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Date: 14 / 03 / 25
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Audit and Risk Committee
paper for Discussion

Sydney WATER

Agenda item 5.9: Thornleigh Reservoir Dam Safety Assessment

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Key points

- Consequence level - all Sydney Water dams are classified as Extreme consequence under our risk matrix (linked to multiple loss of life). Additionally, Thornleigh reservoir is rated as an Extreme level consequence dam under the Dam Safety Act.
- Quantitative risk assessments – Three independent assessments have been undertaken which places the dam above the safety threshold as defined by the Dam Safety Act.
- Failure scenarios - the assessments have identified two credible scenarios including instability on the southern embankment and internal erosion impacting the eastern embankment.
    - Highest risk - Sudden failure of the reservoir embankment resulting in 406ML being released over 4-5min causing probable loss of life of up to 147 people.
    - Secondary risk – Loss of Thornleigh reservoir reduces the ability of Sydney Water to meet Operating Licence service requirements to 834,000 people plus contingency for an over an additional 1,000,000 people.
- Key actions – immediate actions to reduce the consequence, short term to reduce uncertainty in the likelihood of failure & long term to improve system resilience.

Discussion

GHD were engaged by Sydney Water to conduct an Individual & Societal Risk Assessment for Thornleigh Reservoir in accordance the NSW Dams Safety Regulation (2019). GHD noted that there is limited information relating to the geotechnical properties of the reservoir foundation and embankment material, reservoir components as constructed and current condition of the bituminous lining. The annual probabilities of the failure modes were therefore assigned based on engineering judgement. Sydney Water is acting on the outcomes of the assessment and undertaking further geotechnical studies to reduce the level of uncertainty and inform the likelihood of failure.

The Risk Assessment determined that the reservoir was outside the safety threshold, with embankment instability contributing to 98% of the risk. The southern embankment displays evidence of slope