

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 5824

CSAH NO. 1

OVER THE

CLEARWATER RIVER

DISTRICT 2 - RED LAKE COUNTY



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 173)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 5824, the East and West Abutments, were found to be in good to satisfactory condition with no defects of structural significance observed. The spalling at the West Abutment has increased since the last inspection and random hairline cracks have developed at both abutments. The channel bottom has remained stable with no appreciable change in configuration since the last inspection.

INSPECTION FINDINGS:

- (A) A void was observed 1 foot below the waterline with 2 inches of maximum penetration located 2.5 feet north of the downstream end of the West Abutment. Spalling and poor consolidation with up to 6 inches of maximum penetration was observed 3 feet along the wingwall and 4 feet along the breastwall at the north end of the abutment, exposing lightly corroded steel reinforcing at the corner.
- (B) Random hairline map cracking was observed on the West Abutment wingwalls from 1 to 4 feet above the waterline.
- (C) A 6-inch-diameter void and area of poor consolidation was located at 1 foot above the waterline with 2 inches of penetration at the downstream end of the West Abutment.
- (D) Vertical cracking was observed on both abutments, extending from the top of seat down to 1 foot above the waterline on the East Abutment, and all the way down to the channel bottom on the West Abutment.
- (E) Aside for above defects, the abutment concrete was smooth and sound.

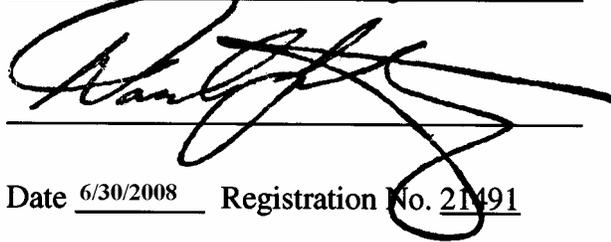
- (F) The channel bottom material along both abutments consisted of silty sand with up to 1 foot of probe rod penetration, and in the center of the river it consisted of up to 1-foot-diameter riprap.

RECOMMENDATIONS:

- (A) Although the channel bottom appears to have remained stable since the last inspection, according to Item 113, the bridge is rated as scour critical, and therefore, it is recommended that the channel bottom be closely monitored after major flood events and during future biennial and underwater inspections.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

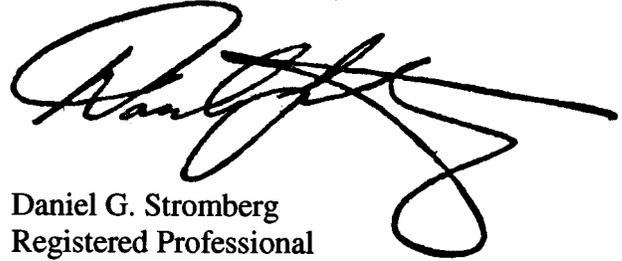
Daniel G. Stromberg



Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.



Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 5824

Feature Crossed: Clearwater River

Feature Carried: CSAH No. 1

Location: District 2 - Red Lake County

Bridge Description: The superstructure consists of a single span multiple steel beam structure supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments founded on spread footings.

2. INSPECTION DATA

Professional Engineer Diver: Bradley A. Syler, P.E., S.E

Dive Team: John J. Loftus, Valerie Rouston

Date: August 19, 2007

Weather Conditions: Cloudy, 65 °F

Underwater Visibility: 3.0 feet

Waterway Velocity: 0.5 f.p.s.

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments.

General Shape: The abutments each consist of a vertical reinforced concrete breastwall with two adjacent skewed wingwalls. The abutments are founded on spread footings.

Maximum Water Depth at Substructure Inspected: Approximately 5.5 feet.

4. WATERLINE DATUM

Water Level Reference: The top of bridge seat on the south end of the West Abutment.

Water Surface: The waterline was approximately 10.6 feet below reference.
Waterline Elevation = 1097.2.

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 7

Item 61: Channel and Channel Protection: Code 7

Item 92B: Underwater Inspection: Code B/08/07

Item 113: Scour Critical Bridges: Code U/96

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

X Yes _____ No



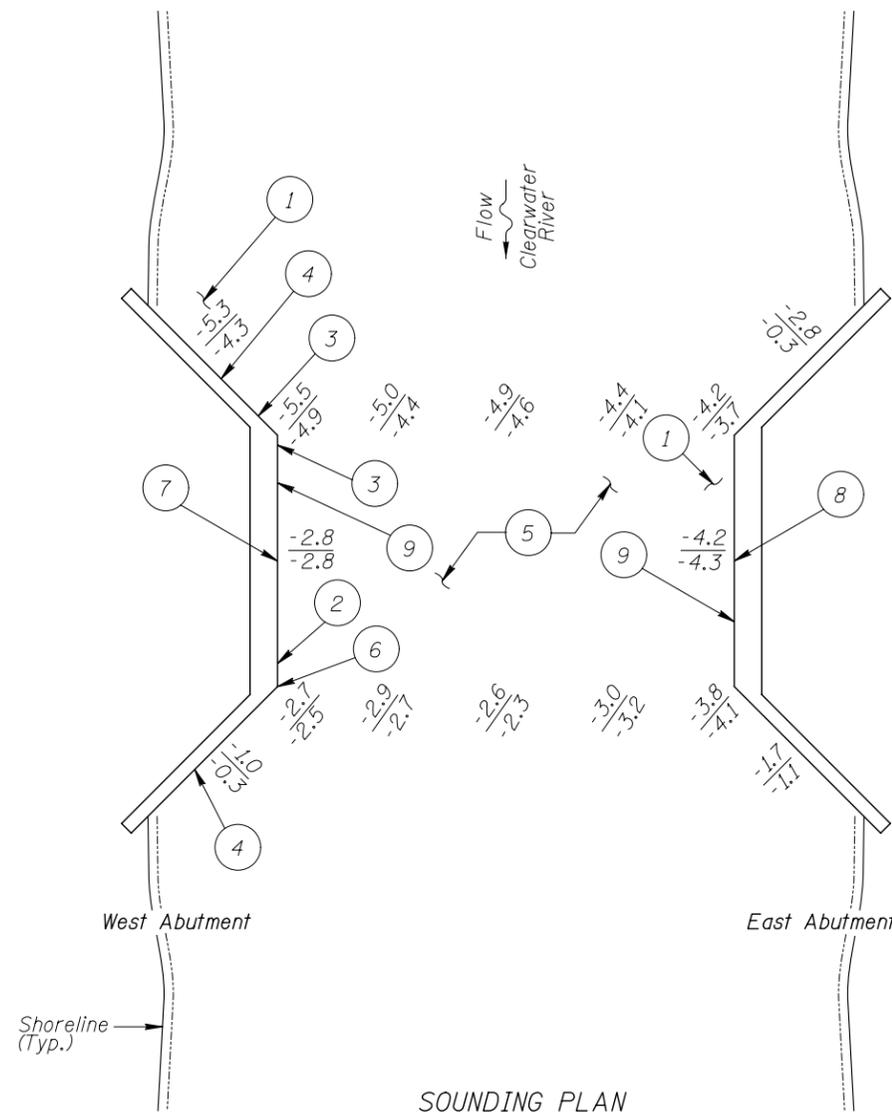
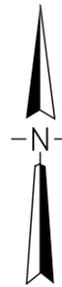
Photograph 1. Overall View of the Structure, Looking Northwest.



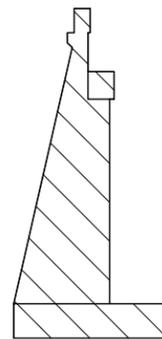
Photograph 2. View of West Abutment, Looking Northwest.



Photograph 3. View of East Abutment, Looking Northeast.



SOUNDING PLAN



SECTION THRU W. ABUTMENT
(E. Abut. Opposite Hand)

GENERAL NOTES:

1. The East and West Abutments were inspected at this bridge.
2. At the time of inspection on August 19, 2007, the waterline was located approximately 10.6 feet below the top of bridge seat at the downstream end of the West Abutment. This corresponds to a waterline elevation of 1097.2 based on previous report dated August 27, 2002.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

1. The channel bottom material along both abutments consisted of silty sand with up to 1 foot of probe rod penetration.
2. 1-foot-diameter void at 0.5 feet below the waterline with 2 inches of maximum penetration was located 2.5 feet north of the downstream end of the West Abutment.
3. 3 feet along the wingwall and 4 feet along the breastwall, spalling and poor consolidation was observed from 1 foot above the waterline to 3 feet below the waterline with 6 inches of maximum penetration and lightly corroded exposed steel reinforcing with no appreciable loss of section at the north end of the West Abutment.
4. Random hairline map cracking was observed on the West Abutment wingwalls from 1 to 4 feet above the waterline.
5. The channel bottom in the center of the river consisted of up to 1-foot-diameter riprap.
6. 6-inch-diameter void and area of poor consolidation located at 1 foot above the waterline with 2 inches of penetration at the downstream end of the West Abutment.
7. Vertical crack starting at the top of the seat extending down to the channel bottom, 1/16 inch wide, was located at the midpoint of the West Abutment.
8. Vertical crack starting at the top of the seat extending down to 1 foot above the waterline, 1/16 inch wide, was located at the midpoint of the east abutment.
9. Overall the concrete was smooth and sound.

Legend

- 2.0 Sounding Depth (8/19/07)
- 5.2 Sounding Depth (8/27/02)

Note:

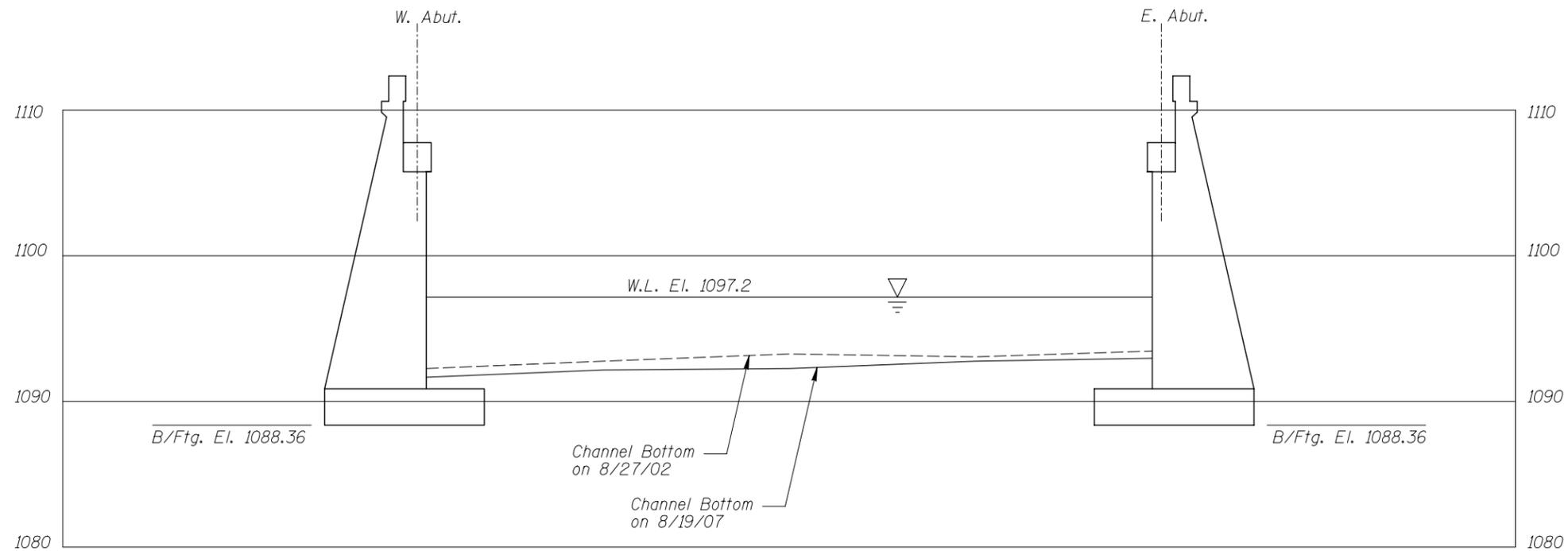
All soundings based on 2007 waterline location.

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

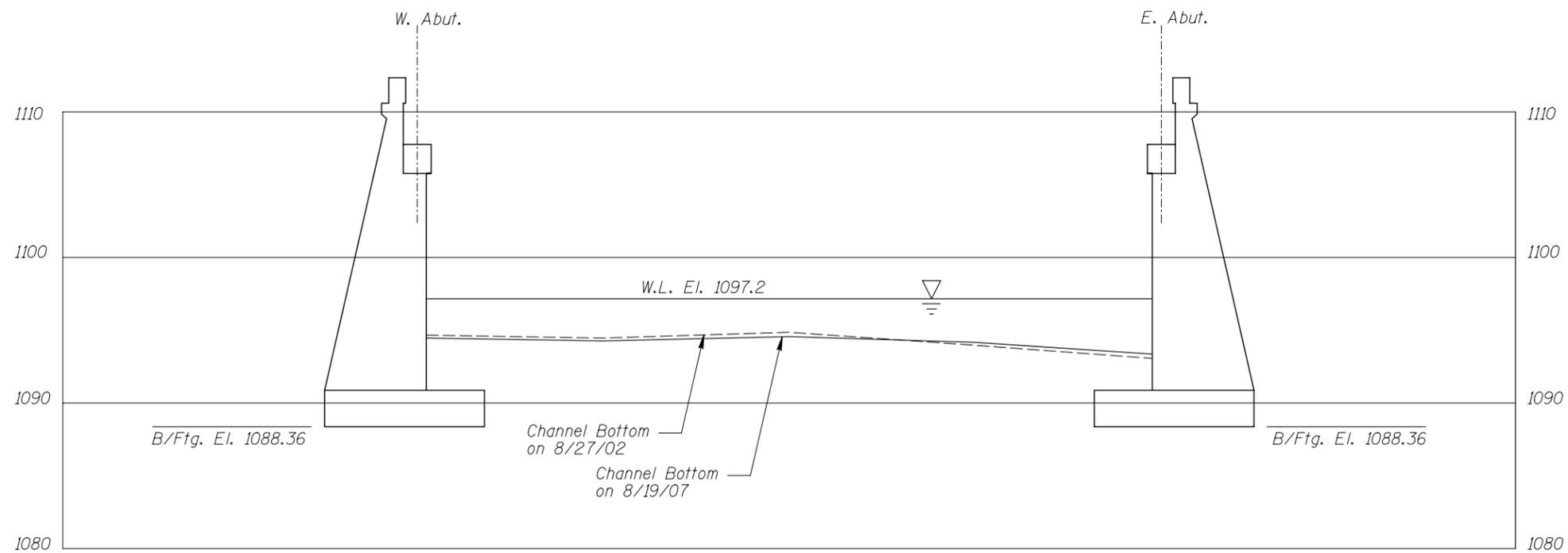
STRUCTURE NO. 5824
OVER CLEARWATER RIVER
DISTRICT 2, RED LAKE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH		123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: AUGUST, 2007
Checked By: MDK		Scale: NTS	
Code: 52210173		Figure No.: 1	



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note:
Refer to Figure 1 for General Notes.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION		
STRUCTURE NO. 5824 OVER CLEARWATER RIVER DISTRICT 2, RED LAKE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: PRH	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: AUGUST, 2007
Checked By: MDK		Scale: 1"=10'
Code: 52210173		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: August 19, 2007

ON-SITE TEAM LEADER: Bradley A. Syler, P.E., S.E.

BRIDGE NO: 5824 WEATHER: Cloudy, 65 °F

WATERWAY CROSSED: Clearwater River

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: John J. Loftus, Valerie Roustan,

EQUIPMENT: Scuba, U/W Light, Scraper, Sounding Pole, Lead Line, Probe Rod, Camera

TIME IN WATER: 8:15 a.m.

TIME OUT OF WATER: 9:00 a.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s.

VISIBILITY 3.0 feet

DEPTH 5.5 feet maximum at the West Abutment

ELEMENTS INSPECTED: East and West Abutments

REMARKS: Overall, the abutments below water were found to be in good to satisfactory condition with no defects of structural significance observed. The West Abutment exhibited three areas of section loss and poor consolidation at or below the waterline. The areas of section loss typically had penetrations ranging between 2 and 6 inches, and the area at the upstream corner of the breastwall now has a small section of exposed and corroded reinforcing steel. Random hairline cracks were observed on both abutments extending from the top of seat to the waterline or channel bottom. The channel bottom has remained stable with no appreciable changes since the previous inspection.

FURTHER ACTION NEEDED: YES NO

*Although the channel bottom appears to have remained stable since the last inspection, according to Item 113, the bridge is rated as scour critical, and therefore, it is recommended that the channel bottom be closely monitored after major flood events and during future biennial and underwater inspections.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 5824
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Bradley A. Syler, P.E., S.E.
 WATERWAY CROSSED Clearwater River

INSPECTION DATE August 19, 2007
 NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	East Abutment	4.2'	N	7	N	9	N	7	7	6	7	N	7	7	N	N	N	N	N
	West Abutment	5.5'	N	6	N	9	N	6	7	6	7	N	7	6	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the abutments below water were found to be in good to satisfactory condition with no defects of structural significance observed. The West Abutment exhibited three areas of section loss and poor consolidation at or below the waterline. The areas of section loss typically had penetrations ranging between 2 and 6 inches, and the area at the upstream corner of the breastwall now has a small section of exposed and corroded reinforcing steel. Random hairline cracks were observed on both abutments extending from the top of seat to the waterline or channel bottom. The channel bottom has remained stable with no appreciable changes since the previous inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.