



**NORTH CENTRAL REGION GRMP  
EDSON / STONY PLAIN  
SITE INSPECTION FORM**



<b>SITE NUMBER AND NAME:</b> NC067 – Anthony Henday Bridge	<b>HIGHWAY AND KM:</b> 216:06, km 10.528	<b>PREVIOUS INSPECTION:</b> June 15, 2022	<b>CURRENT INSPECTION:</b> June 1, 2023
<b>LEGAL DESCRIPTION:</b> SE 4-52-25-W4	<b>NAD83 COORDINATES:</b> UTM12U 5926734N 326219E		<b>RISK ASSESSMENT:</b> PF: 5 CF: 10 Total: 50
<b>AVERAGE ANNUAL DAILY TRAFFIC (AADT):</b> 73,140 (2022)		<b>CONTRACTOR MAINTENANCE AREA (CMA):</b> AHD	

<p><b>SUMMARY OF INSTRUMENTATION:</b> 6 slope inclinometers, 23 pneumatic piezometers, and 25 vibrating wire piezometers functional <b>LAST READING DATE:</b> May 16, 2023</p>	<p><b>INSPECTED BY:</b> Stantec: Leslie Cho and Sonja Pharand TEC: Rocky Wang, Amy Driessen, Pramaya Kannel</p>
<p><b>PRIMARY SITE ISSUE:</b> Erosion along the lower slope of the land piers at the north abutment. Slumping adjacent to outfall at south abutment.</p>	
<p><b>APPROXIMATE DIMENSIONS:</b> North abutment: 50 m wide x 20 m long. Outfall slump: 8 m wide x 25 m long x 1.2 m deep.</p>	
<p><b>DATE OF ANY REMEDIAL ACTION:</b> Armorflex channel south of bridge repaired in 2015. Riprap extended on outside edges of both sides of highway on upper embankments as part of bridge widening works in Fall 2020/Spring 2021. Erosion control matting and straw wattles installed on sections of the head slopes as part of bridge widening works in Spring 2023.</p>	

ITEM	CONDITIONS EXIST		DESCRIPTION AND LOCATION	NOTICEABLE CHANGE FROM LAST INSPECTION	
	YES	NO		YES	NO
Pavement Distress		X			X
Slope Movement	X		SI2 and SI7 previously showed movement in fill layer. Retrogression of slump at outfall west of south abutment.	X	
Erosion	X		Erosion around north abutment piers spanning both bridge structures. Four erosion gullies/ scour holes adjacent to the downslope side of the pedestrian trail at the north abutment under the northbound lane (NBL). Erosion gully at NB abutment on south slope.	X	
Seepage		X			
Bridge/Culvert Distress	X		Outfall pipe separated behind outlet. Ponding under separated pipe. Beveled end separated with about 50 mm gap.		X

**COMMENTS**
**North Side:**

- Aside from ongoing erosion and slumping at the north abutment piers, the site appeared mostly unchanged.
- Significant erosion/slumping was observed at the land piers of the north bank (Photos 1 to 3). Ongoing erosion/slumping may be due to river scour and high intensity precipitation events. The extent of erosion appears to have increased resulting in additional loss of soil support around the piers. In discussion with AT, the bridge group was not concerned with loss of soil support at its current elevation since some loss of lateral soil support was assumed in the original design.
- SI2 and SI7 previously showed movement in the fill. SI2 was installed in the pile wall and showed an average rate of movement of about 3 mm/yr in the upper zone (~3 m depth) since 2014. The instrument was destroyed in 2022 during construction activities. SI7 showed a similar rate of movement as SI2 for the middle movement zone (~7 m depth) since 2009 and a slightly higher rate of movement than SI2 for the upper zone (4 mm/yr at about 3 m depth). An increase in movement rate to 32 mm/year was observed in the upper zone of SI7 during the 2022 instrument reading cycle which was likely due to excavations and spoil pile placed around the SI. SI7 was sheared at approximately 6 m below the top of the pipe during the 2023 spring reading cycle. SI1 and SI3, installed in the pile wall, have shown no discernable movement in the pile wall aside from pile wall deformation, but do show movement in the fill (~2.5 m depth) with current rates of movement of 5 and 6 mm/yr, respectively. Approximate SI locations are shown on Figure 2.
- Four large erosion gullies remain unchanged from the 2022 site inspection under the NBL downslope from the pedestrian trail at the north abutment. These gullies are up to 1 m deep and 0.9 m wide (Photo 4). The minor trail loss and pavement crack also appear unchanged since the 2022 site inspection (Photo 5).
- Erosion gullies up to 0.4 m wide and 0.6 m deep directly downslope from the trail between the two bridge alignments were unchanged since the 2022 site inspection.
- Water draining from the west side of the north NBL bridge abutment appears to be flowing off the waterproofing membrane behind the abutment wall and missing the trough which is leading to erosion of the slope.

**South Side:**

- Erosion is ongoing down the informal biking/ walking trail on the south slope near the bend in the unpaved access road.
- Ongoing erosion was observed on the south slope below the abutment of the NBL. Water is flowing off a waterproofing membrane behind the abutment wall, missing the trough that would direct water to a catch basin, and flowing downslope resulting in erosion of the head slope (Photo 6).
- A crack across the paved trail was observed on the south slope below the NBL (Photo 7).
- The erosion/slumping adjacent to the outfall at the south abutment appeared to have progressed since the 2022 site inspection. The scarp is still 6 m wide but has retrogressed 1 m southeast and is currently 5 m from the catch basin (Photo 8).
- Separation of the concrete pipe and the separation at the beveled end were observed and appeared unchanged from previous observations made in 2021.
- Armourflex channel south of bridge appears to be performing well.

**RECOMMENDATIONS**

- The site should be regularly monitored by the MCI and/or current Southwest Anthony Henday Drive (SWAHD) Lane Widening team until the following recommended remediation can be undertaken.
- Pavement cracks along the pedestrian trail should be sealed to reduce surface water infiltration into the slope.
- The waterproofing membrane behind the abutment walls on the NBL should be repaired to direct water into the drainage trough on both sides of the river. Any associated catch basins/ drainage chutes should be checked for blockage and cleaned as necessary.
- The erosion gullies should be regraded and reseeded to improve erosion protection and reduce the risk of additional loss of trail.
- Stantec submitted two tender packages for site remediation in 2019:
  - North abutment slope: remediation includes flattening the slope to 2.5H:1V and armoring the slope with riprap. Additional surface drainage improvements will also be constructed. The estimated cost for construction is approximately \$1,575,000, excluding engineering costs. Construction was previously scheduled for 2024 and was rescheduled to 2026.
  - Outfall remediation as part of NC79 work: Replace separated sections of pipe with 750 mm reinforced concrete pipe. Reline storm sewer with cured-in-place pipe installed at 5% slope. The estimated cost for




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construction is approximately \$950,000, excluding engineering costs. Construction has been rescheduled for 2025.

- Site inspections should continue annually.
- Instrumentation monitoring should continue semi-annually.

<b>PREPARED BY:</b> Sonja Pharand, P.Eng.	<b>PREPARED BY:</b> Leslie Cho, M.Eng., P.Eng.
	
<b>REVIEWED BY:</b> Carrie Murray, M.Eng., P.Eng.	<b>PERMIT TO PRACTICE</b>

2023 Site Inspection Photos at NC067



**Photo 1:** Erosion of land piers at the north bank. Looking north.



**Photo 2:** Loss of soil support at pier. Looking northeast.

2023 Site Inspection Photos at NC067



**Photo 3:** Erosion at outermost pier of southbound lane. Looking southwest.



**Photo 4:** Four scour holes downslope of pedestrian trail under NBL. Looking northwest.

2023 Site Inspection Photos at NC067



**Photo 5:** No change to trail crack pattern. Minor loss of trail. Looking northeast.



**Photo 6:** Erosion below the NB abutment on the south slope due to damaged waterproof membrane on abutment. Looking southeast.

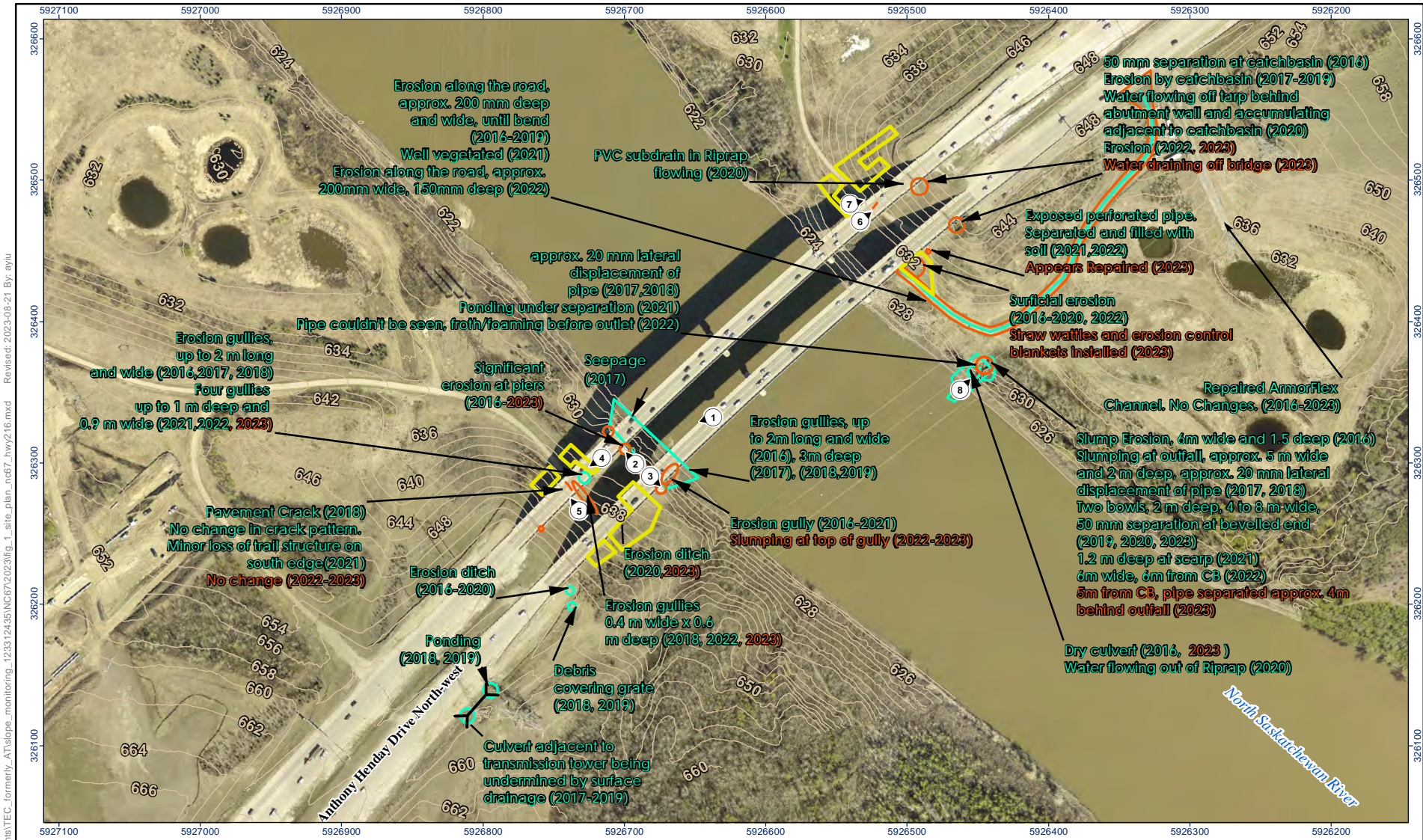
2023 Site Inspection Photos at NC067



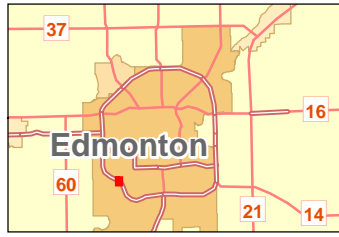
**Photo 7:** Crack in the paved trail below the NB lane of south abutment. Looking northeast.



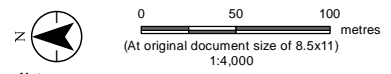
**Photo 8:** Two slumps adjacent and behind the outfall on the south bank of the river. Looking southeast.



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 Revised: 2023-08-21 By: ayju



- Photo Number and Direction
- Previous Observation
- 2023 Observation
- Ground Elevation Contours (m AMSL, LiDAR April-May 2018)
- Culvert
- Erosion Control Blanket and Straw Wattle (June 2023)



- Notes**
- Coordinate System: North American 1983 CSRS UTM Zone 12N
  - Data Sources: Geogratis, ©Department of Natural Resources Canada,
  - Background: City of Edmonton 2020.

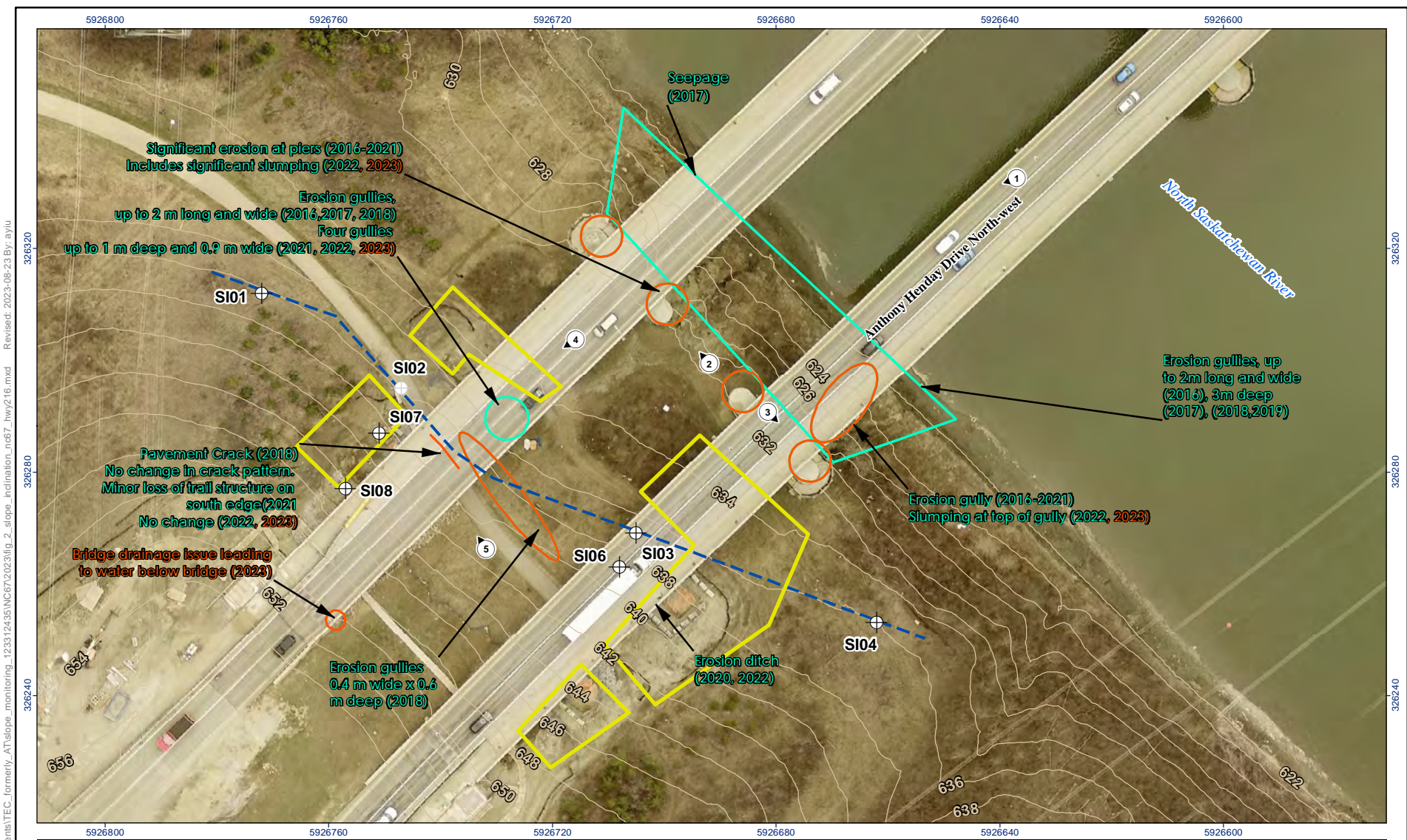
Project Location: 03/04-052-25 W4M  
 City of Edmonton, Alberta  
 Client/Project: Transportation and Economic Corridors  
 Geohazard Monitoring Program  
 NC67 Anthony Henday Bridge  
 Prepared by AY on 2023-08-21  
 Quality Review by LC on 2023-08-21  
 Independent Review by CM on 2023-08-21  
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Figure No.  
**1**

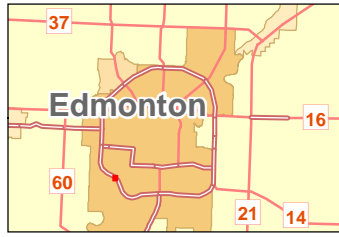
Title  
**Site Plan**



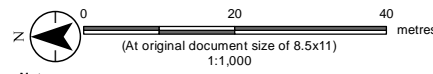




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 Revised: 2023-08-23 By: ayju



- Previous Observation
- 2023 Observation
- - - Approximate Location of Pile Wall
- Ground Elevation Contours (m AMSL, LiDAR April-May 2018)
- Approximate Slope Inclinometer Location
- Previous Slope Inclinometer Location
- Photo Number and Direction
- Erosion Control Blanket and Straw Wattle (June 2023)



- Notes**
1. Coordinate System: North American 1983 CSRS UTM Zone 12N
  2. Data Sources: Geogratis, ©Department of Natural Resources Canada,
  3. Background: City of Edmonton 2022.

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 Figure No.: 123315222

**Figure No.**  
**2**  
**Title**  
**Slope Inclinometer Locations**



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