCE WITH CSA G164-M. ALL GALVANIZING SHALL BE DONE AFTER FABRICATION.
6. ELECTRODES SHALL BE A LOW HYDROGEN SPECIFICATION E7015, E7016 OR E7018.
7. POST AND ANCHORAGE TO INCLUDE ALL BOLTS AND WASHERS.
8. END CAP TO INCLUDE SST SELF TAPPING FASTENERS.
9. L-BOLT, NUT AND WASHERS FOR FASTENING STEEL TUBING TO POSTS SHALL BE GALVANIZED (CSA G164-M).
10. ALTERNATE RAIL CAPS MAY BE USED WITH APPROVAL OF ENGINEER.
11. RAIL SHALL BE PREBENT TO FOLLOW ROAD CURVATURE WHERE RADIUS IS LESS THAN 150m.
12. RAIL POSTS SHALL BE SET PERPENDICULAR TO GRADE.
13. WHERE LAYOUT OF POSTS IS NOT SHOWN, POST LOCATION SHALL BE DETERMINED BY THE CONTRACTOR.
14. RAIL MAY BE CUT AS REQUIRED IN FIELD WITH PIPE CUTTERS. CUT TO BE SURFACE TREATED WITH ZINC RICH PAINT.
15. WHEN CONNECTING TO EXISTING RAILING, RAIL MUST BE MADE CONTINUOUS AND POST SPACING DETERMINED WITH REFERENCE TO EXISTING POSTS.
16. ALTERNATIVE ALUMINUM RAIL AND POST DESIGNS WILL BE PERMITTED SUBJECT TO PRIOR APPROVAL BY MTO. THE RAIL SHALL BE 6061 ALLOY T-6 HEAT TREATED. WHEN AN EXTRUDED POST IS USED, THE ALLOY AND HEAT TREATMENT SHALL BE THE SAME AS SPECIFIED FOR THE RAIL. ALUMINUM DESIGNS SHALL BE EQUIVALENT IN STRENGTH TO THE DESIGN SHOWN ON THIS DRAWING, WITH A CONFIGURATION TO PERMIT COMPLETE INTERCHANGEABILITY WITH GALVANIZED STEEL POSTS AND RAILS.
17. LENGTH FOR 88.9 mm OD PIPE WITH SPLICE GIVEN IN TABLE DOES NOT INCLUDE 300 mm PROTRUSION OF SPLICE TUBE.
18. SPLICING OF RAIL TUBES MAY BE DONE BY WELDING ON OF SPLICE PIECE OR BY SWEDGING OF RAIL END.
19. RAILING ANCHORAGE INSERT TO BE PLACED PRIOR TO CONCRETING.

POST SPACING	
MINIMUM mm	MAXIMUM mm
2 500	3 500

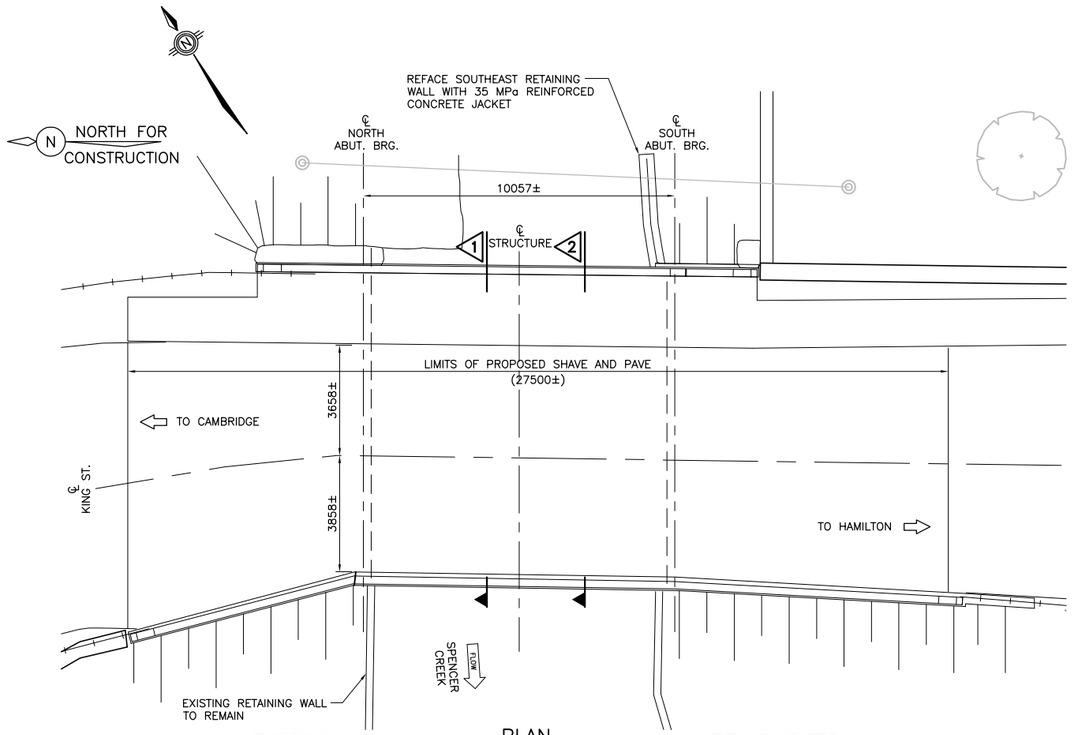
ITEM	NO. REQ'D	LINEAR mm	BENDING RADIUS	LOCATION
POST AND ANCHORAGE	9 13	____ ____	____ ____	EAST WEST
END CAP	2 EACH	____	____	E&W
88.9 OD PIPE WITH SPLICE (6980mm LG)	____	____	____	____
88.9 OD PIPE WITHOUT SPLICE (_____mm LG)	____	____	____	____
88.9 OD PIPE WITH SPLICE (_____mm LG)	____	____	____	____

REVISIONS			
DATE	BY	DESCRIPTION	

DESIGN WT	CHK KM	CODE CHBDC 2000	LOAD CL-625-ONT	DATE	NOV2003	
DRAWN CAD	CHK WT	SITE –	STRUCT .	SCHEME .	DWG	S-5

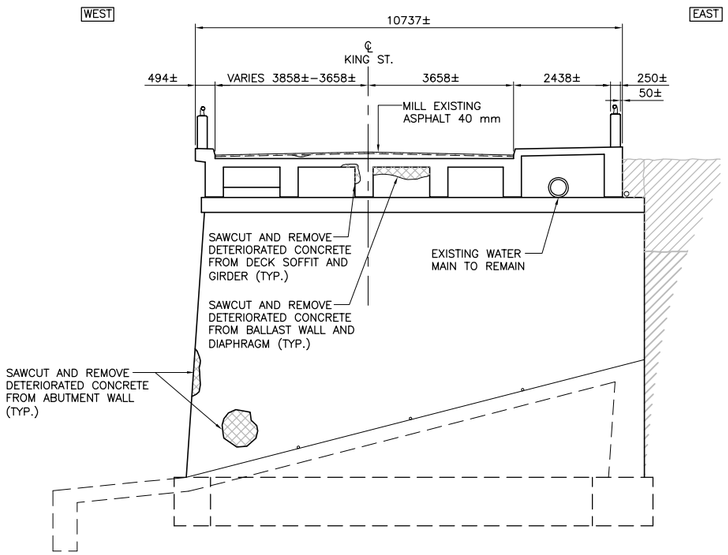
FILE No.	CONTRACT No. DRAWING No.	SHEET No. 1 OF 1

DIMENSIONS SHOWN ON THIS PLAN ARE IN MILLIMETRES UNLESS OTHERWISE NOTED



EXISTING — PLAN — REHABILITATED

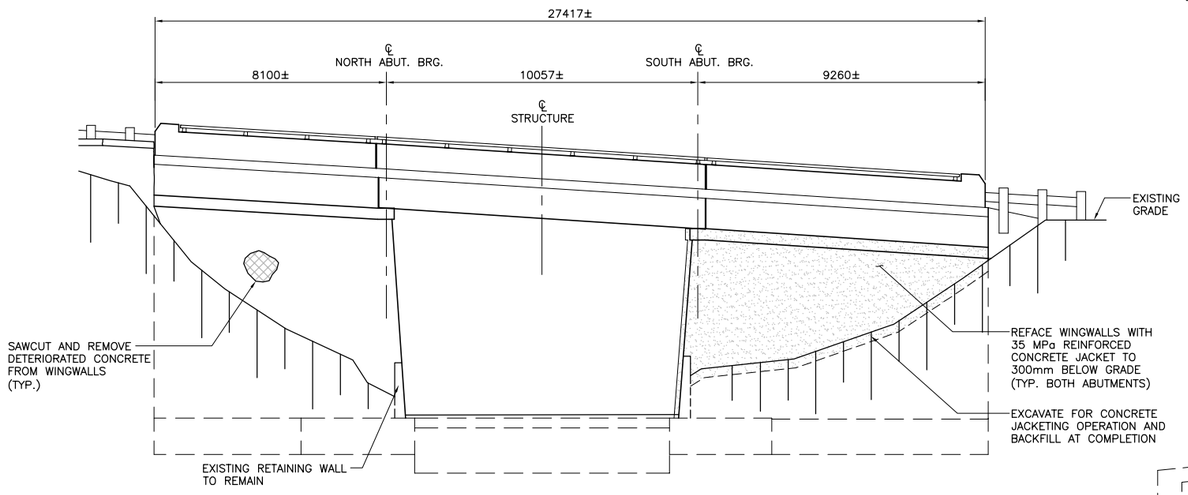
SCALE 1:100



EXISTING

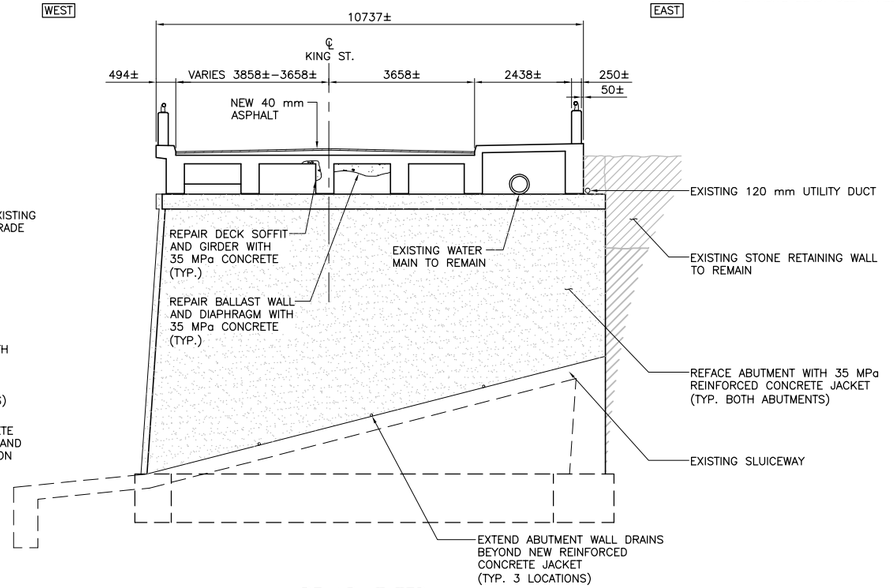
1

SCALE 1:75



EXISTING — WEST ELEVATION — REHABILITATED

SCALE 1:100



REHABILITATED

2

SCALE 1:75

GENERAL NOTES

1. CITY OF HAMILTON BRIDGE ID: 248
2. CODE: CAN/CSA–S6–06 (CANADIAN HIGHWAY BRIDGE DESIGN CODE)
   LOAD: CL–625–ONT TRUCK AND LANE LOAD
3. CLASS OF CONCRETE 35 MPa
4. CLEAR COVER TO REINFORCING STEEL

DECK	TOP	(MATCH EXISTING)
	BOTTOM	(MATCH EXISTING)
REMAINDER		70±20 UNLESS OTHERWISE NOTED

   CONCRETE COVER ON PATCH REPAIRS SHALL MATCH EXISTING UNLESS OTHERWISE NOTED.
5. REINFORCING STEEL

   REINFORCING STEEL SHALL BE GRADE 400 UNLESS OTHERWISE SPECIFIED.

   BAR MARKS WITH THE PREFIX 'C' DENOTE COATED BARS.

   UNLESS SHOWN OTHERWISE, TENSION LAP SPLICES SHALL BE CLASS B.

   BAR HOOKS SHALL HAVE STANDARD HOOK DIMENSIONS USING MINIMUM BEND DIAMETERS WHILE STIRRUPS AND TIES SHALL HAVE MINIMUM HOOK DIMENSIONS. ALL HOOKS SHALL BE IN ACCORDANCE WITH THE STRUCTURAL STANDARD DRAWINGS SS12–1 AND SS12–2, UNLESS INDICATED OTHERWISE.

CONSTRUCTION NOTES

1. KING STREET WEST BRIDGE WILL REMAIN OPEN TO ONE LANE DURING CONSTRUCTION. TO BE REGULATED BY TEMPORARY TRAFFIC SIGNALS.
2. TYPICAL AREAS OF REPAIR ARE INDICATED ON DRAWINGS. WHERE REPAIR LIMITS ARE NOT SHOWN, LIMITS SHALL BE IDENTIFIED BY THE CONTRACT ADMINISTRATOR.
3. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS OF THE PROPOSED WORK AND ALL DETAILS ON SITE AND REPORT ANY DISCREPANCIES TO THE CONTRACT ADMINISTRATOR BEFORE PROCEEDING WITH THE REPAIR WORK
4. SAWCUTS SHALL BE 25 mm DEEP OR TO THE FIRST LAYER OF REINFORCING STEEL, WHICHEVER IS LESS
5. ALL EXISTING CONCRETE SURFACES, WHICH HAVE NOT BEEN SCARIFIED, AGAINST WHICH NEW CONCRETE IS TO BE PLACED, SHALL BE UNIFORMLY ROUGHENED BY MEANS OF SCABBLING, CHIPPING, OR BUSHHAMMERING. A SURFACE PROFILE OF 5±2mm SHALL BE ACHIEVED BY EXPOSING THE AGGREGATES ACROSS THE ENTIRE SURFACE.
6. ALL CONCRETE SURFACES TO BE ABRASIVE BLAST CLEANED AND A BONDING AGENT SHALL BE APPLIED BEFORE CASTING NEW CONCRETE.
7. ABRASIVE BLAST CLEAN ALL REINFORCING STEEL THAT IS TO BE RETAINED.

PRELIMINARY

No.	REVISIONS	INITIAL	DATE

DRAWN BY: G.D.T — DATE: DEC 1, 2009

REFERENCE MATERIAL:

SCALES
AS SHOWN

DILLON CONSULTING

Manager of Construction

Manager of Design

Gary Moore, P. Eng.

CITY OF HAMILTON
Public Works Department

KING STREET BRIDGE
OVER SPENCER CREEK
Bridge Rehabilitation
PRELIMINARY GENERAL ARRANGEMENT