

SITE OBSERVATION REPORT

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| Date of Observation: | February 18, 2025 | Project: | Lake Landis Dam |
| Schnabel Rep: | Corey Schaal, PE, PG | Project Number: | 23210051.000 Task Number(s): 03 |
| Schnabel PM: | Jonathan Pittman, PE | Building Permit No. | N/A |
| Arrival Time: | 9:00 AM | Departure Time: | 11:05 AM |
| Contractor: | Alliance Integrated Solutions, LLC | Superintendent: | Jason Smith, Town of Landis Fire Chief |
| Air Temp ° F: | 40° | Weather: | Mostly Sunny |

PURPOSE OF VISIT

SCHNABEL ENGINEERING SOUTH, P.C. representative above arrived on site, as requested by Mr. Michael Ambrose, Town Manager, via email on February 11, 2025, to observe the north embankment at Lake Landis Dam. The Town of Landis' contractor (Alliance Integrated Solutions, LLC) recently cut the trees on the embankment. Observations during this site visit were limited to the north embankment; we did not perform a full dam safety inspection. Schnabel's past work for Lake Landis Dam includes preparation of a Corrective Action Plan dated May 28, 2024.

PERSONS ON-SITE

Town of Landis: Jason Smith, Fire Chief; Blake Abernathy, Public Works Director; Jessica St. Martin, Parks & Recreation Director

DESCRIPTION OF OBSERVATIONS

The Lake Landis water level was drawn down about 8 to 10 feet below the normal elevation using two 6-inch diameter PVC siphons. According to Mr. Smith, the siphons lowered the lake level to the observed elevation in about one week. The siphons were discharging water at the time of our site visit, and the invert elevation was less than 1 foot below the water surface.

Trees were recently cleared from the north embankment. Stumps were not removed. Observed stump diameters were as large as approximately 12 to 18 inches. We understand that the Town does not intend to remove the root balls. Seed and straw were recently placed on the crest and outboard slope. We also observed significant outboard toe undermining and sloughing, likely resulting from flows in the stream along the toe of the embankment. In general, the outboard slope appeared to be steeper than 2H:1V, and multiple near-vertical scarps were observed near the upstream end of the lake. We were not able to evaluate whether tension cracks were present along the crest as these areas were covered with straw. The embankment crest and both slopes were saturated with standing water and soft surficial soils from recent rain. Construction equipment ruts were observed on the crest.

Town of Landis, North Carolina
Landis Lake Dam (ROWAN-025)

PHOTOGRAPHS

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| <p>Current Lake Landis water level. View from right abutment.</p> | <p>North embankment. View from east end of embankment. Note straw on crest and slope, as well as stump on outboard slope.</p> |
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| <p>North embankment. View looking upstream along outboard slope. Note seed and straw on slope.</p> | <p>North embankment. View looking upstream along outboard slope. Note scarps.</p> |
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| <p>North embankment. View looking upstream along crest. Note standing water and ruts.</p> | <p>North embankment crest. View looking downstream. Note near-vertical scarp and undermining of crest.</p> |
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RECOMMENDATIONS

Clear cutting of the trees from the north embankment slope is a positive step and will prevent further damage to the embankment due to fallen trees. However, given the observations noted above and the constant stream flow along the toe of the embankment, our previous concerns with the long-term stability of the north embankment, as outlined in the Corrective Action Plan, remain. As such, we recommend the Town continue to consider options to rehabilitate the embankment. The following is a list of recommended risk reduction measures to be implemented until a rehabilitation can be completed:

1. Maintain lake level down at about siphon invert elevation.
2. Develop a plan to deploy additional pumps to maintain the lowered lake level during large rain events that could significantly raise the lake level.
3. It is our opinion that the root balls are serving to increase embankment slope stability and recommend against their removal at this time. Paint stumps with tar, polyurethane, or similar, to the extent practical, to slow decay process.
4. Prevent vehicular and foot traffic on the embankment crest for safety reasons. No trespassing signs, barriers, and public notices are warranted.
5. Establish a healthy stand of grass cover to mitigate the development of erosion features.
6. Town staff should perform weekly walkovers of the embankment and note any changes in conditions, such as new erosion rills, additional slumping, and tension cracks. Staff should not walk along the outboard edge of the embankment crest due to stability concerns.
7. Additional slumping due to stream flow along the outboard toe should be expected. We note that, given the current spillway configuration at Lake Corriher Dam upstream, it is not feasible to redirect flow into Lake Landis and out of the stream channel.

We have endeavored to prepare this report in accordance with generally accepted engineering practice and make no warranties, either express or implied, as to the professional advice provided under the terms of our agreement and included herein.

We appreciate the opportunity to be of service for this project. Please do not hesitate to contact either of the undersigned if clarification is needed for any aspect of this report.

**Town of Landis, North Carolina
Landis Lake Dam (ROWAN-025)**

Sincerely,

SCHNABEL ENGINEERING SOUTH, P.C.



**Corey
Schaal**

Digitally signed
by Corey Schaal
Date: 2025.02.19
08:30:54 -05'00'

Corey Schaal, PE, PG
Senior Engineer

A handwritten signature in blue ink, appearing to read "JP", with a long horizontal flourish extending to the right.

Jonathan Pittman, PE
Principal

CDS:JMP

Distribution:

Town of Landis, North Carolina

Attn: Michael Ambrose, Town Manager; Jason Smith, Fire Chief; Blake Abernathy, Public Works
Director; Jessica St. Martin, Parks & Recreation Director