UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 31509

CSAH NO. 63

OVER THE

MISSISSIPPI RIVER

DISTRICT 1 - ITASCA COUNTY

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 3512 (CEI 28)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 31509, Piers 1 through 5, were found to be in good to satisfactory condition with no defects of structural significance observed. The corrosion on the steel pipe piles has increased since the previous inspection, but still has not compromised the overall structural integrity of the piles. The channel bottom appeared to be stable with no evidence of significant scour or appreciable changes since the previous inspection.

INSPECTION FINDINGS:

(A) Coating failure, corrosion, rust nodules, and up to 1/8 inch deep pitting were observed on approximately 100 percent of the steel pile surfaces from the waterline to the channel bottom.

(B) Heavy plant growth and weed accumulations were observed at the upstream third of all piers extending from the waterline to the channel bottom.

(C) Minor amounts of timber drift were found on the channel bottom around Piers 2, 4, and 5.

RECOMMENDATIONS:

(A) 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 6/30/2004 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: 31509

Feature Crossed: The Mississippi River

Feature Carried: CSAH No. 63

Location: District 1 - Itasca County

Bridge Description: The superstructure consists of six spans of prestressed concrete beams. The superstructure is supported by two abutments founded on piles and five steel shell pile bent piers.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg
State of Minnesota, P.E., No. 21491

Dive Team: Michelle D. Koerbel, Matthew J. Lengyel

Date: August 23, 2002

Weather Conditions: Cloudy, ± 65° F

Underwater Visibility: ± 5 feet

Waterway Velocity: Negligible/None

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: Piers 1 through 5.

General Shape: Piers 1, 2, 4, and 5 are made up of a single line of eight steel shell piles supporting a concrete cap. Pier 3 consists of two lines of five steel shell piles each under the cap.

Maximum Water Depth at Substructure Inspected: Approximately 22.0 feet

4. WATERLINE DATUM

Water Level Reference: The top of the cap at the east end of Pier 2.

Water Surface: The waterline was approximately 10.4 feet below reference. Water Elevation = 1268.1.

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

Item 60: Substructure: Code 6

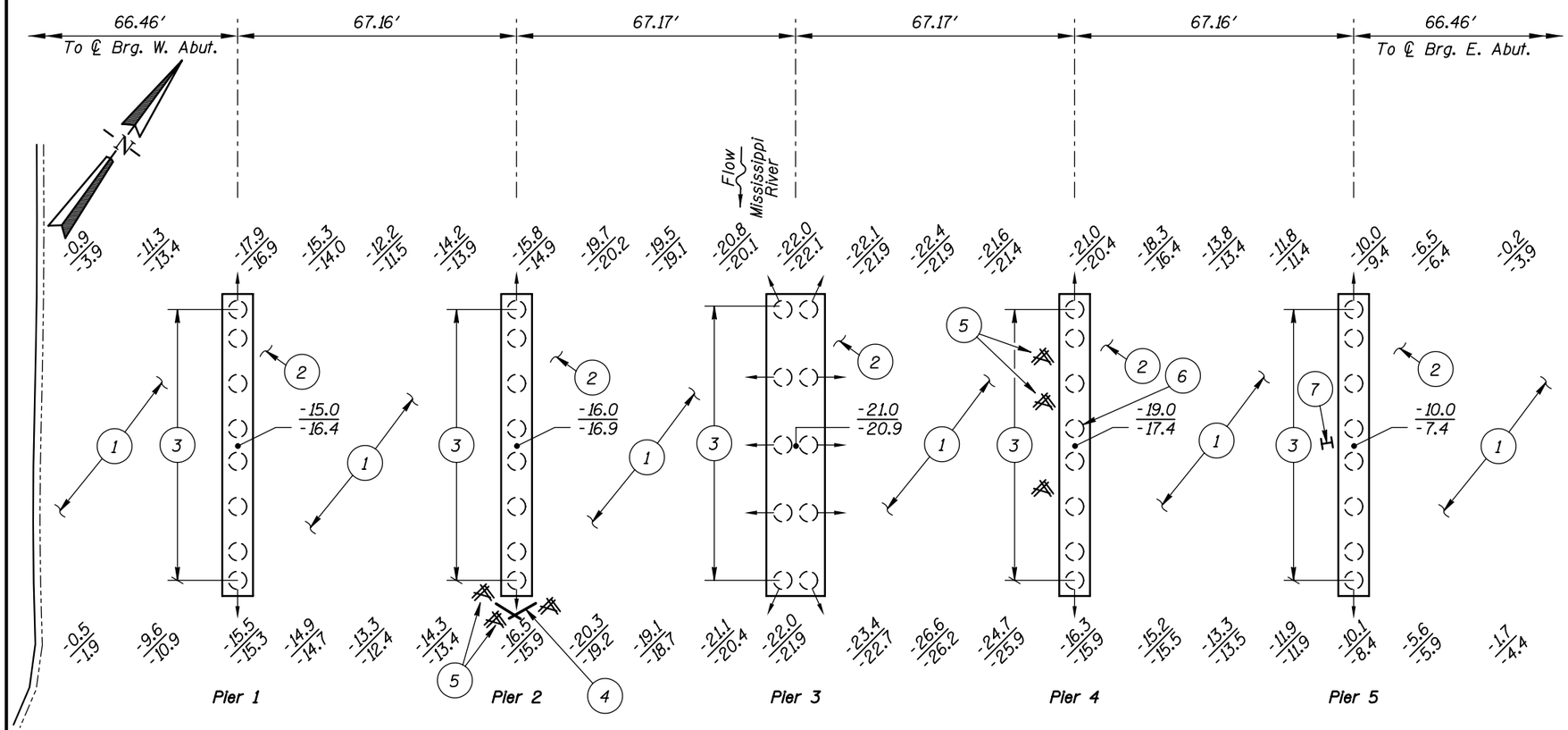
Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/8/02

Item 113: Scour Critical Bridges: Code 0/96

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

_____ Yes _X_ No



SOUNDING PLAN

GENERAL NOTES:

1. Piers 1 through 5 were inspected underwater.
2. At the time of inspection on August 23, 2002, the waterline was located 10.4 feet below the top of cap at the downstream end of Pier 2. This corresponds to a waterline elevation of 1268.1 based on design drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken along the bridge fascias at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

(1) Channel bottom consists of soft silty sand with gravel and cobbles, with up to 6 inches of penetration.

(2) Heavy plant growth and weed accumulation at the upstream third of the piers extending from the waterline to the channel bottom. Random timber debris was also present on the channel bottom between Piers 4 and 5.

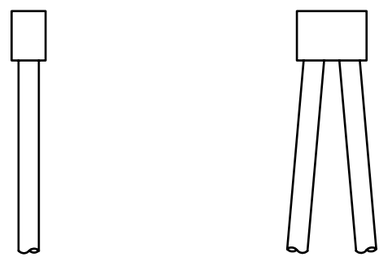
(3) Coating failure, corrosion, and rust nodules, were observed from 6 inches above the waterline to the channel bottom on approximately 80 to 100 percent of the surface area of all piles. Typical penetrations of the rust nodules were 1/32 inch, with infrequent instances of 1/16 inch and 1/8 inch penetration observed on the steel shell piles.

(4) Large steel plate debris.

(5) Timber drift consisting of 1 foot diameter and smaller logs observed at the mudline.

(6) 3/4 inch diameter steel cables were observed to be wrapped around the pile.

(7) A steel H-pile was sticking 8 feet out of the channel bottom and angled toward the downstream.



TYPICAL END VIEW OF PIERS 1,2,4 & 5

TYPICAL END VIEW OF PIER 3

Legend

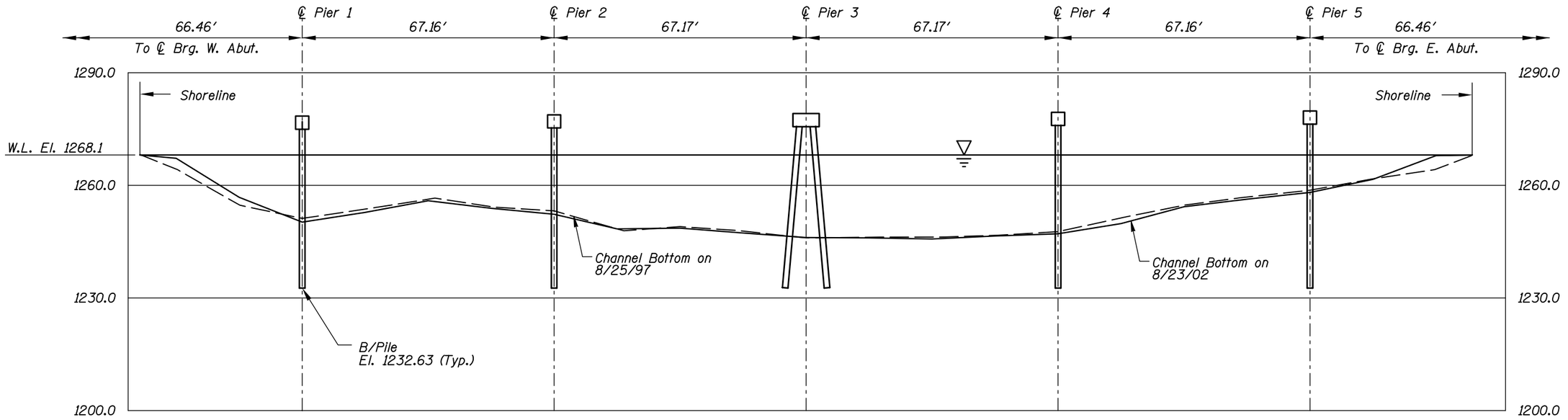
-1.7	Sounding Depth from Waterline (8/23/02)
-4.4	Sounding Depth from Waterline (8/25/97)
	Steel Pile (under cap)
	Steel Batter Pile (cap under)
	Timber Debris

MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

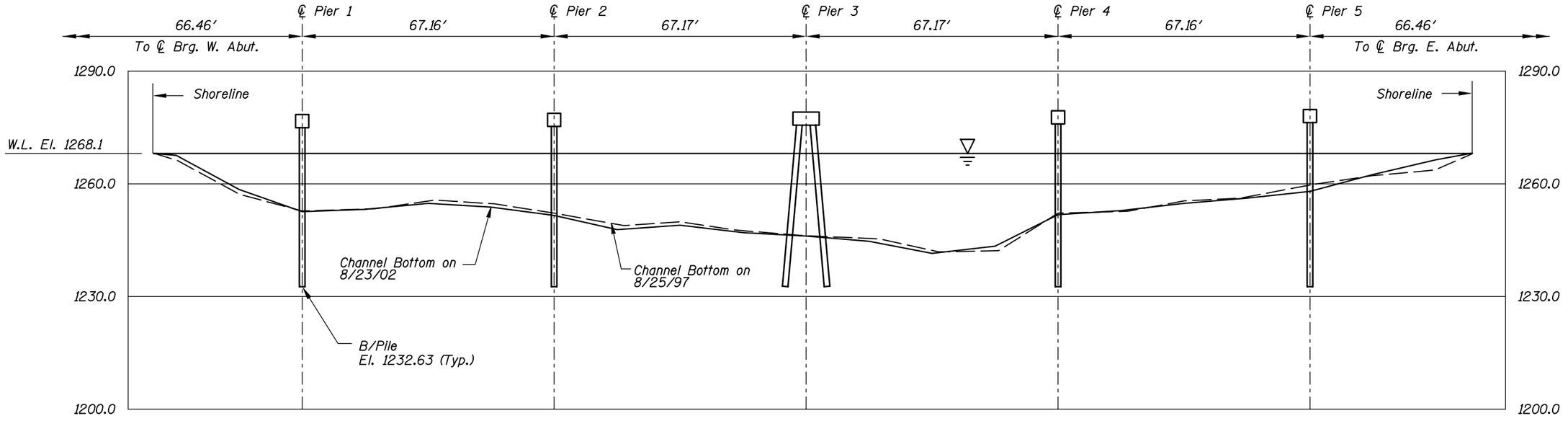
STRUCTURE NO. 31509
OVER THE MISSISSIPPI RIVER
DISTRICT 1, ITASCA COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: PRH	COLLINS ENGINEERS, INC.	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: NTS
Code: 35120028		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. 31509
OVER THE MISSISSIPPI RIVER
DISTRICT 1, ITASCA COUNTY

UPSTREAM AND DOWNSTREAM FASCIA PROFILES

Drawn By: PRH	**COLLINS ENGINEERS, INC.**	Date: AUG. 2002
Checked By: MDK	300 W. WASHINGTON, STE. 600 CHICAGO, ILLINOIS 60606 (312) 704-9300	Scale: 1"=30′
Code: 35120028		Figure No.: 2

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

Photograph 2. View of Pier 1, Looking North.

Photograph 3. View of Piers 2, 3, and 4, Looking North.

Photograph 4. View of Pier 5, Looking West.

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

INSPECTORS: Collins Engineers, Inc. DATE: August 23, 2002

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E.

BRIDGE NO: 31509 WEATHER: Cloudy, $\pm$ 65^{o} F

WATERWAY CROSSED: The Mississippi River

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR

OTHER

PERSONNEL: Michelle D. Koerbel, Matthew J. Lengyel

EQUIPMENT: SCUBA, U/W Light, Scraper, Lead Line, Probe Rod, Camera

TIME IN WATER: 9:30 A.M.

TIME OUT OF WATER: 10:30 P.M.

WATERWAY DATA: VELOCITY Negligible/None

VISIBILITY $\pm$5 feet

DEPTH 22.0 feet maximum at Pier 3

ELEMENTS INSPECTED: Piers 1 through 5

REMARKS: Overall, the submerged steel of the piles where in good to satisfactory condition with 80% to 100% coating failure and nodular corrosion mostly between the waterline and the channel bottom. The corrosion thus far has minimal loss of section associated with it, although there were the early stages of pitting with typical penetrations of 1/32 inch. In a few scattered instances, some of the pitting was 1/16 to 1/8 inch deep. At Piers 2, 4, and 5 there were minor amounts of timber drift and/or steel debris on the channel bottom in and around the piles.

FURTHER ACTION NEEDED: _____ YES ___X___ NO

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. 31509
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E. 21491
WATERWAY CROSSED The Mississippi River

INSPECTION DATE August 23, 2002

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

			SUBSTRUCTURE						CHANNEL					GENERAL					
UNIT REFERENCE NO.		MAXIMUM DEPTH OF WATER	PILING	COLUMNS, SHAFTS, OR FACES*	FOOTINGS	DISPLACEMENT	OTHER (BRACING)	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
	UNIT DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Pier 1	±17.9’	6	N	N	9	N	6	8	N	N	8	8	N	6	N	6	N	N
	Pier 2	±16.5’	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	N	N
	Pier 3	±22.0’	6	N	N	9	N	6	8	N	N	8	8	N	6	N	6	N	N
	Pier 4	±21.0’	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	N	N
	Pier 5	±10.1’	6	N	N	9	N	6	8	N	N	7	7	N	6	N	6	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the submerged steel of the piles where in good to satisfactory condition with 80% to 100% coating failure and nodular corrosion mostly between the waterline and the channel bottom. The corrosion thus far has minimal loss of section associated with it, although there were the early stages of pitting with typical penetrations of 1/32 inch. In a few scattered instances, some of the pitting was 1/16 to 1/8 inch deep. At Piers 2, 4, and 5 there were minor amounts of timber drift and/or steel debris on the channel bottom in and around the piles.

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.