

# REPORT SAYS RIVERWALK NOT STABLE\ - IT WILL LIKELY NEED A MINIMUM OF \$2.5M IN REPAIRS, CONSULTANTS SAY

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The Savannah Riverwalk extension, meant to ensure greater public access to downtown's waterway, contains unstable sections of sheet piling and overstressed anchors that could cause structural failures, a consultant's report has found.

Unstable sections are found outside a 448-foot section of riverwalk that was reinforced late last year. Even that reworked section, however, remains at risk because anchors that were put in place to stabilize the bulkhead are under too much stress and may not stay securely in place, consultants say.

Repairs to that section cost about \$3.8 million and were paid by the insurance company for Thomas & Hutton, the engineering firm that designed the riverwalk.

The 41-page assessment, conducted by two outside engineering firms, is scheduled to be presented to Savannah City Council at a workshop today. The Savannah Morning News received a copy of the draft report after submitting a public record request for the report.

The two firms - Geosyntec Consultants's Kennesaw office and Gary Greene Engineers of Raleigh, N.C. - worked together to assess the 2,100-foot-long riverwalk, which runs east along the waterfront from the Savannah Riverfront Marriott along the undeveloped site of Savannah River Landing.

The assessment includes a proposal to retrofit the walkway, which at a minimum, is estimated to cost \$2.5 million. Thomas & Hutton told council last year that if additional structural issues were found, the company would pay for repairs.

The city has spent about \$2.2 million on the riverwalk project.

The consultants did make an effort to qualify their concerns and reported that some of the data they would have liked to review was not available to them.

"... the stability of the anchored bulkheads for the entire project is questioned. This does not imply that the sheet pile walls are in imminent danger of collapse or that there is a concern for the safety of personnel who may have access to the project," the report states. "Rather ... calculation results indicate specific deficiencies."

Thomas & Hutton issued a two-page statement Tuesday saying its staff has not had adequate time to respond to the report. Thomas & Hutton received the assessment Monday, said Sam McCachern, a senior vice president for the firm.

"Safety is a concern - as stated in the report, the wall is not about to collapse," the Thomas & Hutton statement read.

"... Our field monitoring over the last few months has not indicated detectable movement. Our monitoring program has been in place since August 2010. Surveyors for the city have not indicated any movement in their independent studies, which are ongoing since October 2009."

Thomas & Hutton's engineers did not meet with the consultants during their investigation. The firm plans to meet with the city's assessment team and hopes to address questions and

concerns, the statement read.

Some of the scenarios the consultants presented, Thomas & Hutton contends, "are clearly beyond normal design activity" and there are consistencies that need clarification.

## CONSULTANTS HIRED

The analysis reviewed three components of the riverwalk design: Overall stability of the bulkhead, the anchor loads needed to support the bulkhead and the embedded depth of the sheet piles and the stress imposed on them by soils on the land side and changing tides from the Savannah River.

The study looked at the riverwalk in three sections:

- Section 1: From the start of the wall near the Marriott extending to the east to bent 34, which would be about 1,000 feet of the walkway.
- Section 2: From bent 35 to bent 45, a 320-foot section in the middle of the walkway.
- Section 3: The repaired section of the walkway, which extended from bent 46 to 60, about a 448-foot section of the walkway.

The bents are vertical concrete pilings that support the concrete deck of the walkway. The bents are 32 feet apart.

Among the findings:

- From bent 10 through 16 in the first section, there appear to be inadequate embedment of piles.

"Calculation results indicate that this section is marginally stable under the existing conditions," the report stated.

- In Section 2, the lack of sufficient embedding of piles makes the overall stability of the walkway unacceptable, and the effort to reduce water loads against that section likely will not address the issue. The report stated "piles in this section do not appear to be consistently embedded into "a competent bearing of stratum," meaning the piles have not been sunk into a

sufficiently resistant soil.

- In Section 3, the anchors along the repaired section may exceed allowable stress loads for the steel shafts.

The report also notes that the significant number of timber piles removed along section 3 "undoubtedly caused significant softening of the soils immediately adjacent to the piles." That weakened the soil and ultimately, reduced stability.

#### OTHER ISSUES

The assessment team also noted a "bow" in the walkway near the ramp of the floating dock, which also has a corresponding slight misalignment of the railing. The bowing may not be a result of soil instability, but still could require replacing portions of the walkway and "pulling" the existing wall back into alignment.

Geosyntec and Greene also advised the city that one of the difficulties they had was the lack of project documentation during construction of sections one and two and for repairs of section three.

"Appropriate information regarding sheet pile installation and anchor installation were not available to the assessment team," the report states.

They recommend the city retain experienced construction-monitoring personnel for future construction activities to confirm that rehabilitative measures are adequately implemented and documented.

The report also noted that load calculations in the existing design do not reflect additional loads from vehicle traffic, nor does the design consider any buildings located near the bulkhead. Site plans for Savannah River Landing show an East River Street running 15 feet from the bulkhead and a row of buildings near the waterfront.

Those factors also would increase the load against the wall and, the consultants advised, would need to be considered in future analysis and rehabilitation efforts.

#### **AMONG THE FINDINGS:**

- A section near the Marriott hotel is "marginally stable" under existing conditions.
  
- A section in the middle of the walkway does not have sufficiently embedded sheet piles, "making the overall stability of the walkway unacceptable" in that area.
  
- Helical anchors put in place to provide additional stabilization may have too much stress upon them, which could force them to move out of alignment, lessening the stability they would provide along the wall.
  
- A section of the walkway near the ramp to the floating dock has bowed slightly. It may not be related to instability, but could be repaired by "pulling in" on the wall.

Richard Burkhart/Savannah Morning News file photo This section of the riverwalk, shown before repairs late last year, may need additional anchoring to ensure stability, a city consultant's report states.

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