

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 7065

CSAH NO. 18

OVER THE

GARDEN LAKE

LAKE COUNTY



JUNE 19, 2012

PREPARED FOR THE

MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 7423

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 7065, the East and West Abutments and Piers 1 and 2, were found to be generally in good condition. The few concrete defects observed at the substructure, including scaling and section loss, have not progressed noticeably since the last inspection and are not structurally significant at this time. A minor scour depression, 5 feet in radius with a 1 foot depth, was observed at the upstream column of Pier 1. Overall, the channel bottom at the bridge appeared stable with no significant changes since the last inspection.

INSPECTION FINDINGS:

- (A) An area of minor section loss, 12 inches high by 6 inches wide with 2 inches of penetration, was located on the upstream nose of the downstream column of Pier 1 with no exposed reinforcing steel observed.
- (B) The top horizontal strut was observed at approximately 5.5 feet below the waterline. The channel bottom was generally flush with the bottom horizontal strut on both the east and west columns of Pier 1.
- (C) A moderate accumulation of timber debris, consisting of 1 foot diameter logs and smaller drift, was observed on the channel bottom around Pier 1.
- (D) Light scaling was observed on both piers extending from 6 inches above to 3 feet below the waterline and had a maximum penetration of 1/4 inch.
- (E) Moderate scaling was observed at the West and East Abutments extending from the waterline to the channel bottom with a typical penetration of 1/2 inch.
- (F) A minor scour depression, 5 foot in radius by 1 foot deep, was observed at the upstream nose of Pier 1.

- (G) A heavy concentration of up to 4 foot diameter riprap was observed along the east side of the upstream column of Pier 2. On the west side, there was smaller riprap and a slight 1 foot deep scour depression.
- (H) The channel bottom material consisted of sandy gravel typically allowing 2 inches of probe rod penetration with scattered 1 to 3 foot diameter riprap and 6 inch diameter cobbles.

RECOMMENDATIONS:

- (A) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

Inspection Team Leader:
Daniel G. Stromberg, P.E.

Respectfully submitted,

PROFESSIONAL ENGINEER

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 6/30/14 License # 21491

COLLINS ENGINEERS, INC.

Daniel G. Stromberg

Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 7065

Feature Crossed: Garden Lake

Feature Carried: CSAH 18

Location: Lake County

Bridge Description: The superstructure consists of a three span, multiple steel stringer bridge supporting a reinforced concrete deck. The superstructure is supported by two reinforced concrete abutments and two reinforced concrete piers. The pier and abutment footings are founded on steel H-piles. The piers are numbered 1 and 2, starting from the west end of the bridge.

2. INSPECTION DATA

Professional Engineer Diver: Daniel G. Stromberg, P.E.

Dive Team: Clayton Brookins, Breanne Stromberg

Date: June 19, 2012

Weather Conditions: Cloudy, 65° F

Underwater Visibility: 3.0 feet

Waterway Velocity: 2 ft/sec

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: East and West Abutments, Piers 1 and 2

General Shape: The piers consist of two elongated hexagonal shafts / columns supporting a rectangular pier cap. Each pier shaft is supported on a rectangular footing founded on steel H-piles. The pier shafts are connected by a concrete diaphragm located above the footings. The abutments consist of vertical walls with perpendicular wingwalls.

Maximum Water Depth at Substructure Inspected: Approximately 11.3 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pier cap on the south end of Pier 1.

Water Surface: The waterline was approximately 6.5 feet below reference.
Waterline Elevation = 1388.1.

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 8

Item 92B: Underwater Inspection: Code B/06/12

Item 113: Scour Critical Bridges: Code R

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

 Yes X No

6. STRUCTURAL ELEMENT CONDITION RATING

Item #	Element Description	Quantity	Unit	Conditions				
				1	2	3	4	5
205	Reinforced Concrete Column	4	EA		4			
215	Reinforced Concrete Abutment	68	LF		68			



Photograph 1. View of Upstream Fascia, Looking Northeast.



Photograph 2. View of Downstream Fascia, Looking Southwest.



Photograph 3. View of the West Abutment, Looking Northwest.



Photograph 4. View of Pier 1, Looking Northeast.



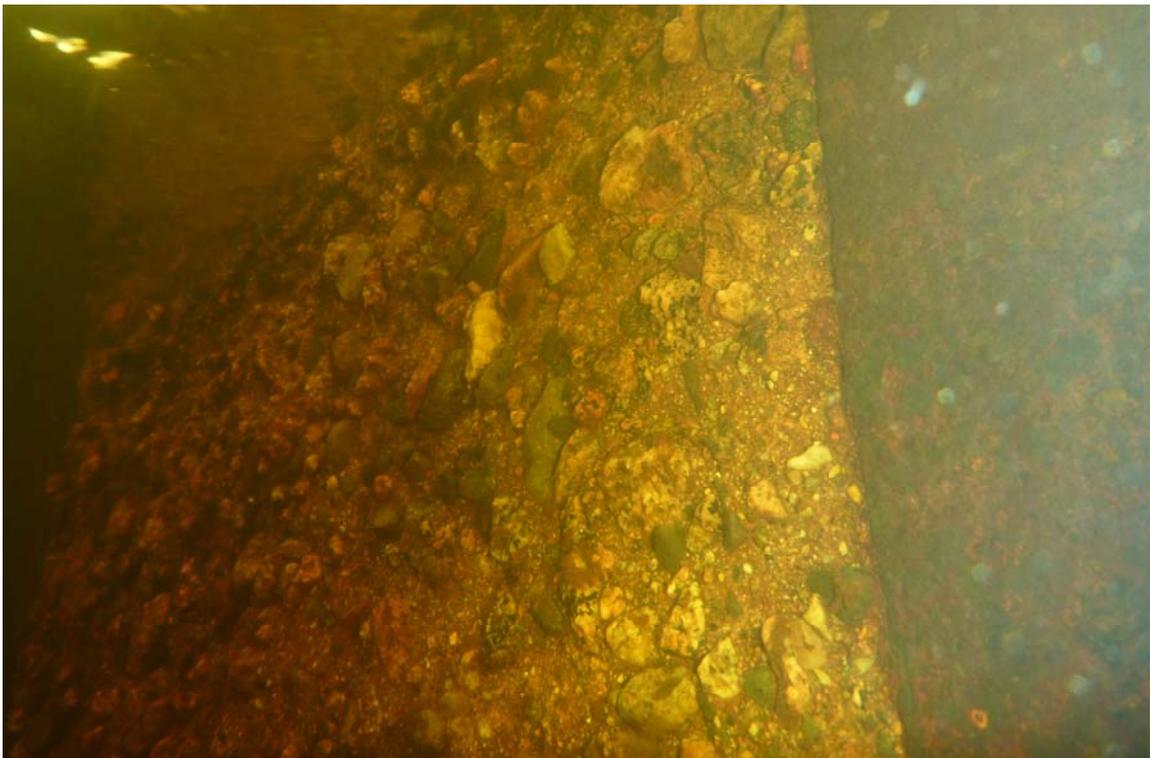
Photograph 5. View of Pier 2, Looking Southwest.



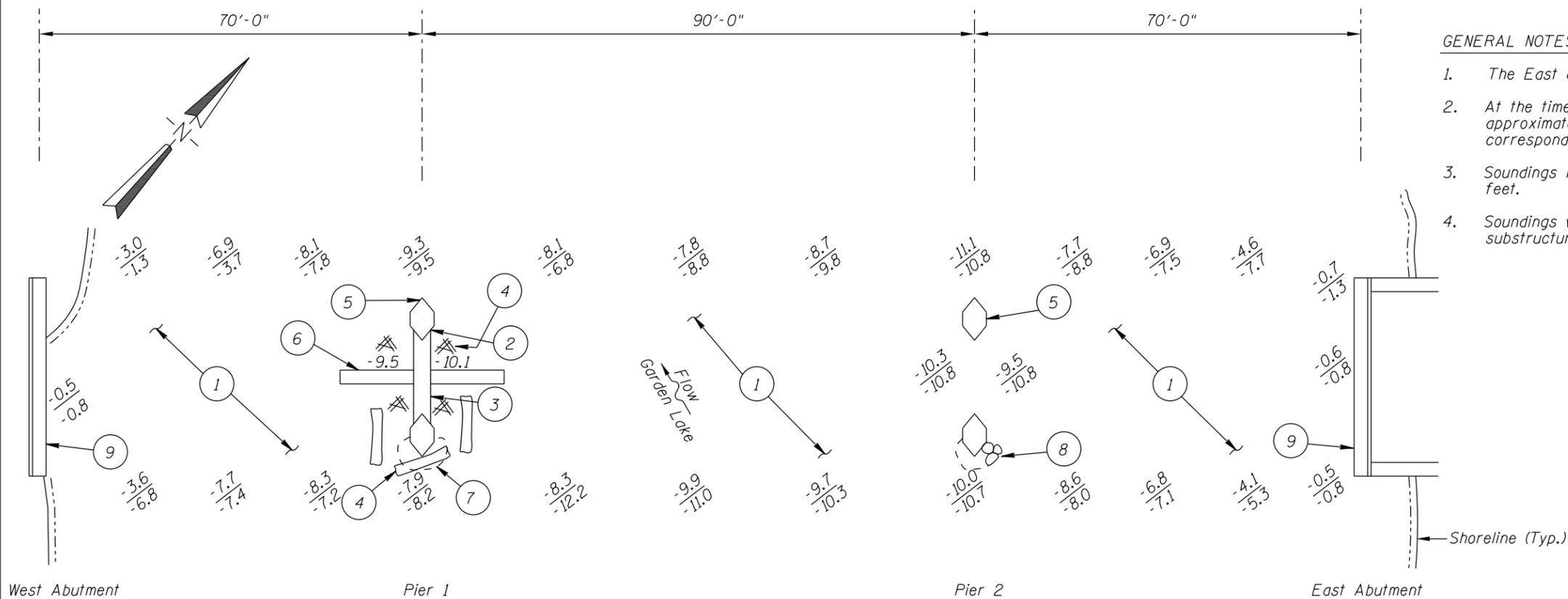
Photograph 6. View of the East Abutment, Looking Southeast.



Photograph 7. View of Typical Scaling near the Waterline at the Upstream Column of Pier 2, Looking North.



Photograph 8. View of Typical Scaling Below Water at the Upstream Column of Pier 2, Looking Northeast.



GENERAL NOTES:

1. The East and West Abutments, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on June 19, 2012, the waterline was located approximately 6.5 feet below the top of the cap at the south end of Pier 1. This corresponds to a waterline elevation of 1388.1 based on design drawings.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

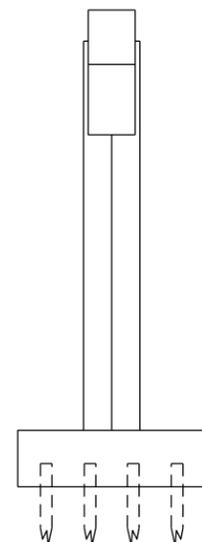
Legend

- 6.5 Sounding Depth (6/19/12)
- 5.5 Sounding Depth (8/25/07)
- Timber Debris
- Scour Depression

SOUNDING PLAN

INSPECTION NOTES:

1. The channel bottom material consisted of sandy gravel allowing 2 inches of probe rod penetration with scattered 1- to 3-foot-diameter riprap and 6-inch-diameter cobbles.
2. Section loss, approximately 12 inches high by 6 inches wide, with 2 inches maximum penetration was observed at the upstream nose of the downstream column of Pier 1. No exposed reinforcing steel was present.
3. The top of a horizontal strut was observed approximately 5.5 feet below the waterline. The channel bottom was generally flush with the bottom of horizontal strut on both the east and west side of the pier.
4. Several scattered 1-foot-diameter logs were observed on the channel bottom around the pier, with one extending across the upstream nose of the pier. Other 6 inch diameter and smaller drift was also scattered around the pier.
5. The concrete surfaces on both piers from 6 inches above to 3 feet below the waterline exhibited up to a 1/4 inch deep scaling with exposed aggregate.
6. At approximately 8 feet below the waterline at the center of the horizontal strut of Pier 1, a steel I-beam was observed extending out 5 feet on each side of the strut.
7. A minor scour depression, 5 feet in radius by 1 foot deep, was observed at the upstream column of Pier 1.
8. Heavy concentration of up to 4 foot diameter riprap was observed at the easterly side of the upstream column of Pier 2. On the westerly side, there was smaller riprap and a slight 1 foot deep scour depression.
9. 1/4" to 1/2" deep scaling was observed at the West and East abutments extending from the waterline to the channel bottom.



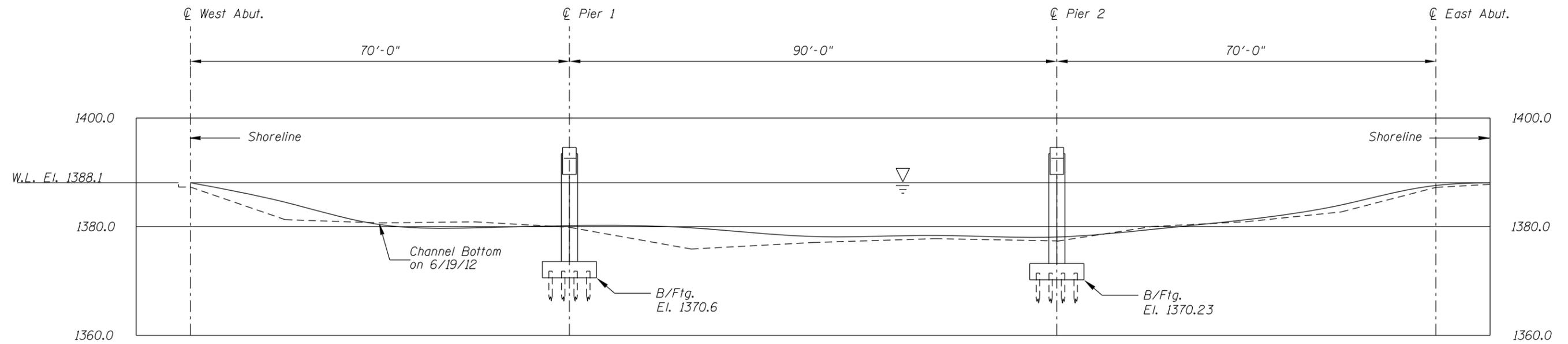
TYPICAL END VIEW OF PIERS

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

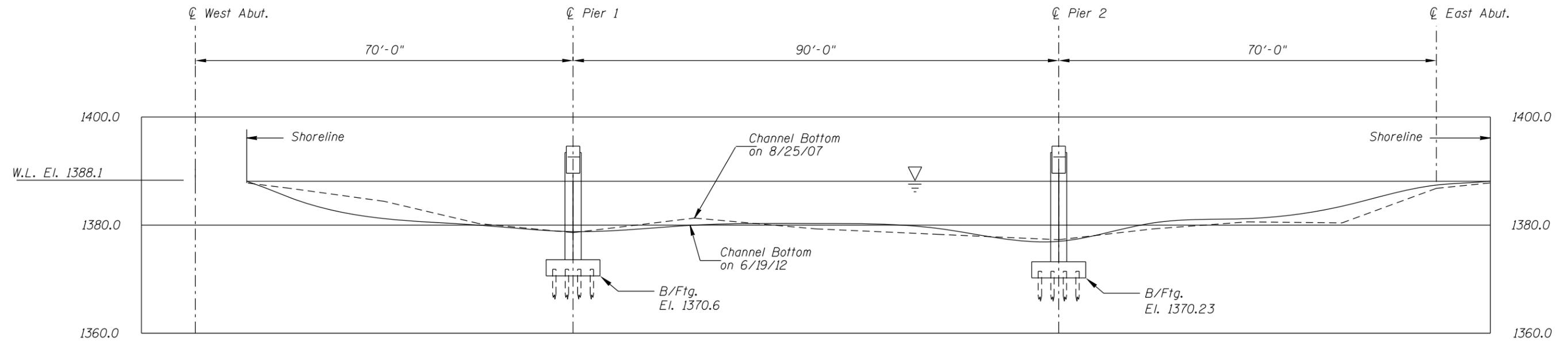
STRUCTURE NO. 7065
OVER GARDEN LAKE
DISTRICT 1, LAKE COUNTY

INSPECTION AND SOUNDING PLAN

Drawn By: BMS	123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: JUNE 2012
Checked By: LJ		Scale: NTS
Code: 74237065		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. 7065 OVER GARDEN LAKE DISTRICT I, LAKE COUNTY		
UPSTREAM AND DOWNSTREAM FASCIA PROFILES		
Drawn By: BMS	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 900 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: JUNE 2012
Checked By: LJ		Scale: 1"=20'
Code: 74237065		Figure No.: 2

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

INSPECTORS: Collins Engineers, Inc. DATE: June 19, 2012

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

BRIDGE NO: 7065 WEATHER: Cloudy, 65° F

WATERWAY CROSSED: Garden Lake

DIVING OPERATION: SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton Brookins, Breanne Stromberg

EQUIPMENT: Commercial Scuba, Scraper, Lead Line, Sounding Pole, Probe Rod,
Camera

TIME IN WATER: 8:15 A.M.

TIME OUT OF WATER: 9:50 A.M.

WATERWAY DATA: VELOCITY 1 ft/sec

VISIBILITY 3.0 feet

DEPTH 11.1 feet maximum at Pier 2

ELEMENTS INSPECTED: East and West Abutments, and Piers 1 and 2

REMARKS: Overall, the East and West Abutments and Piers 1 and 2, were found to be generally in good condition. The concrete defects have not progressed in extent since the previous underwater inspection and do not pose a threat to the structural integrity of the structure. A minor scour depression, 5 feet in radius with a 1 foot depth, was observed at the upstream column of Pier 1. Overall, the channel bottom at the bridge appeared stable and well armored with riprap with no significant changes since the last inspection.

FURTHER ACTION NEEDED: YES NO

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of sixty (60) months.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 7065
 INSPECTORS Collins Engineers, Inc.
 ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
 WATERWAY CROSSED Garden Lake

INSPECTION DATE June 19, 2012

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 (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
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	East Abutment	0.7'	N	7	N	8	N	7	8	9	8	N	8	7	N	N	N	N	N
	Pier 1	10.1'	N	7	N	8	N	7	8	N	N	7	7	7	N	N	N	N	N
	Pier 2	11.1'	N	7	N	8	N	7	8	N	N	N	8	7	N	N	N	N	N
	West Abutment	0.5'	N	7	N	8	N	7	8	9	8	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: Overall, the East and West Abutments and Piers 1 and 2, were found to be generally in good condition. The concrete defects have not progressed in extent since the previous underwater inspection and do not pose a threat to the structural integrity of the structure. A minor scour depression, 5 feet in radius with a 1 foot depth, was observed at the upstream column of Pier 1. Overall, the channel bottom at the bridge appeared stable and well armored with riprap with no significant changes since the last 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.