

2 Overview: Requirements of the legislation

2.1 What is a dam failure?

A dam is considered to have failed when:

- a part or all of the dam physically collapses. For example:
 - when the earth wall slumps
 - when part of the wall erodes when overtopped
 - when foundation weakness removes a section of a concrete dam wall or
- there is an uncontrolled release of any of the contents from the dam. For example:
 - when a gate or valve fails
 - when an outlet pipe breaks.

2.2 What is a dam failure impact assessment?

A dam failure impact assessment is the process used under the *Water Act 2000* to determine the number of people whose safety could be at risk should a dam fail (the “population at risk”). The results of the assessment are used to determine:

- whether a dam is referable and
- the failure impact rating of a dam.

2.3 What is a failure impact rating?

A failure impact rating is a measure of the population at risk should a dam fail. There are two categories:

- **Category 1 - Between 2 - 100 people** at risk by the dam failing.
All category 1 dams are **referable dams** under the *Water Act 2000*.
- **Category 2 - More than 100 people** at risk by the dam failing.
All category 2 dams are **referable dams** under the *Water Act 2000*.

If less than 2 people are at risk by the dam failing then the dam is not given a failure impact rating and is **not referable** under the *Water Act 2000*.

The chief executive imposes dam safety conditions on referable dams based partly on the failure impact rating. Dam safety conditions can be imposed either when a development permit relating to a referable dam is granted or, after the dam has been built (as safety conditions under the *Water Act 2000*, which are taken to form part of a development permit for the dam).

2.4 Who certifies a dam failure impact assessment as complete and accurate?

A written dam failure impact assessment must be certified by a registered professional engineer, which is a person, company or unit registered under the *Professional Engineers Act 1988 (Qld)*. He or she is responsible for certifying, as specified in these guidelines, the:

- accuracy and content of a dam failure impact assessment.
- adequacy and accuracy of the modelling used to calculate the population at risk.
- accuracy of the assessed population at risk and other matters.

An assessment cannot be certified by an engineer who is:

- the owner of the dam being assessed or
- an employee of the owner of the dam or
- the operator of the dam or
- an employee of the operator of the dam.

2.5 How do you do a dam failure impact assessment?

An assessment can be done using one of the following methods:

2.5.1 Two-dimensional flow analysis

This form of assessment is used if the population at risk is situated close to a possible dam breach(es) location(s) and there is a risk that the population will be inundated by water from the dam before it concentrates in downstream channels. This method is likely to be used for ring tanks.

2.5.2 Simplified Assessment

This might typically be used when the flow of water proceeds down well-defined channels and when there is little doubt regarding the level of population at risk. For example, it may be used when:

- the dam is large and located upstream from a major urban population and where it is clear that more than 100 people would suffer the impact of dam failure (ie the dam would have a category 2 failure impact rating) or
- the dam is small and there are no people at risk should the dam fail (ie the dam would not be a referable dam).

2.5.3 Comprehensive Assessment

This may be used when the flow of water proceeds down well-defined channels and when there is some uncertainty in estimates of the population at risk.

This is a detailed assessment and must include a dam break analysis for a range of dam failure scenarios such as overtopping, sabotage, seeping and piping failure.

A dam owner may choose to commission a comprehensive assessment even though a simplified assessment should be acceptable under these guidelines. However, the owner must undertake a comprehensive assessment if the registered professional engineer is:

- uncertain that the dam will have a category 1 or 2 failure impact rating and the owner wishes to justify the lower category 1 failure impact rating or
- uncertain that the dam will have a category 1 failure impact rating, or have no failure impact rating (ie it is not a referable dam), and the owner wishes to justify the dam not being referable.

2.6 Do I need to undertake an initial dam failure impact assessment to obtain a failure impact rating?

See Chart 1 (page 10).

Yes, if you are the owner of a dam which is not deemed to have a failure impact rating under a regulation, and the dam:

- exceeds, or will after its construction, exceed the height and storage criteria specified in the *Water Act 2000* (refer to 2.7) or
- is under notice from the chief executive to undertake a dam failure impact assessment (s.483(2) of the *Water Act 2000*). Notices will only be issued if the chief executive reasonably believes the dam will be given a category 1 or category 2 failure impact rating.

You do not have to undertake an initial dam failure impact assessment if your dam has been deemed to have a failure impact rating under a regulation.

2.7 Does my dam exceed the height and storage criteria specified in the Water Act 2000?

Yes, if your dam is, or after construction will be:

- more than 8 metres in height with a storage capacity of more than 500 megalitres or
- more than 8 metres in height with a storage capacity of more than 250 megalitres and a catchment area more than three times the maximum surface area of the dam at full supply level.

2.8 Do all dams that exceed the height and storage criteria specified in the Water Act 2000 require an initial dam failure impact assessment?

See Chart 1 (page 10).

Yes, unless it is:

- a dam which contains hazardous waste or
- a proposed dam which will contain hazardous waste or
- a weir that does not have a variable flow control structure on its crest or
- a dam that has been deemed to have a failure impact rating under a regulation.

2.9 Do I need to undertake a dam failure impact assessment if I want to increase the storage capacity of my dam?

Yes, if either:

- you are the owner of an existing referable dam and
- you want to carry out operational work that will increase the storage capacity of that dam by more than 10% and
- your existing development permit for the dam does not authorise the carrying out of those works.

OR if:

- the dam did not previously exceed the height and storage criteria specified in the *Water Act 2000* (refer section 2.7) and the increase in dam size means that the dam will exceed the criteria.

2.10 What if I receive a notice from the chief executive to undertake a dam failure impact assessment?

You must comply with the notice.

The chief executive can issue a notice requiring the owner of an existing dam, or a dam being constructed, to undertake a dam failure impact assessment (s.483(2)). Notices will only be issued if the chief executive reasonably believes the dam will be given a category 1 or category 2 failure impact rating. Notices can be issued for dams that do not meet the height and storage criteria specified in the *Water Act 2000* (refer section 2.7). Notices can be issued for dams that have previously been failure impact assessed.

2.11 Who pays for dam failure impact assessments?

See also Responsibilities 3.1

- The chief executive will pay reasonable costs if a dam failure impact assessment was required because of a s.483(2) notice given by the chief executive, the assessment is accepted by the chief executive and in that assessment the dam is not given a failure impact rating (ie it is not a referable dam). Under such circumstances, the chief executive will pay the reasonable costs of:
 - preparing the assessment
 - certifying the assessment
 - any review of the assessment that occurs under the *Water Act 2000* (s. 489).
- In all other cases, the owner of the dam must pay the costs.

2.12 Who submits the dam failure impact assessment?

- The owner of the dam.

The owner must submit a written dam failure impact assessment certified by a registered professional engineer. The dam failure impact assessment must be carried out in accordance with these guidelines and clearly detail how the assessment was undertaken and justify the conclusion.

2.13 To whom does the owner submit the dam failure impact assessment?

See Charts 1 (page 10) and 2 (page 11)

- The chief executive.

2.14 When do I need to submit my initial dam failure impact assessment for my existing dam if my dam exceeds the specified height and storage criteria?

Unless the chief executive gives you a notice to have a dam failure impact assessment carried out earlier (under s.483(2)), the initial dam failure impact assessment must be done :

If your dam was not licenced under the *Water Resources Act 1989*:

- within 1 year after the commencement of the dam safety provisions of the *Water Act 2000*.

If your dam was licenced under the *Water Resources Act 1989*:

- within 5 years after the commencement of the dam safety provisions of the *Water Act 2000*.

You do not have to undertake an initial dam failure impact assessment if your dam exceeds the height and storage criteria specified in the *Water Act 2000* and your dam has been deemed to have a failure impact rating under a regulation.

2.15 When must I submit my dam failure impact assessment if I plan to construct a new dam that exceeds the height and storage criteria specified in the *Water Act 2000*?

See Chart 1 (page 10) and Responsibilities 3.4.

2.16 When must I submit my dam failure impact assessment if I plan to carry out works that will increase the storage capacity of my referable dam by more than 10%?

- You must ensure the dam failure impact assessment is completed, and accepted by the chief executive, before work begins.
- You must also obtain a development permit approving the works before starting work, and supply evidence of the accepted dam failure impact assessment with the application for the development permit.
- In some cases, the *Water Act 2000* will also require the chief executive to give written consent (as the water manager under the *Water Act 2000*) to the development application being made. Consent will be required in cases where a water entitlement is required to operate the dam. The entitlement could be a water allocation, an interim water allocation or a water licence.

2.17 How often do I need to undertake a dam failure impact assessment once I have my initial failure impact rating?

See Chart 1 (page 10).

Every 5 years if your dam:

- has a category 1 failure impact rating or
- is not given a failure impact rating in a dam failure impact assessment accepted by the chief executive, but your dam exceeds the specified height and storage criteria outlined in the *Water Act 2000* (refer to 2.7).

Each five-year period runs from the date the last assessment was accepted by the chief executive.

For dams deemed to have a failure impact rating under a regulation, the first five year period will start on the date of commencement of the dam safety provisions of the *Water Act 2000*.

A further dam failure impact assessment will also be required if your dam is a referable dam and you want to carry out operational work that will increase the storage capacity of the dam by more than 10% and the existing development permit for the dam does not authorise the carrying out of those works. This further assessment is required because of the application for the development permit for the works (ie permission to carry out the works) must be supported by evidence the chief executive has accepted a dam failure impact assessment for the dam.

A further dam failure impact assessment will also be required if you are given a notice to have your dam failure impact assessed by the chief executive (s.483(2)).

Five yearly dam failure impact assessments are not required if:

- your dam has a category 2 failure impact rating as it is considered unlikely that such a dam would be given a lower rating if reassessed
- the chief executive issued you with a notice under s.483(2) to have your dam failure impact assessed, the dam failure impact assessment is accepted by the chief executive, the dam is assessed as not having a category 1 or category 2 failure impact rating (ie it is not a referable dam), and the dam does not meet the specified height and storage criteria outlined in the *Water Act 2000*.

2.18 When must I submit my failure impact assessment if I receive a notice from the chief executive requiring me to undertake a dam failure impact assessment?

The notice you receive will state the date when the dam failure impact assessment must be submitted.

2.19 What details must be included in the written dam failure impact assessment?

See Section 5 on page 35 for a complete list.

However in general the assessment must include:

- general information (eg name of owner, operator, address, geographical location etc)
- catchment area details
- dam description
- data and analysis
- results of failure impact assessment (include detailed discussion)
- registered professional engineer's written certification

2.20 What happens to my dam failure impact assessment once it is submitted?

See Chart 2 (page 11) and Responsibilities 3.3

The chief executive (NR&M) can:

- accept a dam failure impact assessment or
- reject a dam failure impact assessment or
- require a review of a dam failure impact assessment.

A dam failure impact assessment may be rejected or a review of it may be required if it is:

- not completed in accordance with these guidelines
- incomplete in a material particular (eg the assessment is not certified by a registered professional engineer)
- incorrect in a material particular (eg the assessment did not take into account downstream residential development).

The owner of the dam will be given written notice of the chief executive's decision.

Before requiring a review of, or rejecting an assessment, the chief executive can request additional information about the assessment.

If a dam failure impact assessment is not initially accepted and is then reviewed, corrected or completed, it will need to be recertified and resubmitted.

Details of the process for accepting, rejecting or reviewing a dam failure impact assessment are presented in Chart 2 on page 11 (including the appeals process against the chief executive's decision).

2.21 What happens if I don't do a dam failure impact assessment as required?

See Responsibilities 3.1 & 3.2

A dam owner may be prosecuted for failing to comply with the *Water Act 2000* if he or she fails to carry out and submit a dam failure impact assessment as required. Penalties may also apply if a person gives information which is false or misleading to the registered professional engineer certifying the dam failure impact assessment or if the registered professional engineer certifies a dam failure impact assessment the engineer knows is false or misleading.

2.22 What happens to my waterworks licence issued under the Water Resources Act 1989?

For dams which are no longer referable:

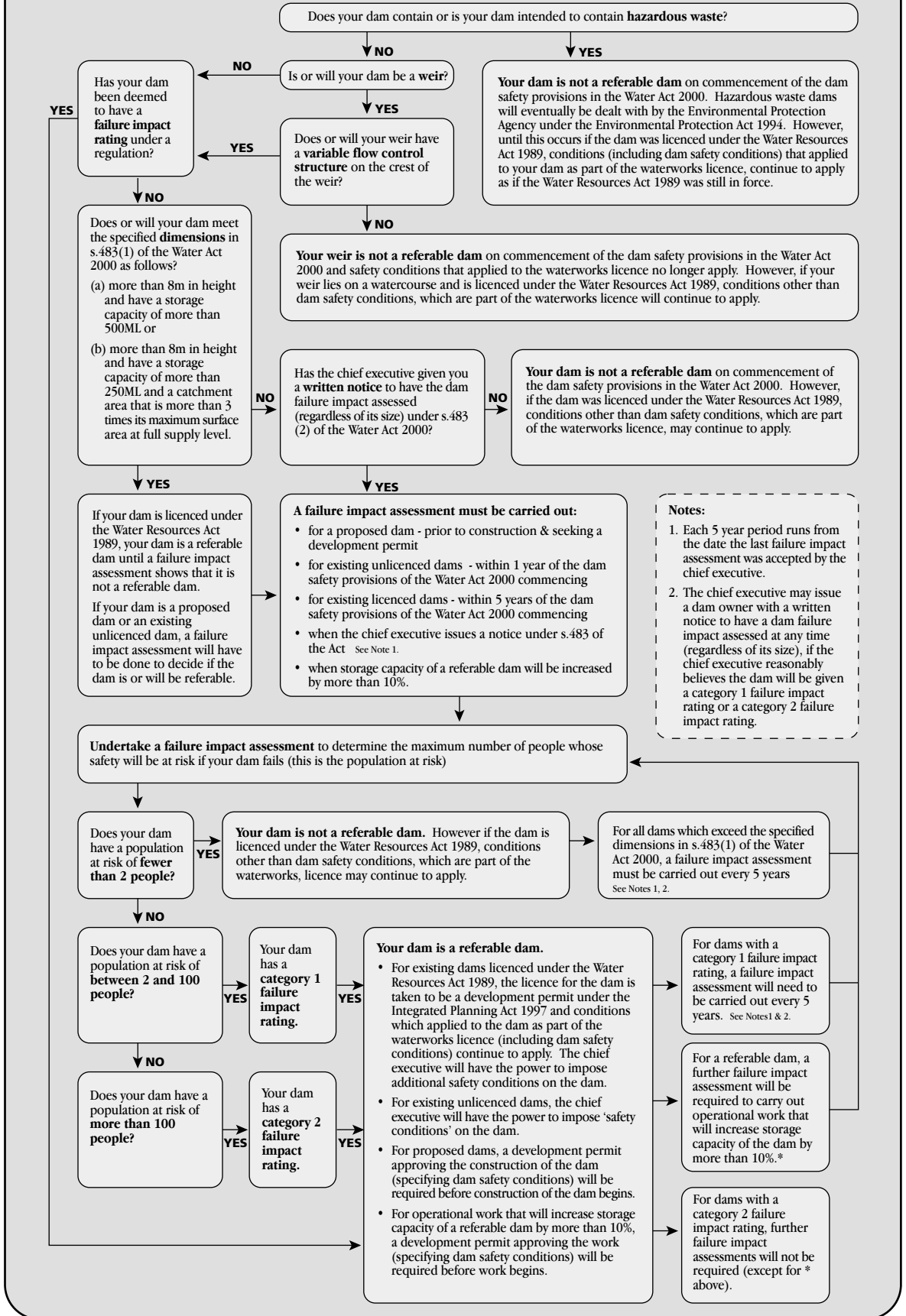
Owners may find that their dam, which was referable under the *Water Resources Act 1989* and had a waterworks licence, is not referable under the *Water Act 2000*. However, take note that there may be certain waterworks licence conditions which still apply. For example:

- If your dam was licenced under the *Water Resources Act 1989* and is no longer considered to be a referable dam, conditions on the waterworks licence other than dam safety conditions may still continue to apply (eg conditions dealing with the interference with the flow of water in a watercourse continue to apply).
- If your dam contains hazardous waste it is not covered by the *Water Act 2000*. The Environmental Protection Agency will eventually deal with hazardous waste dams under the *Environmental Protection Act 1994*. However, until this occurs conditions (including dam safety conditions) that applied to your dam as part of the waterworks licence, continue to apply as if the *Water Resources Act 1989* was still in force.

For dams which are still referable:

If your dam was licenced under the *Water Resources Act 1989* and is still a referable dam under the *Water Act 2000*, the licence for that dam will be taken to be a development permit approving the dam. Any safety conditions issued as part of the existing waterworks licence continue to apply and form part of the development permit.

Chart 1:
How to determine if your dam is referable and when a dam failure impact assessment is required



**Chart 2:
Process for Accepting, Rejecting or Reviewing Dam Failure Impact Assessments**

