



**Final Dam Inspection Report**

**Neustadt Dam and  
Flood Control Wall**

**Municipality of West Grey,  
County of Grey, Ontario**

**D.M. Wills Project Number 22-5540**



**D.M. Wills Associates Limited**

Partners in Engineering, Planning and  
Environmental Services  
Peterborough



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**Prepared for:  
Saugeen Valley  
Conservation Authority**

### Summary of Revisions

Rev. No.	Revision Title	Date	Summary of Revisions
1	Draft Report	January 2, 2023	Issued for Client Review
2	Final Report	January 3, 2023	Issued as Final

This report has been formatted considering the requirements of the Accessibility for Ontarians with Disabilities Act.

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## 1.0 Introduction

### 1.1 Purpose and Objectives

The Saugeen Valley Conservation Authority's (SVCA's) jurisdiction, the Saugeen watershed, covers an area of approximately 4,675 km<sup>2</sup> and encompasses the counties of Bruce, Dufferin, Grey, Huron and Wellington as well as the Saugeen River, Penetangore River, Teeswater River, Pine River and the shoreline of Lake Huron. Within this jurisdiction, the SVCA's mandate is to undertake watershed-based programs to protect people and property from floods and other natural hazards and to conserve natural resources for economic, social and environmental benefits. This includes the management of flood and erosion control structures.

In cooperation with their municipal partners and regulatory agencies, the SVCA maintains a number of flood and erosion control projects within their jurisdiction. The SVCA is currently responsible for coordinating the inspection, maintenance and repair of 21 flood and erosion control projects, including 10 dam and dyke projects, 7 slope stability and erosion control projects and 4 flood control channelization projects.

D.M. Wills Associates Limited (Wills) was retained by the SVCA to undertake the inspection of 20 flood and erosion control structures. In the past, annual inspections of the SVCA's flood and erosion control structures have been completed in-house by the SVCA; however, it is understood that past inspection documentation has ranged from photo records to the completion of a site inspection form. Given the importance of ensuring that this infrastructure is in good condition and to plan for future maintenance and repairs, the SVCA has recognized that a more formal inspection of the flood and erosion control infrastructure is required in order to re-establish a baseline condition for each structure.

The purpose of these inspections is to thoroughly document the existing condition of the dams through a visual inspection, including the completion of an underwater inspection where possible, identify operator and public safety deficiencies, and provide a prioritized list of recommendations for the remediation of the identified deficiencies, including the development of budget-level cost estimates and a recommended timeline for the completion of each measure.

The subject of this report is the Neustadt Dam and Flood Control Wall. The inspection of the Neustadt Dam and Flood Control Wall was completed on September 20, 2022, in the presence of SVCA staff.

### 1.2 Site Location and Access

The Neustadt Dam and Flood Control Wall is located within the limits of Town of Neustadt, upstream of Queen Street on Meux Creek. The dam was accessed via the public road system and is generally publicly accessible. The dam was accessed via Grey Road 10 (Jacob Street) in Neustadt. Parking is in the gravel parking area for the mill. The dam can be accessed on foot from this location. The location of the dam is shown in **Figure 1**.

### 1.3 Dam Description

The Neustadt Dam was originally constructed in the 1850's to support a sawmill and flour and grist mill; however, it is believed that the current dam structure was constructed in the 1920's. The right (west) section of the dam is thought to be original whereas the left (east) section of the structure was reconstructed in 1976 with a poured concrete retaining wall. In 1991, the SVCA constructed a flood control wall at the dam and mill buildings to help contain floodwaters within the channel.

The Neustadt Dam and Flood Control Wall consists of four openings and a flood control wall extended to the left side of the structure. The centre opening measures approximately 6.7 m by 2.6 m, the right opening measures approximately 4.7 m by 1.5 m, and the 2 left openings measure approximately 3.6 m by 1.3 m.

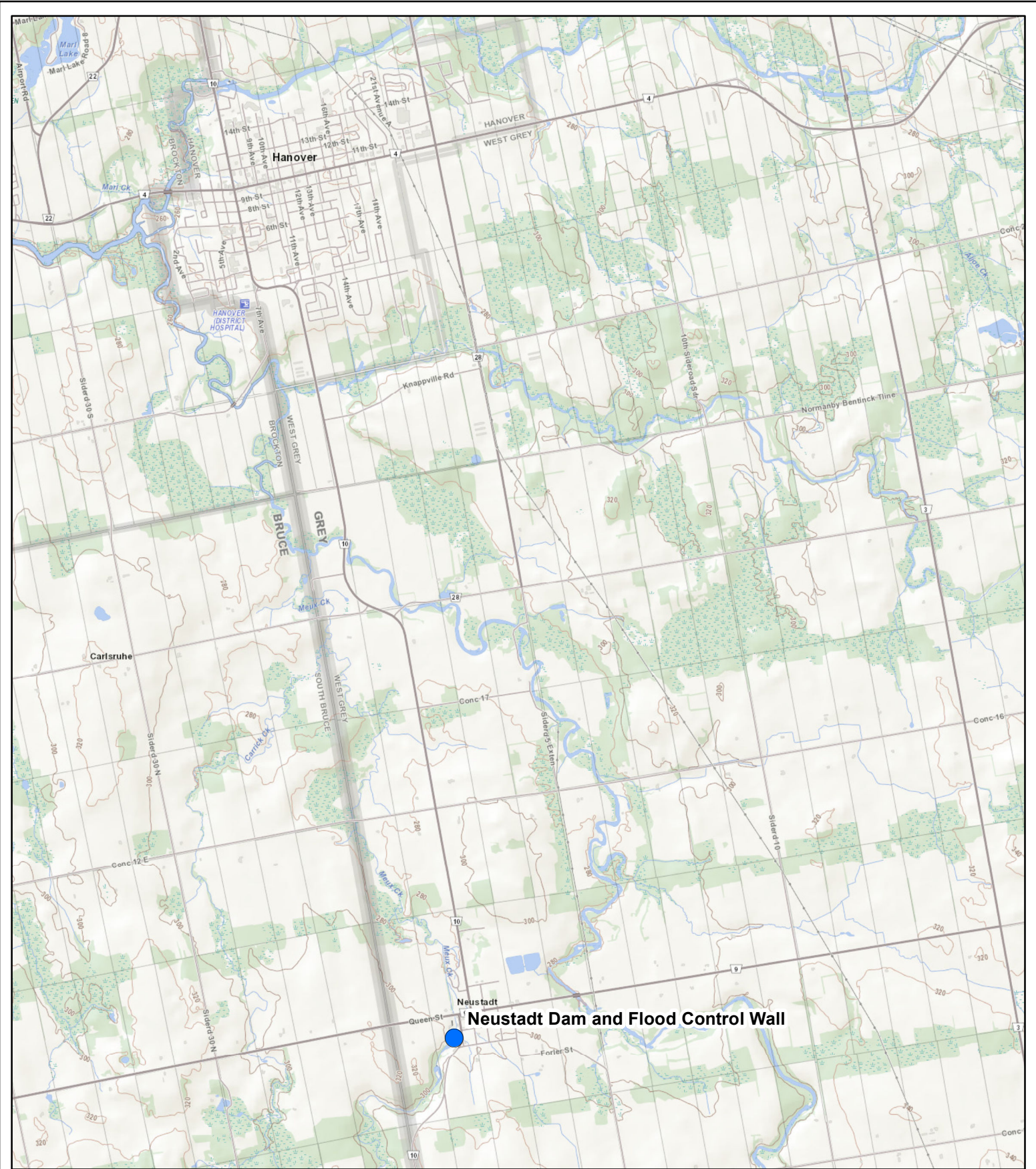
The site plan is shown in **Figure 2**. The location of site features is referenced left to right facing upstream.

### 1.4 Description of Operations

The dam is not currently operable; therefore, no operations are conducted at the Neustadt Dam.

It is noted that the dam is owned by the Municipality of West Grey and the SVCA has been involved with past rehabilitation, operation, and annual inspections of the dam on their behalf.



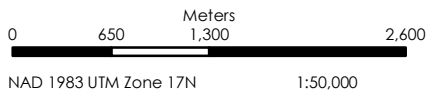


**Legend**

- Dam Location



Data Sources  
 Land Information Ontario 2022  
 Created In: ArcMap 10.7



**Figure 1 - Location Plan**

Drawn By:	GB
Checked By:	DG
Map Date:	12/02/22
Project Number:	22-5540
Map File Number	Figure 1



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**Figure 2 - Site Plan**



Data Sources  
 Saugeen Valley Conservation Authority  
 Created In: ArcMap 10.7  
 Scale: N.T.S

- Legend**
- Dam
  - Parcel Fabric
  - Flood Control Wall

Drawn By:	GB
Checked By:	DG
Map Date:	12/05/22
Project Number:	22-5540
Map File Number	Figure 2



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## 2.0 Inspection Methodology

### 2.1 Background Review and Fieldwork Preparation

A review of the background information provided by the SVCA was completed prior to Wills' field inspection. This information included available drawings, site access plans, photographs, inspection records and reports. The background review and fieldwork preparation consisted of the following tasks:

- Coordination of access to the dam site with SVCA staff.
- Review of the available background information.
- Set-up of MNRF Form B-2 (Dam Inspection Form).
- Preparation of a Site-Specific Health and Safety Plan.
- Printing inspection forms and available drawings.

### 2.2 Dam Condition Assessment

Wills performed a visual and non-destructive structural inspection of the dam. The methodology for this inspection is summarized as follows:

- Visual inspection, along with recording and classification, of all observable deficiencies according to the Ontario Structure Inspection Manual (OSIM).
- Georeferenced photographs of all aspects of the dam.
- Where possible, aerial imagery of the dam and up and downstream areas collected using a Remotely Piloted Aircraft System.
- Where possible, underwater video of the underwater faces of the dam collected using a pole mounted GoPro camera.
- Review of previously identified deficiencies and their digression over time.
- Completion of MNRF Form B-2 (Dam Inspection Form).

Wills classified the structural deficiencies, including those in concrete, steel and wood, based on the 2008 OSIM. The OSIM reference checklist used for the inspection is provided in **Appendix C**.

### 2.3 Assessment of Public and Operator Safety Measures

Wills' inspection of the site included a thorough visual inspection of all public and operator safety measures at the dam. The methodology for the inspection and review of the public and operator safety measures is summarized below:

- Visual inventory and inspection of all signage.
- Visual inspection of dam access route(s).
- Visual inspection of existing public safety measures (railings, booms, buoys, etc.).



- Visual inspection of existing operator safety measures (railings, fall arrest).

The inspection of the public safety measures was carried out in accordance with the methodologies and requirements described in the Best Management Practices for Public Safety Around Dams (MNR, 2011), the Guidelines for Public Safety Around Dams (CDA, 2011) and the Ontario Building Code (OBC). The inspection of the operator safety measures was carried out in accordance with the Occupational Health and Safety Act (OSHA) and the Industrial Establishments Regulation.

### 3.0 Inspection Findings

#### 3.1 Dam Condition Assessment

Wills performed the inspection of the Neustadt Dam and Flood Control Wall on September 20, 2022. At the time of the inspection, the weather was sun and cloud and approximately 15°C.

The dam inspection results are documented in the photographic record in **Appendix A** and the Dam Inspection Form B2 in **Appendix B**. Digital copies of all photographs and videos from the inspection will be provided to the SVCA by digital file transfer.

In general, the dam was observed to be in very poor condition and is considered to be a public safety hazard.

Wills developed the following rating scale in order to provide the SVCA with a high-level assessment of the condition of the various components at the site:

- **1 – Very Poor** – Major deficiencies throughout the component. The structural integrity of the component is likely compromised and/or the component does not function as intended.
- **2 – Poor** – Significant deficiencies throughout component and the component may not function as intended under certain conditions.
- **3 – Fair** – Some deficiencies throughout component that may affect the ability of the component to function as intended if not corrected.
- **4 – Good** – Some localized deficiencies that do not affect the ability of the component to function as intended.
- **5 – Very Good** – No significant deficiencies throughout the component. Only slight imperfections may exist.

Similar to the condition rating system described above, Wills developed the following rating scale in order to provide the SVCA with a high-level understanding of the risk of failure of the various components at the site:

- **1 – Low** – Failure of the component could occur but only in rare/unforeseen events or circumstances.
- **2 – Moderate** – Failure of the component may occur in extreme events or circumstances but is unlikely to occur during normal operations.
- **3 – High** – Failure of the component may occur during normal operations.

A detailed list of the site's components along with the identification of deficiencies, condition ratings and risk ratings is provided in **Table 1**.

### **3.2 Assessment of Public Safety Measures**

Dams, and their associated structures and operational practices, present a number of potential hazards to the public. Protecting the public from these potential hazards is an important element of a dam owner's due diligence. Public safety should be considered throughout all stages of a dam's life cycle, from design to decommissioning; however, this is most important during the operational phase of the project. In Ontario, public safety around dams is managed in accordance with the Best Management Practices for Public Safety Around Dams (MNR, 2011).

The public safety measures that have been installed at the site include:

- The pedestrian bridge, deck and flood control wall have railings with chain link fence installed.

Based on our site investigation, Wills identified the following potential public safety issues:

- No public safety signage present.
- Railings do not meet the Ontario Building Code requirements.

### **3.3 Assessment of Operator Safety Measures**

Operator safety measures are regulated under the Occupational Health and Safety Act (OHSA). The OHSA and its associated regulations are used to assess the adequacy of operator safety measures. For the majority of dam sites, there are two (2) primary operator safety measures, railings and fall protection, the requirements for which depend on specific site conditions.

The Industrial Establishments Regulation of the OHSA (O.Reg. 851) requires a guard rail at the open side of any raised surface. The guard rail must have a top rail located not less than 910 mm and not more than 1070 mm above the surface to be guarded, have a mid rail, have a toe-board that extends at least 125 mm from the surface if tools or other objects may fall on other workers below, be free of splinters and protruding nails

and be constructed to meet the structural requirements for guards as set out in the Ontario Building Code. The existing railing does not meet the requirements for a guard rail under O.Reg. 851.

O.Reg. 851 requires a fall arrest system where a worker is exposed to the hazard of falling and the surface to which they might fall is more than 3 m below the position where they are situated. Based on the drawings provided, the potential fall height is less than 3 m; therefore, a fall arrest system for dam operators is not required.

No operator safety issues were identified as the dam is not currently operated.



**Table 1 – Summary of Inspection Results**

Structure	Location	Deficiency / Description	Condition Rating	Risk Rating
<b>Concrete Structures</b>				
Flood Control Wall	Wall	Varying degrees of scaling worsening towards the base. Honeycombing around construction joint (Photos: 4-7)	3	1
	Gap in Wall	Honeycombing and spalling showing corroded rebar (Photos: 4-7)	2	1
	Upstream Face	Random cracking with efflorescence and varying degrees of scaling (Photo: 43)	3	1
Weir Structure	Crest	Severely scaled and eroding. Right wall completely missing. Seepage underneath base of pier causing erosion (Photos: 21-25)	1	3
	Left Wall	Seepage underneath base causing erosion (Photos: 18-20)	2	2
Apron	Throughout	Wide cracking, minor to medium scaling. Seepage through void (Photos: 20, 29, 32)	2	2
Control Structure	Gains	Severely spalled and some areas of disintegration (Photos: 10-12)	2	2
	Piers	Severely spalled and are eroding and disintegrating (Photos: 9, 13-17)	2	2
	Abutments	Minor scaling, honeycombing and severe random wide cracks. Exposed large aggregates and large sections missing (Photos: 8, 25)	2	3
	Floor	Fair to poor condition with scaling throughout. Localized areas of spalling and honeycombing (Photos: 11, 14)	2	2

Structure	Location	Deficiency / Description	Condition Rating	Risk Rating
	Deck	Fair condition with random cracking. Fascia severely scaled (Photo: 13)	2	2
<b>Wooden and Metal Structures</b>				
Pedestrian Bridge	Chain Link Fence	Moderate corrosion (Photo: 44)	3	1
	Railings	Signs of rot and weathering throughout (Photo: 45)	2	2
Deck Railing	Throughout	Moderate corrosion (Photo: 44)	2	2
Flood Control Wall Railing	Throughout	Fair to good condition with minor coating loss and minor abrasions. Minor spalling on post bases (Photos: 6, 40, 43)	4	1

## 4.0 Recommendations

The inspection recommendations along with prioritization and cost estimates for each recommendation are provided in **Table 2**. The degree of accuracy for the cost estimates is approximately +/-50% and are based the best information available at the time of report production. The priorities are classified as "Immediate", "High", "Medium", "Low" and "Ongoing" and are defined as follows:

- **Immediate** – Remedial action that needs to be carried out as soon as possible because the deficiency is an immediate high-risk dam safety hazard with a high likelihood of occurrence of loss of life and /or serious environment and/or serious economic consequences.
- **High** – Remedial action is required within the next two years to meet current regulations and/or dam safety requirements and is a high-risk dam safety hazard.
- **Medium** – These items may include additional work that could improve the performance or issues that may become serious dam deficiencies. These items typically should be addressed within five years.
- **Low** – These are opportunities to improve safety or deficiencies that may only become a serious dam safety deficiency in the long term. The recommendation can be carried out at the SVCA's convenience, or the recommended remedial action is expected to be required six years from now or later.
- **Ongoing** – These items may need to be reviewed and completed on a regular basis to ensure that the function of the dam and public safety measures is maintained.

The recommendations are prioritized based on the risk of occurrence, the significance of potential negative impacts and the resources (cost, time, effort) required to implement. The recommendations have been categorized as Dam Safety Management, Public Safety, Operator Safety, Minor Maintenance (repairs < \$100,000) and Major Maintenance (repairs > \$100,000).



**Table 2 – Dam Inspection Recommendations**

Recommendation	Description of Deficiency	Priority	Estimated Cost	Additional Comments
<b>Public Safety</b>				
1. While the dam removal is being planned, block public access to the dam structure with fencing/gates and place public safety around dams signage on the gates. The public safety signs shall be installed in accordance with the Best Management Practices for Public Safety Around Dams (MNR, 2011).	There are significant public safety hazards at the structure, the public has access to the structure and it may take some time to plan and obtain funding for the dam removal.	Immediate	\$10,000	
<b>Major Maintenance</b>				
2. Remove the dam and restore the creek channel. Considerations may need to be given to maintaining the flood control wall.	The dam is in poor to very poor condition, is a public safety hazard and does not serve a purpose for the SVCA or the Municipality of West Grey.	High	\$500,000	A Class Environmental Assessment (Conservation Ontario) and a permit under the Lakes and Rivers Improvement Act from the Ministry of Natural Resources and Forestry may be required before the dam can be removed. The cost of a Class Environmental Assessment study, including public consultation, is estimated as \$100,000.

## 5.0 Conclusion

Wills completed this Dam Inspection Report to provide the SVCA with an understanding of the overall existing condition of the structure, address any potential public or operator safety concerns and provide recommendations to better direct the SVCA with respect to long term management of the structure.

In general, the dam was observed to be in very poor condition and is considered to be a public safety hazard.

The dam should continue to be monitored for future deterioration and remedial action should be completed on an as needed basis.

The detailed inspection findings are presented in **Section 3.0** and the recommendations are presented in **Section 4.0**. The following highlights the Urgent, Important and Future priority items for the dam:

### Urgent Priority Items

- While the dam removal is being planned, block public access to the dam structure with fencing/gates and place public safety around dams signage on the gates. The public safety signs shall be installed in accordance with the Best Management Practices for Public Safety Around Dams (MNR, 2011).

### Important Priority Items

- Remove the dam and restore the creek channel. Considerations may need to be given to maintaining the flood control wall.

### Future Priority Items

- None.

If you have any questions with regards to the information contained herein, please do not hesitate to contact the undersigned.

Respectfully Submitted,



David Green, P.Eng.  
Group Leader, Dam Engineering



Alex Payette, EIT  
Structural Engineer in Training



James Chambers  
Project Designer,  
Water Resources Engineering

DG/JC/



# Appendix A

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Photographic Record





Photo 1 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Upstream Side of Dam



Photo 2 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Flood Control Wall



Photo 3 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Flood Control Wall



Photo 4 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Flood Control Wall



Photo 5 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Flood Control Wall



Photo 6 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Flood Control Wall





Photo 7 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Flood Control Wall



Photo 8 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Control Structure, Sluice 1



Photo 9 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Control Structure, Sluice 1



Photo 10 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 1 Left Gain



Photo 11 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 1 Sill



Photo 12 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 1 Right Gain





Photo 13 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Control Structure



Photo 14 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 2



Photo 15 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 2 Right Pier and Apron



Photo 16 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Control Structure, Sluice 2 Downstream Pier



Photo 17 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Centre Pier



Photo 18 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Right Side of Centre Pier





Photo 19 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Bottom Right Side of Centre Pier



Photo 20 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Bottom Right Side of Centre Pier



Photo 21 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Side of Weir Structure



Photo 22 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Right Side of Raised Weir Spillway



Photo 23 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Right Side of Raised Weir Spillway



Photo 24 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Side of Weir Structure





Photo 25 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Right Side Retaining Wall



Photo 26 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Upstream Side of Dam



Photo 27 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Downstream Side of Dam



Photo 28 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Right Side of Dam



Photo 29 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Side of Weir Structure



Photo 30 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Left Side of Dam







Photo 31 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Side of Control Structure, Sluices 1 and 2



Photo 32 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Apron for Control Structure Sluices 1 and 2



Photo 33 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Left Bank



Photo 34 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Watercourse



Photo 35 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Overhead View of Dam and Flood Control Wall



Photo 36 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Parking on Left Side of Dam





Photo 37 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Building on Left Side of Dam



Photo 38 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Parking on Left Side of Dam



Photo 39 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Left Side of Dam and Flood Control Wall



Photo 40 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Back of Flood Control Wall



Photo 41 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Building on Left Bank



Photo 42 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Left Facing Public Safety Sign







Photo 43 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Entrance to Dam from Left Side



Photo 44 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Pedestrian Bridge from Left Side



Photo 45 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Deck of Pedestrian Bridge



Photo 46 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Under Side of Pedestrian Bridge



Photo 47 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Upstream Watercourse



Photo 48 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Right Bank





Photo 49 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Downstream Right Bank



Photo 50 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Pedestrian Bridge from Right Bank



Photo 51 - September 20, 2022  
Neustadt Dam and Flood Control Wall  
Aerial View of Downstream Side of Dam





## **Appendix B**

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**Dam Inspection Form B2**





**Date:** Tuesday, September 20, 2022

**Name of Dam:** Neustadt Dam and Flood Control Wall

**Municipality:** Municipality of West Grey, County of Grey

**Location:** Lot 2, Concession 13, Geographic Township of Normanby

**GPS Coordinates:** 499708.00 m E, 4880300.00 m N, UTM Zone 17T

**Inspected By:** David Green, P.Eng., Alex Payette, EIT

**Weather:** Sun and cloud, 15°C

**1 – Earth Embankment**

There are no earth embankments at the Neustadt Dam and Flood Control Wall.

**2 – Concrete Structures** (wingwalls, piers, deck, spillways, apron, etc.)

**Flood Control Wall** – The flood control wall begins on the left side of the control structure, runs towards the public parking area and then turns upstream. The flood control wall acts as a retaining wall for the parking area and for the building adjacent to the control structure. The wall is exhibiting varying degrees of scaling, worsening towards the base of the wall. There is honeycombing around the apparent horizontal construction joint of the vertically orientated wall. The joint sealant has failed at the vertical expansion joints. On the horizontal section of wall, there is a gap along the construction joint between the angled wall and parapet sections of the wall. This gap has honeycombing and spalling showing corroded rebar along the length. There is a section of failed sealant at the intersection with the vertical wall. There is random cracking, with and without efflorescence and varying degrees of scaling along the upstream face of the horizontal section, similar to the vertical portion.

**Control Structure** – The dam consists of three sections. The left section used to be the operable control structure section of the dam and has gains, abutments and piers with a concrete floor and deck.

**Gains** – The gains are lined with steel angles. The concrete around the gains is severely spalled with some areas of disintegration.

**Piers/Abutments** – The left face of the abutment has minor scaling at the base, honeycombing throughout and random wide cracks. The upstream face has localized spalling. The concrete ballast wall infilling between the girders is in very poor condition and is severely cracked. The steel girders are sitting on elastomeric bearing pads and due to the cracking concrete, some girders are no longer bearing on the pads. The centre pier is in a similar condition to the left abutment with one localized area of spalling with exposed rebar. On the downstream face of the centre pier, there is a large section of delaminated concrete. The right pier/abutment is in very poor condition. The upstream face of the pier is severely spalled and is eroding and disintegrating. The exterior face of the abutment,



adjacent to the weir wall is in very poor condition. The concrete is disintegrating, exposing large aggregates. The concrete acting as diaphragms infilling the girders is severely cracked and displaced with large sections missing. In several cases the girders are not bearing on any concrete because the concrete is missing.

**Floor** – The floor of the structure is in fair to poor condition with scaling throughout. There are localized areas of spalling and honeycombing.

**Deck** – The deck soffit is in fair condition with random cracking throughout. The fascia of the deck is severely scaled. There is a grout material between the top flange of the girders and the soffit. This grout is spalled and missing in many areas which is resulting in a void between the soffit and top flange.

**Weir Structure** – The weir structure is in poor condition. The crest of the weir is severely scaled and eroding. The left wall of the weir is described in the pier section above. The right wall of the weir is completely missing. It appears that the pier broke free some time ago and now lies several metres downstream. The floor of the weir is in very poor condition with a large void in the concrete on the left side. This void is allowing water to travel below the concrete floor and erode the material below. Along the left wall, water is seeping underneath base of the pier and is eroding the downstream side of the pier.

**Raised Weir Spillway** – There is a raised weir spillway on the right side of the structure. It is in very poor condition with severe erosion between the floor and the right abutment wall, severe spalling and severe scaling throughout the upstream and downstream face. There are also trees and shrubs growing out of the downstream face. The right wall acts as the abutment for the pedestrian bridge. It is in fair condition with scaling at the base and cracking with efflorescence throughout. There is a large void between the upstream side of the floor and the abutment.

**Apron** – Below the dam is a large concrete apron. The apron has some wide cracking on the left section and minor to medium scaling throughout.

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### 3 – Wooden and Metal Structures (decks, gains, railings, conduits, etc.)

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**Pedestrian Bridge** – The pedestrian bridge consists of steel girders supporting a timber wearing surface and steel post and wooden railing system. The steel “I” type girders are in fair condition with coating loss on all faces and corrosion on the top and bottom flanges. The steel posts for the railing are a “C” channel style and are in fair condition with minor erosion. The wooden railings and wearing surface are in fair condition with signs of rot and weathering throughout.

**Deck Railing** – The dam deck has a square tube railing system with chain link fencing. There is moderate corrosion throughout the railing and fencing. The posts and anchors appear small for the application as public can access the deck top. There is a large gap between the bottom of the metal railing and the concrete deck. The railings do not meet current Ontario Building Code Requirements.

**Flood Control Wall Railing** – The flood wall has a two-tube railing system on the top of the flood wall. The railing is in fair to good condition with minor coating loss and minor

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abrasions. Several post bases have minor spalling with them that has been repaired with a caulking product.

**4 – Gates and/or Stop Logs**

There are no gates or stoplogs associated with the Neustadt Dam.

**5 – Water Level Gauge** (reading and condition)

There is no water level gauge installed at the Neustadt Dam.

**6 – Winches** (type and number)

There are no winches associated with the Neustadt Dam.

**7 – Valves** (type and number)

There are no valves associated with the Neustadt Dam.

**8 – Boom** (driftwood, chains, anchors)

There is no public safety boom associated with the Neustadt Dam.

**9 – Erosion** (upstream and downstream)

There is erosion of the creek banks downstream of the dam.

**10 – Seepage or Leaks**

Water was noted to be seeping into a void in the concrete apron downstream of the dam.

**11 – Access Route** (location of gate keys, winch handles and keys)

The dam was accessed via the public road system and is generally publicly accessible. The dam was accessed via Grey Road 10 (Jacob Street) in Neustadt. Parking is in the gravel parking area for the mill. The dam can be accessed on foot from this location.

**12 – Safety Issues** (public and operator)

**Public Safety** – There are inadequate public safety measures at the Neustadt Dam. There is no public safety signage and the railings do not meet the current Ontario Building Code requirements.

**Operator Safety** – No operator safety issues were identified as the dam is not currently operable.

**13 – Signage**

There is no public safety signage installed at the Neustadt Dam.

**14 – Divestment and/or Decommissioning Opportunities**

This dam should be decommissioned as it is in very poor condition, is a public safety hazard, and doesn't serve a functional purpose for the SVCA.



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**15 – General Remarks**

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It is understood that in the past crossing over the dam was the only access to certain properties on the west side of the creek. This is no longer the case and residents can access their properties via a driveway to the north.

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**16 – Recommendations**

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- Remove the dam and restore the creek channel. Considerations may need to be given to maintaining the flood control wall.
  - While the dam removal is being planned, block public access to the dam structure with fencing/gates and place public safety around dams signage on the gates. The public safety signs shall be installed in accordance with the Best Management Practices for Public Safety Around Dams (MNR, 2011).
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## Appendix C

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### OSIM Inspection Deficiency Classifications



## OSIM Checklist

Concrete		
<b>Scaling</b> - loss of portion of concrete surface or mortar due to freeze thaw. Common with non-air entrained concrete or poorly finished concrete.	Light	Loss of mortar up to 5 mm
	Medium	6 to 10 mm, some coarse aggregate visible
	Severe	11 to 20 mm aggregate pocking
	Very Severe	More than 20 mm
<b>Disintegration</b> - breakdown of concrete. Starts as scaling and its disintegration when it's beyond the level of very severe scaling.	Light	Loss of depth up to 25 mm
	Medium	25 to 50 mm
	Severe	50 to 100 mm
	Very Severe	More than 100 mm
<b>Erosion</b> - deterioration of concrete by water, sand or gravel scrubbing against the surface.	Light	Loss of depth up to 25 mm
	Medium	25 to 50 mm
	Severe	50 to 100 mm
	Very Severe	More than 100 mm
<b>Corrosion of Reinforcement</b>	Light	Rust stains on concrete surface
	Medium	Exposed reinforcement, loss of section 10%
	Severe	Loss of reinforcing steel section 10% to 20%
	Very Severe	Loss of section more than 20%
<b>Delamination</b> - discontinuity of the surface concrete, which becomes substantially separated but not completely detached. Hollow sounding when tapped.	Light	Measured area less than 150 mm in any direction
	Medium	150 mm to 300 mm
	Severe	300 mm to 600 mm
	Very Severe	More than 600 mm
<b>Spalling</b> - fragments of concrete become detached.	Light	Measured area less than 150 mm in any direction, or less than 25 mm deep
	Medium	150 mm to 300 mm, or 25 mm to 50 mm deep
	Severe	300 mm to 600 mm, or 50 mm to 100 mm deep
	Very Severe	More than 600 mm, or greater than 100 mm in depth
<b>Crack</b> - linear fracture.	Hairline	Less than 0.1 mm
	Narrow	0.1 mm to 0.3 mm
	Medium	0.3 mm to 1.0 mm
	Wide	More than 1.0 mm
<b>AAR</b> - aggregate reaction with the alkalis in cement, product is highly expansive substance called alkali-silica gel. The expansion of the gel and aggregate under damp conditions causes cracking.	Light	Hairline cracks, widely spaced, no visible expansion of concrete mass
	Medium	Narrow pattern cracks, closely spaced, with visible expansion of concrete mass
	Severe	Medium to wide pattern cracks, closely spaced, with visible expansion and deterioration of concrete
	Very Severe	Wide pattern cracks, closely spaced, with extensive expansion and deterioration of concrete

## OSIM Checklist

### Concrete Surface Defects

**Stratification** - separation of concrete into horizontal layers in over wetted or over vibrated concrete.

**Segregation** - differential concentration of the components of mixed concrete resulting in non-uniform properties in mass. Caused by concrete falling from height, with the coarse aggregate setting to the bottom and fine aggregate to the top.

**Cold Joints** - caused from delay between placements of successive pours of concrete and incomplete bond develops.

<b>Deposits</b> - water percolates through the concrete and dissolves or leaches chemicals from it and deposits them on the surface.	Efflorescence	A deposit of salts, usually white and powdery
	Exudation	A liquid or gel-like discharge through pores or cracks in the surface
	Incrustation	A hard crust or coating formed on the concrete surface
	Stalactite	A downward pointing formation hanging from the concrete surface, usually shaped like an icicle

<b>Honeycombing</b> - improper or incomplete vibration, which leaves voids in the concrete where mortar failed to completely fill the space between aggregate.	Light	Measured area less than 150 mm in any direction
	Medium	150 mm to 300 mm
	Severe	300 mm to 600 mm
	Very Severe	more than 600 mm

<b>Pop-outs</b> - shallow, conical depressions caused by small portions of concrete surface breaking away due to frost or expansion of aggregate.	Light	Holes up to 25 mm diameter
	Medium	25 mm to 50 mm
	Severe	50 mm to 100 mm
	Very Severe	More than 100 mm

**Abrasion** - vehicles or snow plow blades scraping against concrete.

**Wear**- dynamic and/or friction forces from vehicles, dirt, debris, sand, water & ice. Surface appears polished.

**Slippery**- as a result of polishing of concrete deck by vehicular traffic.

### Steel

<b>Corrosion</b> - deterioration of steel by chemical or electro-chemical reaction.	Light	Loose rust formation, no noticeable section loss
	Medium	Loose rust with scales or flakes. Up to 10% sectional loss
	Severe	Stratified rust with pitting of metal. 10% to 20% section loss
	Very Severe	Localized perforation or rusting through. More than 20% section loss

**Permanent Deformation** - bending, buckling, twisting or elongation, or any combination thereof.  
Note location of deformation

**Crack** - a linear fracture in the surface of steel or weld.  
Cracks perpendicular to direction of stress are critical

<b>Loose Connections</b> - caused by corrosion of connector plates or fasteners, excessive vibration, overstressing, cracking or the failure of the individual fasteners.	Light	up to 5% of fasteners loose or missing
	Medium	5% to 10
	Severe	10% to 20%
	Very Severe	more than 20%

## OSIM Checklist

Wood		
<b>Weathering, Checks, Splits and Shakes</b> - deterioration of wood due to sun, rain, wind, frost and atmospheric pollutants.	Light	tissue separation short and extends less than 5% into member
	Medium	separation long and 5% to 10% into member
	Severe	10% to 20%
	Very Severe	more than 20%
<b>Rot and Decay</b> - breakdown of wood by microorganisms.	Light	slight change in colour, wood cannot be penetrated by sharp object
	Medium	surface discolored with black and brown streak. Hollow sounding when tapped
	Severe	surface fibrous, checked or crumbly with fungal fruiting growing on it
	Very Severe	wood can be crumbled and disintegrated with ease
<b>Insect Damage</b> - tunneling and boring by larvae or mature insects.	Light	occasional exit or entrance hole
	Medium	several entrances and exit holes
	Severe	extensive tunneling and holes
	Very Severe	extensive tunneling, holes and larvae insects present
<b>Abrasion and Wear</b> - deterioration caused by vehicles or snowplow blades scarping against wood.	Light	5% section loss
	Medium	5% to 10% section loss
	Severe	10% to 20%
	Very Severe	more than 20%
<b>Cracking, Splintering, Crushing and Shattering</b> - physical damage from vehicular collision or overloading of member.	Light	5% section loss
	Medium	5% to 10% section loss
	Severe	10% to 20%
	Very Severe	more than 20%
<b>Fire and Chemical Damage</b> - charring.	Light	slight charring and 5% section loss
	Medium	5% to 10% section loss
	Severe	10% to 20%
	Very Severe	more than 20%
<b>Loose Connections</b> - loosened due to repetitive or dynamic loading, wear or decay.	Light	up to 5% of fasteners loose or missing
	Medium	5% to 10
	Severe	10% to 20%
	Very Severe	more than 20%
Masonry		
<b>Crack</b> - incomplete separation into one or more parts with or without space between.	Hairline	less than 0.1 mm
	Narrow	0.1 mm to 0.3 mm
	Medium	0.3 mm to 1.0 mm
	Wide	more than 1.0 mm
<b>Splitting, spalling and disintegration</b> - opening of seams, chipping away of pieces of stones or gradual breakdown of stone.	Light	hairline cracks and minor loss of stone surface up to 50 mm section loss
	Medium	narrow cracks and 50 mm to 100 mm section loss
	Severe	spalling and disintegration of stone with 100 mm to 150 mm section loss
	Very Severe	extensive spalling and disintegration of stone with 100 mm to 150 mm section loss
<b>Loss of mortar and stone</b> - loss of mortar due to frost, erosion, plant	Light	loss of mortar from joints of depth up to 20 mm
	Medium	20 to 50 mm

## OSIM Checklist

growth or softening by water containing dissolved sulfate or chlorides.	Severe	extensive loss of mortar resulting in loss of stone
	Very Severe	extensive loss of stones jeopardizing the stability of structure
<b>Aluminum</b>		
<b>Corrosion</b> - gradual oxidation of the surface in the presence of moisture.	Light	loose rust formation, no noticeable section loss
	Medium	loose rust with scales or flakes. Up to 10% sectional loss
	Severe	stratified rust with pitting of metal. 10% to 20% section loss
	Very Severe	localized perforation or rusting through. More than 20% section loss
<b>Crack</b> - a linear fracture which may extend partially or completely through the material		
<b>Loose Connections</b> - may occur in bolted or riveted connection.	Light	up to 5% of fasteners loose or missing
	Medium	5% to 10
	Severe	10% to 20%
	Very Severe	more than 20%
<b>Coatings</b>		
<b>Coating Related Defects</b>		<b>Adhesion Related Defects</b>
Checking or crazing		Undercutting
Cracking		Blisters
Alligatoring		Intercoat delamination
Chemical attack		Peeling
Chalking		Underfilm corrosion
<b>Coating Related Defects</b>		
Bridging	Pinholing	
Edge effects	Runs	
Shadows	Sags	
Overspray	Pinpoint rusting	