



**THE CLOUTIER DRIVE OUTFALL (RR-7)
OUTFALL INSPECTION/CONDITION ASSESSMENT**


AUGUST, 2009

Prepared By:



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Approved By:



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KGS
GROUP

CONSULTING
ENGINEERS



August 14, 2009

File No. 09-0107-02

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The City of Winnipeg
Water and Waste Department
110-1199 Pacific
Winnipeg, Manitoba
R3E 3S8

ATTENTION: Mr. Darcy Strandberg

RE: 2009 Cloutier Drive Outfall (RR-7) Condition Assessment

Mr. Strandberg:

Enclosed are two (2) copies of the draft condition assessment for your review.

Regards,

A handwritten signature in black ink that reads 'Roy Houston'.

Roy Houston, P.Eng.
Manager of Civil / Municipal Services

RH/ro
Enclosure

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1.0 INTRODUCTION AND BACKGROUND

The following condition assessment was completed by KGS Group on the Cloutier Drive Outfall (RR-7). The assessment is based on an outfall inspection carried out by KGS Group on August 6, 2009 in response to a sinkhole that was reported in July of 2009. A photograph of the sinkhole taken during the initial site visit on July 30, 2009 is shown in Figure 1.



Figure 1: Sinkhole above Outfall RR-7

The existing outfall (Appendix A) consists of a 1.8 m CSP pipe originating at a concrete intake structure approximately 40 m north of Cloutier Drive. Just before the outfall traverses Cloutier Drive (Station 2+39.1) the pipe transitions to a 1.5m – 3mm liner plate. The liner plate, which runs for approximately 45 m beneath Cloutier Drive, was installed in 2006 as part of the City of Winnipeg's Outfall Repair Program. On the south side of Cloutier Drive (Station 1+94.1), the liner plate transitions through a 1.5 m x 1.2 m reducer to a 1.2 m CSP pipe which extends 87 m to the Red River.

A condition assessment on this outfall was completed by KGS Group in 1996 (Appendix B), which was supplemented with a CCTV inspection carried out by UniJet Industrial Pipe Services on March 1, 2005. At that time, the outfall was given a structural condition ranking of 5, representing the highest degree of structural issues used to rank outfalls. This rating was based mainly on the 1.8m CMP segment of the outfall located under Cloutier Drive, which showed

excessive deformations and was being supported with timbers. This segment was repaired in 2006 using liner plates. The 1.2 m CSP pipe located south of Cloutier Drive that extends to the river did not have the same structural concerns and was not repaired.

In early 2009, the bank upstream of the outfall was scheduled for stabilization work by E. F. Moon Construction. Prior to construction, KGS Group was asked to provide advice about construction vehicles crossing the 1.2 m CSP outfall pipe south of Cloutier Drive in order to access the site. KGS instructed that there was insignificant cover over the pipe and that bridging would be required if construction vehicles were to cross the outfall. At that time, two sewer inspections were carried out, a CCTV inspection by Unijet Industrial Pip Services on January 19, 2009 and a visual inspection by a KGS staff on January 21, 2009. The bank works proceeded and was completed on March 20, 2009.

In July of 2009 a sinkhole formed over the 1.2 m pipe approximately 23 m +/- south of the MH (approximately at station 1+77).

A visual inspection of the outfall was carried out by KGS group on August 6, 2009 with the assistance of the City of Winnipeg Water and Waste Field Staff. The inspection was initiated at the manhole at Station 2+00 and continued downstream approximately 60 m (The extent of the City's safety rope). The inspection shows five areas of significant structural defects. These defects present in the August 6, 2009 inspection are consistent with the defects shown in the January 19, 2009 and January 21, 2009 inspections, however, they are not present in the March 1, 2005 inspection. A brief description of these defects are listed below in the order they were encountered:

1. Reverse Grade on pipe
 - Occurs just past the 1.5 m x 1.2 m transition



Figure 2: Reverse grade on pipe – looking down-stream

2. Large Displaced Joint
 - Approximately 190 mm (7.5")
 - Approximately 22 m downstream from manhole
 - Probable location of sink hole



Figure 3: Large displaced joint (Probable location of sink hole) looking downstream



Figure 4: Large Displaced Joint (Probable location of sink hole) looking upstream

3. Open Joint 1



Figure 5: Open joint 1 - Looking downstream

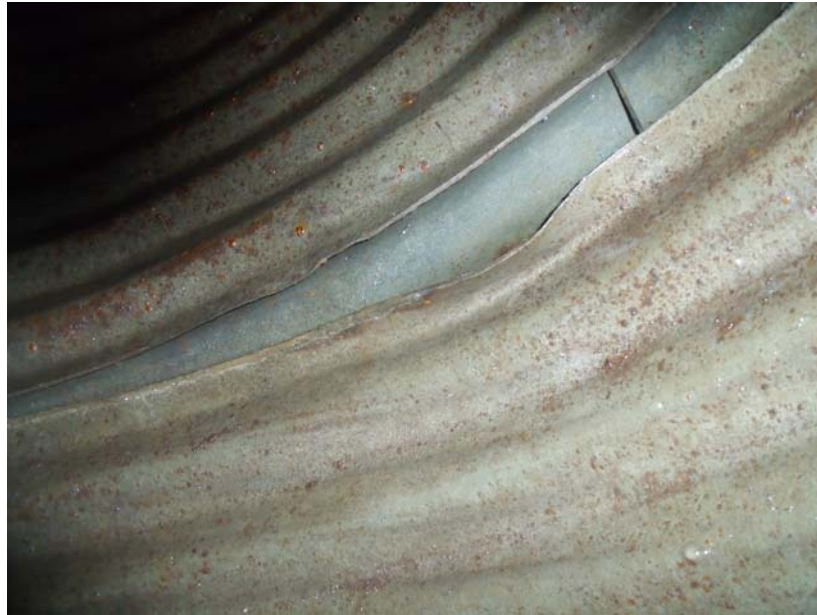


Figure 6: Open Joint 1 – Looking west from middle of pipe showing extent of opening

4. Open Joint 2

- Pipe appears to be out of round in the upper west quadrant of the pipe (Top right in Figure 7)



Figure 7: Open Joint 2 – Looking down stream

5. Deformed Sewer at Joint

- Pipe is deformed on upper east quadrant of the pipe (Top left in Figures 8 & 9)
- Joint is open



Figure 8: Deformed sewer at Joint – looking downstream



Figure 9: Deformed sewer at Joint – Looking at bulge in pipe

2.0 CONCLUSIONS

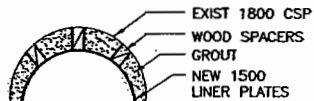
The Cloutier Drive outfall (RR-7) is damaged and requires an immediate repair to the portion of the pipe directly below the sinkhole. The defects observed during the August 6, 2009 inspection appear to have occurred some time between the March 1, 2005 inspection and the January 19, 2009 Inspection.

3.0 RECOMMENDATIONS

KGS group recommends an immediate repair pipe at the location directly below the sinkhole. This may be achieved through a localized point repair. While the pipe is currently functional, the flow of water will continue to eat away at the surrounding soil. This poses a risk to pedestrians walking in the vicinity of the sinkhole as well as to the pipe itself.

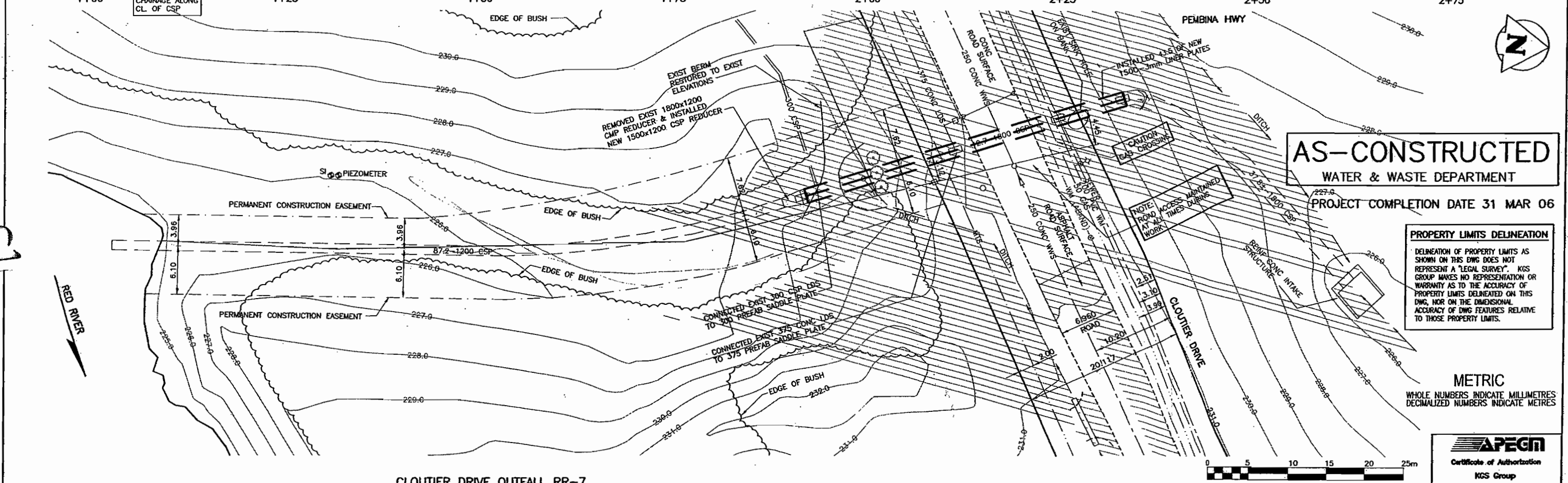
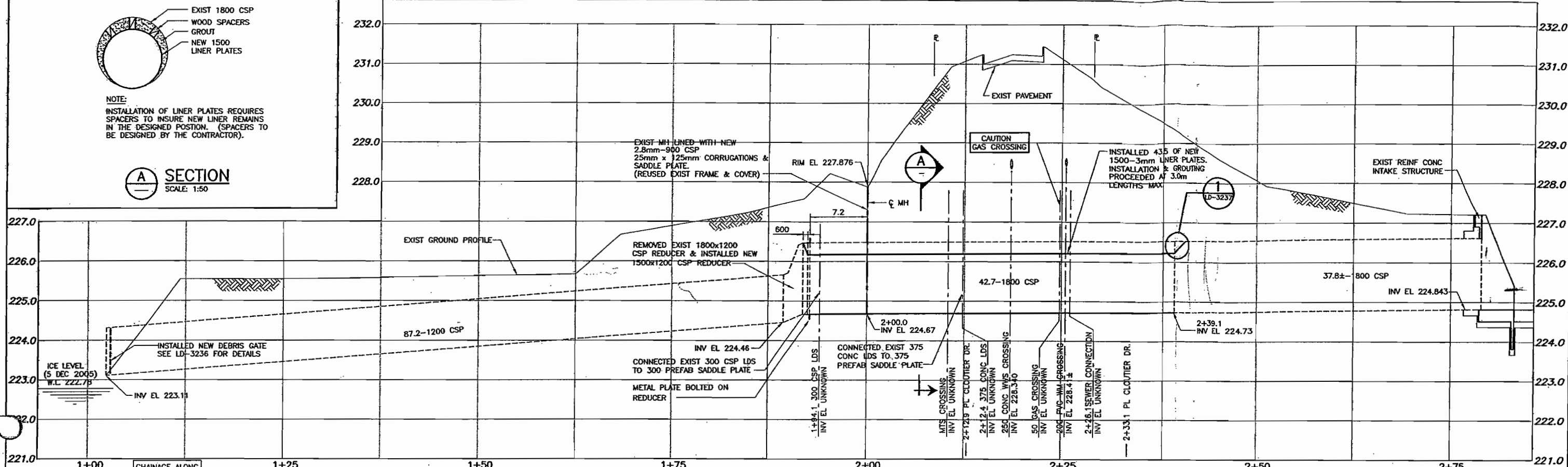
KGS Group further recommends investigating the option of lining the existing 1.2 m CSP pipe from the tie-in to the 1.5 m liner plate, to the outfalls end and the Red River. In order to achieve this, point repairs will be required at some of the location where structural defects exist.

APPENDIX A
AS-BUILT DRAWING OF 2006 OUTFALL REPAIRS



NOTE:
INSTALLATION OF LINER PLATES REQUIRES SPACERS TO INSURE NEW LINER REMAINS IN THE DESIGNED POSITION. (SPACERS TO BE DESIGNED BY THE CONTRACTOR).

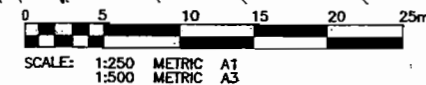
A SECTION
SCALE: 1:50



AS-CONSTRUCTED
WATER & WASTE DEPARTMENT
PROJECT COMPLETION DATE 31 MAR 06

PROPERTY LIMITS DELINEATION
DELINEATION OF PROPERTY LIMITS AS SHOWN ON THIS DWG DOES NOT REPRESENT A "LEGAL SURVEY". KGS GROUP MAKES NO REPRESENTATION OR WARRANTY AS TO THE ACCURACY OF PROPERTY LIMITS DELINEATED ON THIS DWG, NOR ON THE DIMENSIONAL ACCURACY OF DWG FEATURES RELATIVE TO THOSE PROPERTY LIMITS.

METRIC
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES



APEGN
Certificate of Authorization
KGS Group
No. 245 Date:

150 WM	WATERMAIN	150 WM	HYDRO
+	HYDRANT	+	M.T.S.
+	VALVE	+	PROPERTY LINE
300 LDS	LAND DRAINAGE SEWER	300 LDS	SURVEY BAR
250 WWS	WASTE WATER SEWER	250 WWS	LIGHT STANDARD
○	MANHOLE	○	HYDRO POLE
□	CATCH BASIN	□	GUY WIRE
▽	CURB INLET	▽	SIGN
+	JUNCTIONS	+	BUSH LINE
—	CULVERT	—	FENCE

1	ISSUED FOR CONSTRUCTION	11/01/06	RJH
2	AS CONSTRUCTED	21/04/08	RJH
3	REISSUED - AS CONSTRUCTED	08/06/08	RJH

LOCATION APPROVED UNDERGROUND STRUCTURES

SUPV. U/G STRUCTURES COMMITTEE DATE

NOTE:
LOCATION OF UNDERGROUND STRUCTURES AS SHOWN ARE BASED ON THE BEST INFORMATION AVAILABLE BUT NO GUARANTEE IS GIVEN THAT ALL EXISTING UTILITIES ARE SHOWN OR THAT THE GIVEN LOCATIONS ARE EXACT. CONFIRMATION OF EXISTENCE AND EXACT CONFIGURATION OF UTILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.

KGS CONSULTING ENGINEERS & PROJECT MANAGERS
WINNIPEG (204) 896-1209
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DESIGNED BY: RJH
CHECKED BY: RJH
DRAWN BY: DMW
APPROVED BY:
RELEASED FOR:

ENGINEER'S SEAL
R.J. HOUSTON
Member 4395

THE CITY OF WINNIPEG
WATER & WASTE DEPARTMENT

2005 OUTFALL REPAIRS
CLOUTIER DRIVE OUTFALL (RR-7)

SHEET 04 OF 10
CAD FILE DRAWING NUMBER 05-0107-11

APPENDIX B
1996 CONDITION ASSESSMENT

Sewer Outfall Study

Mar 29, 2005

General Outfall Information

Outfall Name: Cloutier Dr. **Location:** Perimeter Hwy. at Cloutier Dr.
Outfall ID No#: RR-7 **Tributary:** Red River **Sewer Type:** Land Drainage System
Operations Area: South **Owner:** City
Number of Inspections To-date: 1

Inspection Information

Inspection Number: 1

Inspector: Z.Z./J.T. **Party Members:** K.B.

Invert: **Temperature:** -8 **Weather:** Partly sunny

Date of Inspection: 22-Nov-96 **Date of Last Inspection:** **Date Constructed:**

Description of Outfall Survey: KGS Outfall Study **Start Date:** 01-Nov-96 **End Date:** 31-Dec-97 **Grates:** No

Physical Characteristics

Segment No	LBIS No. #	Width or Dia. (1) (mm)	Height or Dia. (2) (mm)	Length (m)	Material Type
2		1200		84	Corrugated Metal Pipe
1	60022329	1800		80	Corrugated Metal Pipe

Pipe Hydraulics:

Restriction Type: **Comments:**

Ice Damage: No **Comments:**

Longitudinal Pipe Deflection (m)

Deformation:

Geotechnical:

Bank Height: 3.5 **Slump:** Stable
River Section: Outside Bend **Erosion:**
Slope: **Vegetation:** Scrub Brush
Instrumentation: None

Comments:

Slope: > 1:10. Erosion: toe scour and undercutting.

Condition Rating:

Structural Rating:	Geotechnical (Bank) Rating:	Stream Rating:	Overall Rating:
5	1	3	5

Comment

Horizontal joint displacements of 10 cm. At 106 m from outlet there was a 50 mm gap at 3:00 & 9:00. At 112 m there was a dent at 11:00. At 120 m the bottom half of the CMP was corroded. At 164 m joint was completely separated. Small dents throughout length of pipe.
