

**SITE VISIT REPORT  
MCNEARS BEACH FISHING PIER  
INITIAL ABOVE DECK DAMAGE REVIEW  
FOR COUNTY OF MARIN  
VISIT DATE: MARCH 23, 2023**

Prepared by Liftech Consultants Inc.  
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Project No. 2421



FOR LIFTECH CONSULTANTS INC  
SIGNATURE DATE: 3/28/23

*Quality Assurance Review  
for Liftech Consultants Inc.*

<i>Author:</i>	<i>Sugiarto Loni</i>	<i>California Structural Engineer</i>	<i>SL</i>
<i>Editor:</i>	<i>Erik Soderberg</i>	<i>California Structural Engineer</i>	<i>E.S.</i>
	<i>Linda Weber</i>	<i>Technical Support</i>	<i>[Signature]</i>
<i>Principal:</i>	<i>Derrick Lind</i>	<i>California Structural Engineer, S4719</i>	<i>DJL</i>

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**BACKGROUND**

On Tuesday, March 21, 2023, a severe storm with high winds occurred in the Bay Area. An unknown vessel was blown from the north into the McNears Beach Fishing Pier. The vessel collided into the north side of the pier causeway near the intersection with the pier head. See photographs and Figure 1 below.

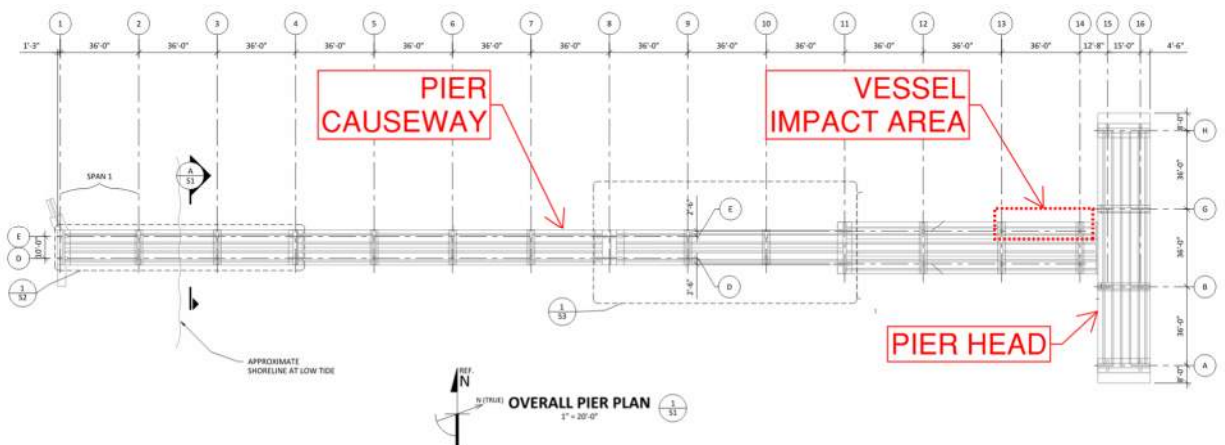


Figure 1: Overall pier plan with terms and impact area

On March 22, the County of Marin contacted Liftech Consultants Inc. (Liftech) requesting a structural engineering evaluation of the pier damage and to prepare cost estimates for the repair.




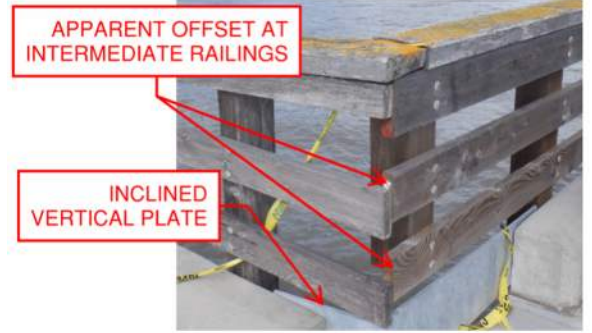
On March 23, Sugi Loni, a Liftech Structural Engineer, visited the site starting around 10:00 am and met with Ari Golan of Marin County Park. The location of the vessel hull is unknown at this time, but some vessel contents were washed toward the beach.

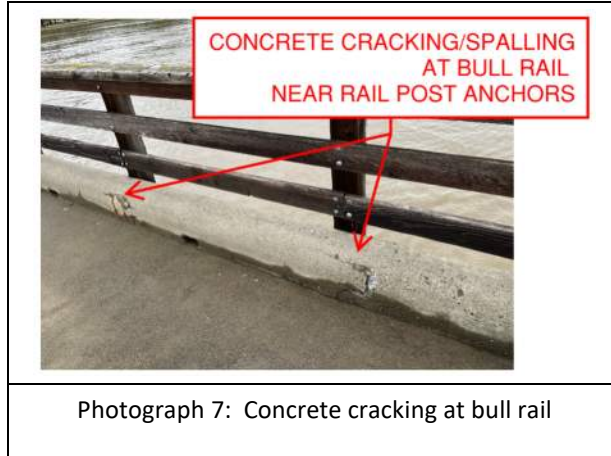
**OBSERVATIONS**

We were able to observe the pier from land and from on top of the pier deck. No observations were made from a boat or underwater.

We observed the following:

1. The pier section where the vessel collided was barricaded at approximately Bent 13 (see photograph 3).
2. A section of the wood railing was broken (see photograph 4).
3. The north side of the expansion joint steel cover plate between the pier causeway and head was bent upward about 3” (see photograph 5).
4. The north end of the pier causeway may be approximately 2–3” lower than the pier head (see photograph 6). This comment is based only on our visual observations. Levelness and elevations were not measured.
5. Minor concrete cracking at the bull rails (see photograph 7) where the railing posts are anchored.

	
<p>Photograph 3: Barricaded area</p>	<p>Photograph 4: Broken wood railing</p>
	
<p>Photograph 5: Plate bent up by 3”</p>	<p>Photograph 6: Apparent offset at north end of causeway</p>



Ari mentioned that the waterline pipe was broken, and the water was shut off. We were not able to locate the water pipe damage from above deck. The pipe break may be below deck.

A below-deck investigation is required to perform a detailed evaluation of the supporting double tee beams, pile cap beams, and the pile connection condition. The condition of the underwater portion of the piles cannot be determined due to access limitations.

The above-deck damage appears localized at the vessel collision area. The broken wood railing presents a safety hazard to the public. Concrete cracking on the bull rail does not affect the structural integrity of the pier structure, and only affects the railing anchorage and railing support strength. The pier causeway is straight and appears reasonably aligned (centered) with the pier head.

Although not confirmed with measurements, the north end of the causeway appears to be lower than the adjacent pier head. This movement is likely the cause of the bent expansion joint cover plate. It is also possible that the cover plate and associated vertical closure plate were bent during a temporary movement of the pier.

We expect the piles at Bent 14 are deformed and may be damaged. Photographs 8 and 9 show that pile-beam connections appear to have some damage.



Photographs 8 and 9: Possible damage at pile-beam connections at Bent 14

The pier head structure does not appear to be damaged. There may be localized damage to railing and the expansion joint.

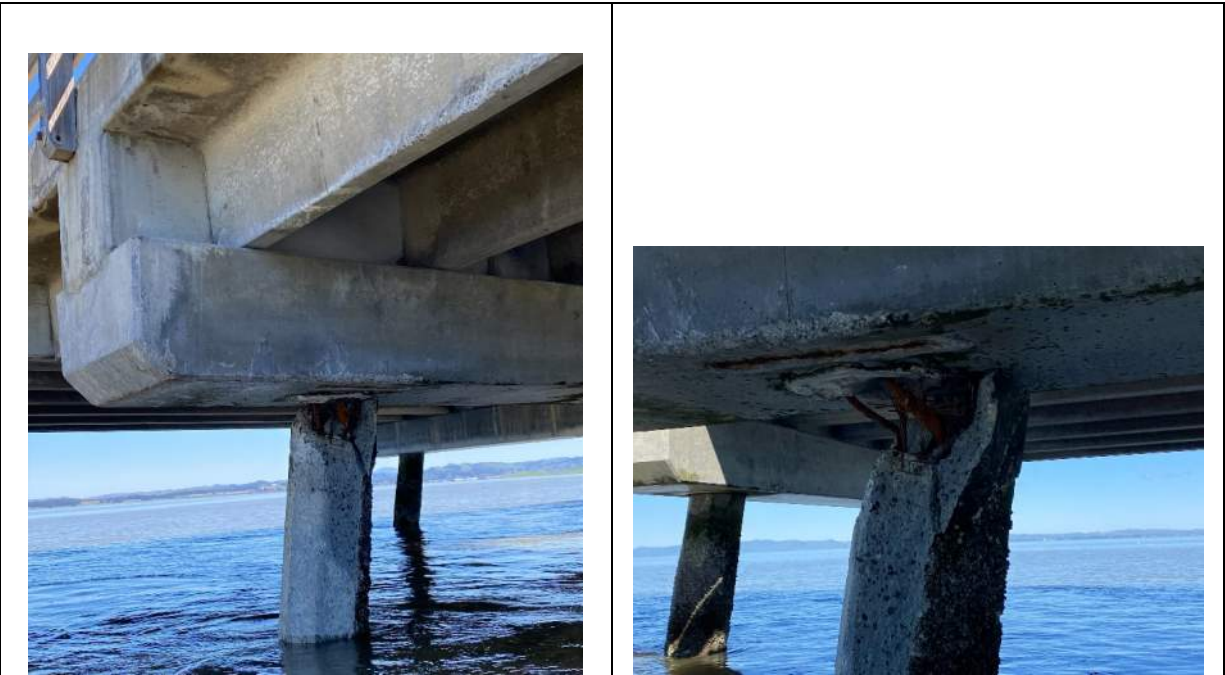


The pier causeway landside of Bent 12 is safe for public use.

### Post-Site Visit Observations

On 03/26, Marin County provided photographs 10 and 11 that show significant damage at the pile-beam connection at Pile F14. These photographs show that the top of the pile has been translated from its original position. The pile cap rests on a small portion of the pile top. It is likely that approximately 2-3" of the top of the pile fell off which allowed the north end of the pile cap to lower.

Translation restraint of the pile top is compromised. If subjected to lateral loads, it is possible that the pile cap could lose support if it slid off the pile top. If pile support is lost, the end of the causeway could collapse. Liftech has not performed calculations to evaluate this condition, but the causeway structure does not have significant torsional strength to support the asymmetric support condition. This condition should be mitigated immediately with temporary shoring to reduce the possibility of partial causeway deck collapse. With temporary shoring in place, further investigation of the piles, design, bidding, and construction of the repairs can be completed safely.



Photographs 10 and 11: Damaged north pile-beam connection at Pile F14

## RECOMMENDATIONS

Based on our initial observation and Photographs 10 & 11, we recommend the following actions to mitigate the risk of causeway collapse, determine the full extent of damage, and restore the pier:

### Urgent Actions

1. Move the public access barricade of the damaged area one bay back to Bent 12.
2. Install temporary railings to replace the broken railings.
3. Install temporary shoring to support the causeway deck near Bent 14.
4. County to obtain emergency permits for temporary shoring installation.

### Post-Shoring Actions

5. Perform a below-deck visual review of the structural condition of the double tee beams, pile cap beams, and pile-beam connections from Bents 12 through 16 as soon as practical.
6. Perform an underwater inspection of piles at Bents 13-14 and intersection of Bents G-15. At a minimum, Piles F13, F14, and G15 shall be inspected. If possible during pile inspection, we recommend determining if there is a sunken vessel at this location.
7. Design and implement repairs to restore the pier structure.

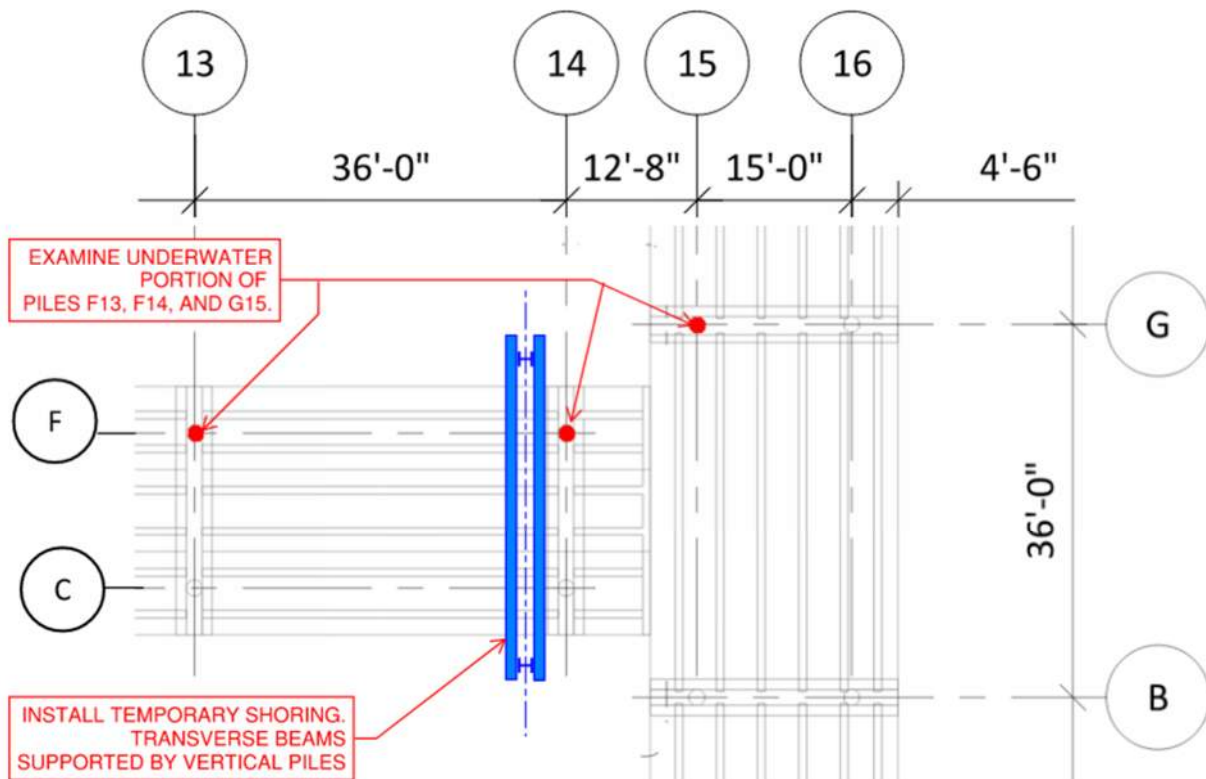


Figure 2: Temporary shoring and underwater pile inspection