Regulatory Impact Statement: Proposal to amend the Building (Dam Safety) Regulations 2022

Coversheet

Purpose of Document	
Decision sought:	Analysis produced for the purpose of informing final Cabinet decisions on a change to the height and volume threshold of a classifiable dam in the *Building (Dam Safety) Regulations 2022*.
Advising agencies:	Ministry of Business, Innovation and Employment
Proposing Ministers:	Minister for Building and Construction
Date finalised:	13 March 2024

Problem Definition

The Dam Safety Regulations are commencing on 13 May 2024. However, new modelling suggests that the height and volume thresholds for a classifiable dam will capture almost three times the number of dams previously estimated. This will likely include many low potential impact dams that don't pose significant risks. Therefore, the Minister for Building and Construction has directed the Ministry of Business, Innovation and Employment to review the classifiable thresholds to make sure they strike the right balance for managing risks posed by dams and removing regulatory burden faced by owners of smaller dams.

Executive Summary

Background

Dams are important to the New Zealand economy, and investment in dam infrastructure is worth billions of dollars. Dams also support the productivity and economic viability of agricultural sectors and provide vital drinking water supplies to communities. However, they also represent a significant hazard to life, property and the environment.

Until recently, New Zealand was one of the few Organisation for Economic Cooperation and Development (OECD) countries without a consistent, national scheme to ensure there is ongoing maintenance and inspection of dams. The *Building (Dam Safety) Regulations 2022* (the Regulations) were made on 12 May 2022 and commence on 13 May 2024, two years after Royal Assent. Dam owners will then have until 13 August 2024 to submit a Potential Impact Classification (PIC). The Regulations are intended to reduce the likelihood of dam failures, which have the potential to cause significant harm downstream.

The Regulations require dams that meet the height and volume thresholds for a classifiable dam to be identified and triaged based on the potential impact that a dam incident or failure will have on people, property and the environment. Owners of high and medium potential impact dams are required to prepare a dam safety assurance programme (DSAP). A DSAP provides dam owners with a structured framework of plans and procedures to plan and complete the activities required for the safe operation and management of their dams.

Although a PIC and DSAP and can be prepared by anyone, the *Building Act 2004* (the Act) requires a Recognised Engineer to audit and certify both documents before submission to the relevant regional authority. This is due to dam safety being a relatively specialised field, and in many cases, dam owners are likely to engage an engineering consultant to both undertake and certify the PIC.

Regional authorities are responsible for administering and monitoring the Regulations. However, they can only refuse a PIC if it is not certified by a Recognised Engineer.

Problem definition

The existing height and volume thresholds were intended to avoid capturing too many small dams (dams under four metres in height) with low potential impact. However, new modelling from the University of Auckland using existing data suggests that the balance has shifted, and a significantly higher number of small, low impact dams would be captured than originally intended.

Information about the cost of compliance has also changed. When the Regulations were made, the 2021 Impact Analysis estimated that costs for an initial PIC assessment would range between $3,000 and $7,000. However, the Ministry of Business, Innovation and Employment (MBIE) is aware of some Recognised Engineers intending to charge between $10,000 to $18,000 for an initial PIC assessment. This has created unintended consequences for small dam owners who will face disproportionate compliance costs under the existing threshold.

A deficit of available specialised engineering resources, including Recognised Engineers further exacerbates challenges experienced by dam owners to submit a PIC for their dam by 13 August 2024, and then commence work on the DSAP (for medium and high potential impact dams).

Options

The Minister for Building and Construction directed MBIE to review the thresholds for a classifiable dam to address issues relating to the number of dams being captured and the shortage of engineering resources. MBIE considered three options against the following assessment criteria: effective implementation, proportionate, consistency and confidence. All three options are based on previous work to develop the Regulations.

Status quo
This option would not address the issues identified. It risks imposing disproportionate costs on small dam owners, and the diversion of scarce technical resources away from risk reduction activities, which are the objectives of the Regulations.

Option One: Large dams only (as defined in the Building Act 2004)
The Act defines a large dam as a dam that has a height of four or more metres and holds 20,000 or more cubic metres volume of water or other fluid. This is the preferred option as it strikes a balance between societal expectations for managing potential risks with the costs of compliance. It will also reduce pressure on specialist resources to support owners of classifiable dams to meet their obligations on time. However, it is possible that there may still be some challenges in meeting the demand from dam owners. The classifiable dam threshold for option one also aligns with the Government's wider commitments to cut red tape and support farmers. However, it is possible that option one will reduce public confidence in the scheme by excluding some medium to high potential impact dams.

Option Two: Higher threshold (as proposed in 2013)

A higher threshold for a classifiable dam would be more consistent with other OECD countries, such as Australia and America. This option would significantly reduce the compliance costs for small dams and the pressure on available technical engineering resources. However, it would also increase the number of medium and high potential impact dams being excluded from the Regulations, and therefore, introduces more risk that these dams are not adequately managed. Consequently, this could significantly impact public confidence in the scheme.

Stakeholder feedback

MBIE conducted targeted consultation with regional authorities and the Technical Working Group for Dam Safety that supported the development of the Regulations. Members are made up of groups that represent those most impacted by the Regulations.

Most stakeholders acknowledged the issues with undercounting the number of dams captured in the Regulations and capacity issues in accessing specialist engineering resources to support compliance. However, regional authorities, the New Zealand Society on Large Dams (NZSOLD) and representatives of owners of large dams preferred the status quo. This was due to concerns regarding the unknown number of high and medium potential impact dams that would be excluded under other options.

Stakeholders representing farmers and growers preferred an increase in the classifiable dam threshold, identifying concerns about the disproportionate compliance costs being posed on small dam owners under the status quo. These stakeholders were also of the view that increasing the threshold would ensure that specialist resources, including Recognised Engineers are focused on supporting compliance on the dams that pose the most risk.

Key limitations or constraints on analysis

Scope of options for consideration

MBIE initially identified a wide range of possible options to address the issues relating to the number of dams captured and shortages in engineering resources. This included deferring the commencement of the Regulations and options requiring changes to the enabling provisions in the Act, such as staggered implementation deadlines based on the classification of a dam or widening the provisions for who can certify a PIC.

Stakeholders were broadly supportive of the existing proposals that were consulted on in 2019 to inform the Regulations, with the exception of the thresholds for a classifiable dam.

Previous dam safety regulations were made in 2008, however, commencement was deferred three times before they were revoked in 2015. With this in mind, the Minister for Building and Construction is committed to the 13 May 2024 commencement date for the Regulations. Accordingly, the Minister for Building and Construction has ruled out options that would require legislative changes and has directed MBIE to conduct a targeted review of the thresholds for a classifiable dam.

Timeframes for developing proposals

The options were developed in a shortened timeframe to ensure any proposed changes can be made and communicated before the commencement date of 13 May 2024. Consequently, this has also resulted in an abbreviated consultation period targeted at those who are most impacted by the Regulations. This has limited the ability of those

consulted to consider the costs and benefits of options consulted and potential risks of changing the classifiable threshold.

Quantification of risk

It is difficult to model the likelihood of dam failure using conventional data analytics as the frequency of both dam failures and extreme events leading to dam failure, such as floods and earthquakes) is historically very low. The frequency of these events may also change with time, such as climate change effects on rainfall intensity.

However, the impact of a serious dam failure can be extremely high. For example, a poorly maintained dam close to a population centre can represent a significant hazard. It is also possible for the consequences to change with time, such as increase in urbanisation downstream of a dam.

The cost-benefit analysis conducted in 2017 to inform the existing Regulations also did not take into account the likelihood of dam failure.

Quality of data

Limitations with the quality of data were identified in the 2021 Impact Analysis that informed the Regulations. The information provided by the New Zealand Inventory of Dams (NZID), a national dataset about dams, is of variable quality as it is largely based on data collected by Councils from resource and building consents, so there are gaps in terms of older dams and dams under four metres in height. Many of the dams recorded also have unknown potential impact classifications. It was also noted that there appeared to be a systematic undercounting of some types of dams and some groups of dam owners.

Although new modelling and data provides insight into the number of dams that were undercounted when the Regulations were developed, MBIE do not have any insight into the classification of these dams.

Responsible Manager(s)
Suzannah Toulmin Manager, Building Policy Building System Performance Ministry of Business, Innovation and Employment Privacy of natural persons *13 March 2024*

Quality Assurance (completed by QA panel)	
Reviewing Agency:	Ministry of Business, Innovation and Employment
Panel Assessment & Comment:	The Ministry of Business, Innovation and Employment's Regulatory Impact Assessment Review Panel has reviewed the RIS and considers that it partially meets the quality assurance criteria. The panel was satisfied with the problem definition and quality of evidence presented on the benefits of the options (particularly reduced compliance costs).

	To fully meet quality assurance criteria, it would be important to: • have a stronger evidence base on the costs of the options (increased risk of dam failures) and a more objective basis for assessing the proportionality of the options (e.g. CBA) • assess the full range of feasible regulatory and non-regulatory options, beyond a one-time adjustment to size thresholds (e.g. an option that captures the highest risk dams in the first instance, and covers other dams later – potentially giving more time to reconsider policy settings and improve the evidence base).

Section 1: Diagnosing the policy problem

What is the context behind the policy problem and how is the status quo expected to develop?

Current situation

1. Dams are important to the New Zealand economy and investment in dam infrastructure is worth billions of dollars. Dams can have a range of purposes, including water storage for municipal water supply, irrigation, hydroelectricity generation and recreation. Dams can also be used for effluent storage and flood management.

2. Dams also represent a significant hazard to life, property and the environment. A Cabinet paper from 2002 identified 24 dam incidents in New Zealand since 1960. While 13 of these incidents are considered serious, there have been no recorded fatalities to date. Many of these failures were also during construction or on first filling and would not be prevented by additional requirements for post-construction monitoring and maintenance. The actual number and details of dam incidents are unknown[1]. Annex One provides an overview of influences on dam safety in New Zealand.

3. Recent incidents include the flood following the Makirikiri Dam (Whanganui) failure in 2013, and severe silting of the Waiau River in 2015 after the Waihi Dam's sluice gates were damaged.

4. The cost of typical dam failure is estimated at near $5.8 million[2]. Dams fail for many reasons, and failures can arise at any stage in a dam's life. Failures can be caused by construction defects, gradual deterioration processes or natural events. The most likely time for a dam to fail is in on first filling, when they are first exposed to reservoir load[3].

5. Dam safety requires ongoing active management, inspection and maintenance that is proportionate to the potential impact of the dam's failure. Until recently, New Zealand was one of the few OECD countries without a consistent, national scheme to ensure ongoing maintenance and inspection of dams.

6. The Regulations were made on 12 May 2022 and commence on 13 May 2024, two years after Royal Assent. Dam owners will then have three months to submit a PIC to the regional authority (by 13 August 2024).

7. MBIE has been working with regional authorities, Engineering New Zealand and Irrigation New Zealand to support the implementation of the Regulations.

Key regulatory features

8. The Act provides the legislative framework for the regulation of dams. This includes the requirement for a building consent for the construction, alteration and/or demolition of large dams (defined in the Act as a dam with a height of four or more metres which holds 20,000 or more cubic metres volume of water or other fluid).

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[1] 2019, NZSOLD letter to the then Minister for Building and Construction

[2] 2017 (MWH; NZIER) Case study cost benefit analysis report National Environmental Standard on post-construction dam safety

[3] 2019, NZSOLD letter to the then Minister for Building and Construction

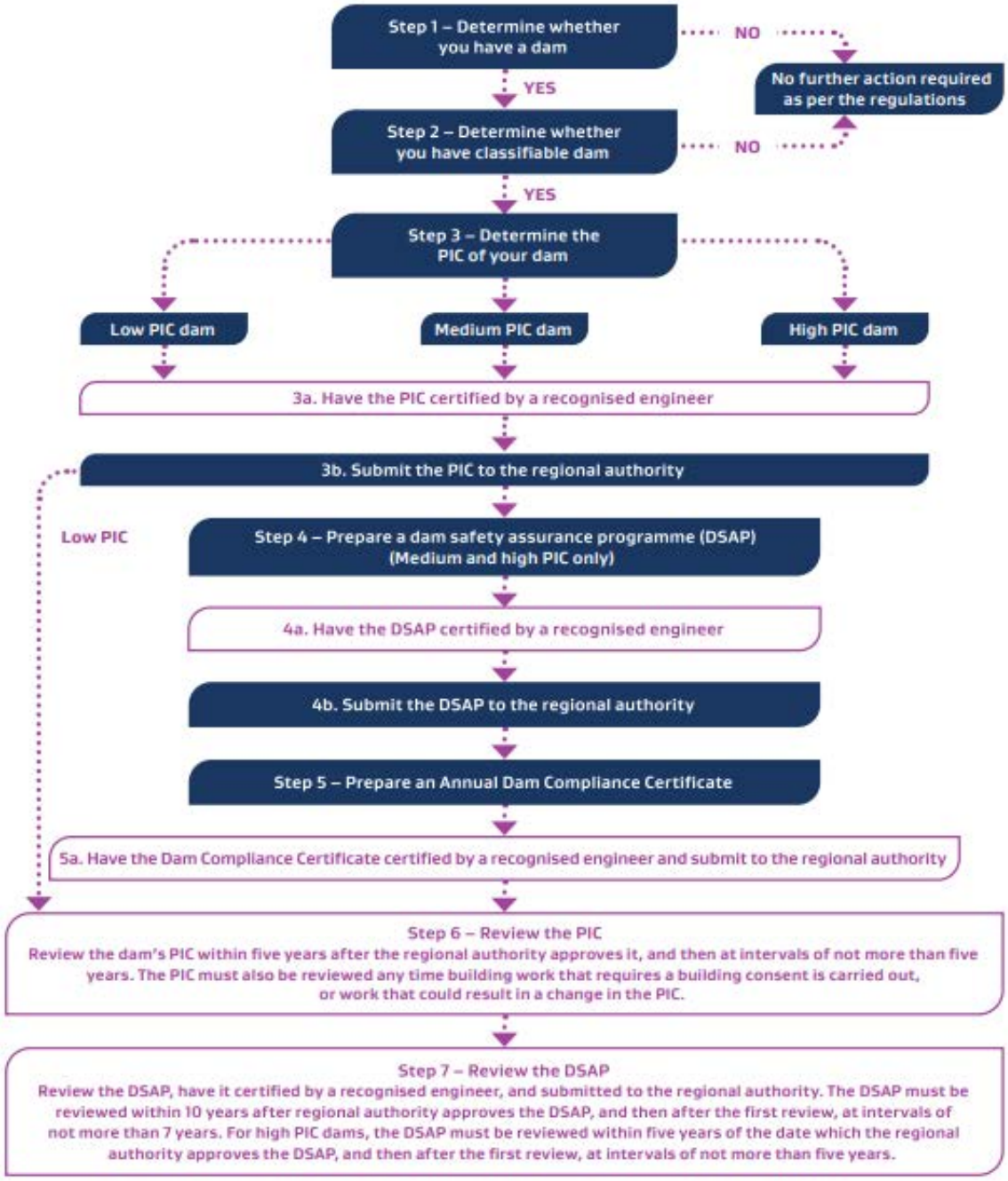
9. Regional authorities are responsible for managing the consent process for new dams.

10. The post-construction dam safety framework has four key steps:

- Determine whether the dam meets the height and volume threshold for inclusion in the regulatory system (classifiable dam).
- If the dam meets the classifiable threshold, determine the level of hazard that the dam presents to people, property and the environment (PIC).
- If the dam has a medium or high PIC, develop a DSAP.
- Review the PIC and DSAP at regular intervals.

11. The Regulations will bring the post-construction dam safety provisions of the Act into full effect and will ensure a nationally consistent approach to dam safety to protect people, property and the environment from the potential impacts of dam failure.

12. The diagram below provides an overview of dam owners' responsibilities within the dam safety framework (the purple boxes indicate the steps in which the involvement of a Recognised Engineer is required):



13. The Regulations were developed with the objective that costs and regulatory burden are proportionate with the benefits of life safety and avoidance of damage to property and the natural environment.

14. They were also designed with the intent to capture most dams that would be medium and high potential impact. Any new dam that is subject to a building or resource consent is already required to undertake a PIC assessment at the consent stage.

15. Regulation 5 (Meaning of a classifiable dam) sets out the height and volume thresholds for a classifiable dam. This captures dams that are four or more metres high and stores 20,000 or more cubic metres volume of water or other fluid; or one or more metres high and stores 40,000 or more cubic metres.

Owners of dams

16. Dam owners with a classifiable dam must assess the potential impact its failure could have on the community, historical or cultural places, critical or major infrastructure and the natural environment. This assessment will determine the dam's PIC which will be either low, medium or high. Annex Two outlines how the classification of a dam is determined.

17. For low potential impact dams, no further work is required once their PIC has been certified and approved by the relevant regional authority, apart from the requirement to have that classification re-certified every five years. However, medium and high potential impact dams are required to prepare a DSAP – which provides dam owners with a structured framework of plans, procedures and activities required for the safe operation and management of their dams.

18. If it is likely that loss of life would result from a potential dam incident or failure, it will be classified as medium (one person) or high (two or more persons) regardless of whether the assessed damage level is minimal or catastrophic.

Recognised Engineer

19. A Recognised Engineer is required to certify the PIC and DSAP before they are submitted to a regional authority for approval. For medium to large consultancies that have a dam safety practice in place, they are likely to have a team of people who prepare the PIC or DSAP and have these certified by a Recognised Engineer on staff.

20. The Act permits a PIC and DSAP to be prepared by anyone, whether it's the dam owner themselves, a farm consultant, or a technical practitioner. However, dam safety engineering is a relatively specialised field, and in many cases, dam owners are likely to engage an engineering consultant to both undertake and certify the PIC.

21. The Regulations also specify the qualifications and competencies that Recognised Engineers are required to hold, including the requirement to be a Chartered Professional Engineer that is subject to a code of ethical conduct. Engineering New Zealand is responsible for assessing and registering Recognised Engineers.

Regional authorities

22. Regional authorities are responsible for administering and monitoring the Regulations. This includes establishing and maintaining a register of dams in its district and accepting or refusing a PIC, DSAP and their associated certificates. However, regional authorities can only refuse a PIC if it's not certified by a Recognised Engineer. This is

due to dam safety being a very specialised field and not all Chartered Professional Engineers will have the necessary expertise.

Recent regulatory history

23. Previous dam safety regulations were made in 2008, however, commencement was deferred three times (in 2010, 2012, and 2014), before they were revoked in 2015 with the intention to redirect the provisions under the *Resource Management Act 1991.* However, in 2018, Ministers directed officials to stop work and recommence work on the regulations under the enabling provisions of the Act.

24. In 2019, MBIE consulted on the proposed regulatory framework for dam safety. Although stakeholders were largely supportive, they raised some specific concerns relating to the threshold for classifiable dams and the availability of appropriately skilled Recognised Engineers.

25. There was considerable feedback on the height and volume thresholds, with the greatest disagreement on the proposed 30,000 cubic metre volume threshold with no minimum height. The proposals were revised to reflect stakeholder feedback, including a larger volume threshold (40,000 cubic metres or more) within a minimum height of 1 metre.

26. The Regulations were informed by the best available data at the time, noting constraints with the quality of data[4]. At the time, MBIE acknowledged that the estimates of known dams were significantly understated due to information gaps, particularly for dams under four metres high.

How the status quo may develop if no action is taken

Work is already underway to support the implementation of the Regulations

27. MBIE has been working with regional authorities, Irrigation New Zealand and Engineering New Zealand to support the implementation of the Regulations. This includes:

    - Launching two awareness campaigns to ensure dam owners, engineers and regulators are aware of the Regulations;
    - Publishing a resource pack on the Building Performance website that has also been sent out to impacted parties; and
    - Producing a resource to help agricultural dam owners calculate the volume of their dam and understand if they are impacted by the Regulations.

28. MBIE is also working with Irrigation New Zealand to develop a screening tool to support owners of smaller dams to collate information that will contribute to the classification of their dam. The aim of the tool is to minimise the cost and time that rural or small dam owners spend engaging technical practitioners.

29. MBIE has also commissioned Engineering New Zealand to assess and register Recognised Engineers. Engineering New Zealand have also been contracted through to June 2024 to continue working to raise awareness of the Regulations within the

[4] UCQC (2017). New Zealand Inventory of Dams: Reservoir Volume Estimation using GIS Techniques, prepared for Ministry of Business, Innovation, and Employment (MBIE) and UCQC (2018). New Zealand Inventory of Dams: Stage Two Inventory Update and Analysis, prepared for Ministry for the Environment (MfE).

engineering community and remove potential barriers that suitably experienced engineers have when applying to become a Recognised Engineer.

However, new modelling suggests a lot more dams will be captured than previously estimated

30. The current height and volume thresholds aimed to capture the majority of dams that may present a hazard to people, property and the environment, while not imposing a regulatory burden on the owners of small dams that are relatively lower risk, such as stock drinking ponds and weirs in rural areas.

31. However, new modelling of existing data from the University of Auckland suggests that there could be up to 10,000 dams in New Zealand that are greater than 1 metre high[5]. Of this, the modelling suggests that there is likely to be 3,000 classifiable dams, which is an additional 1,500 to 2,000 dams that were not accounted for in the development of the Regulations. MBIE also estimates that the current threshold excludes in the order of 19 high or medium potential impact dams[6].

32. If the status quo does not change, the Regulations will impose disproportionate compliance costs, time and resource demands owners of dams under four metres, many of which will likely be low impact.

33. Some stakeholders, including regional authorities have accepted that there will be large scale non-compliance, particularly from small dam owners. MBIE is aware that many small dam owners have yet to begin the classification process. However larger commercial dam owners who are already following the NZSOLD Guidelines will be able to continue using these systems under the Regulations.

34. The longer it takes to get a dam classified, the longer it will take to get onto the main objective of the Regulations, which is the risk reduction activities guided by DSAPs. If no action is taken, specialist engineering resources will be used for undertaking classifications of many low potential impact dams rather than focusing on identifying and addressing dam safety issues for the dams that pose the greatest risk. In such a situation, any enforcement measures would be an inefficient use of resources.

What is the policy problem or opportunity?

Scope and nature of the problem

35. New modelling from the University of Auckland of existing data (refer to paragraph 31) shows that the number of dams captured within the scope of the Regulations is significantly greater than what was previously estimated when policy decisions were made. The additional 1,500 to 2,000 classifiable dams between the height of 1 metre and 3.99 metres are also likely to include a large number of low potential impact dams[7].

36. This will mean owners of these dams will face compliance costs to undertake a PIC assessment and get it certified without corresponding benefits to society (as no further

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[5] Presentation to NZSOLD Symposium 2023. Dams in Aotearoa New Zealand: Knowns, unknowns, and implications for technical and regulatory resourcing. 13 November 2023.

[6] Estimation is based on the 2017 New Zealand Inventory of Dams. Note the actual figure could differ due to gaps in the information about dams, particularly dams under four metres in height.

[7] Presentation to NZSOLD Symposium 2023. Dams in Aotearoa New Zealand: Knowns, unknowns, and implications for technical and regulatory resourcing. 13 November 2023.

work is required to manage the dam, apart from the requirement to have that classification re-certified every five years). This new information suggests that the existing threshold for a classifiable dam may not strike the right balance between risks and compliance costs.

37. The 2021 Impact Analysis that informed the development of the Regulations estimated that the cost for an initial PIC assessment would range between $3,000 and $7,000. However, MBIE has heard anecdotally that some Recognised Engineers are intending to charge between $10,000 to $18,000 for an initial PIC assessment. Some dam owners have also indicated that they have been quoted between $9,000 and $15,000 for a PIC assessment.

38. These two factors combined will mean that the overall compliance costs are significantly higher than what was previously estimated when the Regulations were being developed.

39. Concerns have also been raised regarding the capacity of technical staff, including Recognised Engineers and the implications this will have on the ability of dam owners to provide the relevant regional authority with a certified PIC by 13 August 2024.

40. MBIE understands that as of February 2024, there are currently only 17 Recognised Engineers, and only a smaller subset of this (5 or 6) work with small private clients. Although these engineers will have larger teams to support them, the workforce is still too limited. MBIE expects that the additional 1,500 to 2,000 dams meeting the current classifiable threshold will further exacerbate the workforce pressures and disproportionately impact small dam owners and farmers.

41. Although anyone is able to do the PIC assessment, farmers typically do not have the skills required to complete a PIC assessment on their own for smaller on-farm dams. The Recognised Engineer role is a relatively specialised field and not all Chartered Professional Engineers will have the necessary expertise to undertake this role.

42. It is also more difficult to reliably model the downstream impacts of a small dam failure, as the empirical models used for dam break assessments models are based on larger dam failures. Consequently, owners are experiencing costs which are disproportionately high for dams below four metres in height.

43. The limited availability of specialist engineering resources, including Recognised Engineers to classify the additional dams, shifts the focus and resources away from prioritising the classification of medium and high impact dams, and beginning work on a DSAP and physical risk reduction works.

Who is affected and how?

44. MBIE undertook targeted consultation with regional authorities and the Technical Working Group that supported the development of the Regulations. The members are made up of different groups that will be most impacted by the Regulations. This includes regional authorities, Irrigation New Zealand, Federated Farmers, NZSOLD, technical experts, large dam owners and Engineering New Zealand.

45. The submissions largely acknowledged the issues relating to the undercounting of dams and the unintended consequences this will have in capturing low impact dams. Similarly, all submitters acknowledged capacity issues of Recognised Engineers, and the impact this will have on the ability for dam owners to meet their obligations on time.

46. Submitters also identified that the undercounting of classifiable dams, particularly those under four metres and under reported on, will likely flow through to cost pressures and delays in complying with the Regulations.

47. Owners of dams range from councils, territorial authorities, irrigation companies and farmers, through to hydroelectric power generators.

48. Most owners of large commercial dams already operate using the voluntary dam safety framework published by the NZSOLD and have existing relationships with consultancies that specialise in dam safety. Large commercial dam owners will be able to continue operating these systems under the Regulations. Therefore, the impact of the Regulations on large commercial dam owners is likely to be small.

49. However, the NZSOLD dam safety framework is not widely used by owners of small to medium dams. The compliance cost will therefore be greater for small dam owners that do not already have documented systems in place to manage their dams. Additionally, many small dam owners do not have existing relationships with Recognised Engineers, so are most at risk of not meeting their obligations under the Regulations. MBIE has also heard anecdotally that larger dam safety consultancies are reluctant to take on work from owners of small dams.

What objectives are sought in relation to the policy problem?

50. The objective of the Regulations is to provide a minimum, consistent and effective risk-based regulatory framework for post-construction dam safety.

51. The Minister for Building and Construction is committed to the commencement of the Regulations while ensuring the regulatory burden and specialist engineering resource is focused on dams that provide the greatest risk to people, property and the environment downstream. This includes ensuring that owners of classifiable dams are able to meet their obligations to supply a dam classification certificate to the relevant regional authority by 13 August 2024 (three months after the Regulations come into force).

52. The development of the Regulations was informed by the best available data at the time. However, further modelling from the University of Auckland suggests that the balance has shifted.

Section 2: Deciding upon an option to address the policy problem

What criteria will be used to compare options to the status quo?

53. The table below outlines the assessment criteria for options to be considered against.

Table 1: Assessment criteria

Criteria	Description
Effective implementation	Dam owners have access to the required capability and resources to meet their obligations.
Proportionate	Compliance costs are proportionate to the level of risk posed in the event of a dam incident or failure.
Effective implementation	Dam owners have access to the required capability and resources to meet their obligations.
Consistency	Consistent with similar jurisdictions and the Government's objectives to allow a broader range of productive rural activities such as on-farm water storage ponds.
Confidence	Maintains public confidence that dams are being managed safely.

What scope will options be considered within?

54. MBIE initially identified a wide range of possible options to address the issues relating to the number of dams captured and shortages in engineering resources. This included deferring the commencement of the Regulations and options requiring changes to the enabling provisions in the Act, such as staggered implementation deadlines based on the classification of a dam or widening the provisions for who can certify a PIC.

55. Extensive consultation was undertaken to inform the existing dam safety framework and there has been broad support for the Regulations, with the exception of the height and volume thresholds for a classifiable dam.

56. However, given the history of deferral of previous dam safety regulations (refer to paragraph 23) and the need to provide certainty to those impacted, the Minister for Building and Construction is committed to the 13 May 2024 commencement date for the Regulations. For these reasons, the Minister for Building and Construction has ruled out options that would require legislative changes and directed MBIE to conduct a targeted review of the height and volume thresholds for a classifiable dam.

57. Although some options have been considered out of scope, MBIE expects that any further deferral of the Regulations would not necessarily address issues with the number of dams being captured by the Regulations and the availability of engineering resources, but rather further delay addressing them. For example, engineers who have delayed becoming a Recognised Engineer may likely delay their recognition again.

58. The options being considered have been informed by previous work and feedback to develop the Regulations.

What options are being considered?

1. MBIE consulted on two options to amend the height and volume thresholds for a classifiable dam. These options as well as the status quo are outlined below.

Status Quo

2. Under the status quo, no changes to the Regulations will be made. Therefore, the height and volume thresholds for a classifiable dam will remain at:

   - four or more metres high and stores 20,000 or more cubic metres volume of water, or other fluid; or
   - one or more metres high and stores 40,000 or more cubic metres volume of water, or other fluid.

3. The status quo excludes 5 known dams of medium or high potential impact. However, there are a significant number of unconfirmed dams in the dataset (NZID 2017), so the number of medium or high potential impact dams excluded are more likely to be in the order of 19 dams.

4. As outlined in the context section above, MBIE will continue to deliver a number of non-regulatory actions to support the implementation of the Regulations. This includes:

   - Launching two awareness campaigns to ensure dam owners, engineers and regulators are aware of the Regulations;
   - Publishing a resource pack on the Building Performance website that has also been sent out to impacted parties; and
   - Producing a resource to help agricultural dam owners calculate the volume of their dam and understand if they are impacted by the Regulations.

5. MBIE is also working with Irrigation New Zealand to develop a screening tool to support owners of smaller dams to collate information that will contribute to the classification of their dam. The aim of the tool is to minimise the cost and time that rural or small dam owners spend engaging technical practitioners.

6. MBIE has also commissioned Engineering New Zealand to assess and register Recognised Engineers. Engineering New Zealand have also been contracted through to June 2024 to continue working to raise awareness of the Regulations within the engineering community and remove potential barriers that suitably experienced engineers have when applying to become a Recognised Engineer.

Option One – Large dams only (as defined in the Act)

7. Under this option, the height and volume threshold for a classifiable dam would be amended to:

   - four or more metres high and stores 20,000 or more cubic metres volume of water, or other fluid.

8. This threshold is similar to the status quo but excludes all dams under four metres high (consistent with the definition of a large dam under the Act).

9. If option one is progressed, it could reduce compliance costs by approximately $13.3 million every five years due to around 1,900 fewer dams (most of which are expected to be low potential impact) needing to be classified compared with the status quo[8].

10. This option would exclude 10 known dams of medium or high potential impact. However, the dataset has limitations with a significant number of 'unknown' dams. MBIE estimate in the order of 45 medium or high potential impact dams would be excluded under this threshold, compared with 19 dams under the status quo.[9]

11. The non-regulatory options described under the status quo will continue to be delivered under option one.

Option Two – Higher threshold (as proposed in 2013)

12. Under this option, the height and volume thresholds for a classifiable dam would increase to:

    - height of eight or more metres and hold 20,000 or more cubic metres volume of water or other fluid; or
    - height of four metres and holds 100,000 or more cubic metres volume of water or other fluid.

13. This option would reduce the scope of the Regulations to focus on larger dams. It could also lead to a reduction in compliance costs of up to $17.5 million every five years, due to there being approximately 2,500 less dams compared with the status quo[10].

14. It would also exclude 30 known dams of medium or high potential impact, compared with 5 (status quo), or 10 (option one). The actual number of medium and high potential impact dams excluded is likely to be higher, in the order of 60 dams, compared with 19 (status quo) and 45 (option one).[11]

15. Similar to option one, the non-regulatory options discussed under the status quo will continue to be delivered under this option.

Stakeholder views

16. Although the majority of stakeholders acknowledged issues with the undercounting of classifiable dams and capacity issues relating to currently pool of Recognised Engineers; regional authorities, NZSOLD and representatives of owners of large dams preferred to retain the status quo.

17. These stakeholders thought that the existing thresholds were based on the analysis of risks of known dams while trying to ensure most medium and high potential impact dams were captured. They were also of the view that limitations were known at the time of the Regulations being developed and they do not consider the that new

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[8] Based on an average cost of $7,000 per dam for classification.

[9] Estimation is based on the 2017 New Zealand Inventory of Dams. Note the actual figure could differ due to gaps in the information about dams, particularly dams under four metres in height.

[10] Based on an average cost of $7,000 per dam for classification.

[11] Estimation is based on the 2017 New Zealand Inventory of Dams. Note the actual figure could differ due to gaps in the information about dams, particularly dams under four metres in height.

information affects the conclusions from previous work about the hazard posed by known dams.

18. Those who supported option one – large dams only (as defined in the Building Act) thought that it best balances safety with obligations.

19. Irrigation New Zealand and Federated Farmers were supportive of the higher threshold (option two) as it would significantly reduce the costs for dam owners and ease resource pressures, allowing focus to be on larger dams that pose a higher risk to public safety. Option two would also better align the threshold with other similar jurisdictions, such as Australia.

20. Regional authorities raised concerns regarding option two, noting that it may not reduce compliance costs for dam owners if they were instead regulated under regional plans and resource consents. This option would also reduce the number of owners that would be required to inform regional authorities of the dam size and location, impacting the quality of the national dam register.

21. Regional authorities are also in the process of consulting on or updating their policies on dangerous dams, which incorporates the threshold for a classifiable dam. Any changes to the classifiable threshold would incur one-off costs for regional authorities to update their systems, policies and communications to support the implementation of the Regulations as well as other related policies.

22. Insights provided by stakeholders have informed the assessment of options against the criteria and cost benefit analysis. As identified in the limitations and constraints, the consultation timeframe restricted the ability of stakeholders to adequately consider the proposed options and provide quantitative feedback. Therefore, feedback was predominantly high-level and qualitative.

How do the options compare to the status quo?

	Status Quo	Option One – Large dams only	Option Two – Higher threshold
Effective implementation	0 The status quo captures a large number of low impact dams. It is estimated that there will be 3,000 classifiable dams. This creates a risk that a number of dam owners will not be able to comply with the regulations by 13 August 2024.	+ This option reduces the number of small dam owners that incur costs to classify their dam in comparison to the status quo. This will also better support dam owners to meet their obligations as Recognised Engineers will be focused on medium to high impact dams that pose a greater risk to people, property and environment from a dam incident or failure. Focusing on medium to high impact dams will also enable a focus on developing the DSAPs and doing the risk reduction work, following classification. However, there may still be a shortage in technical engineering resources to fully meet the demand from dam owners.	++ This option will further reduce the pressure on demand for technical engineering resources, including Recognised Engineers. Compared to option one, this option will better ensure resources are focused on medium to high impact dams by reducing the number of classifiable dams.
Proportionate	0 The status quo captures an estimated 3,000 classifiable dams and is expected to exclude in the order of 19 medium and high impact dams.	++ This option reduces the compliance burden on small dam owners and farmers (savings of up to $13.3 million every five years due to approximately 1,900 fewer dams, most of which are expected to be low potential impact dams)[12].	+ This option will further reduce the compliance burden imposed on small dam owners and farmers (savings of up to $17.5 million every five years due to there being approximately 2,500 less dams compared with the status quo)[13].

[12] Based on an average cost of $7,000 per dam for classification.

[13] Based on an average cost of $7,000 per dam for classification.

Consistency	0 The status quo has a lower threshold than other OECD countries, such as Australia and America. This does not align with the Government's wider commitments to cut red tape by allowing a broader range of productive rural activities such as on-farm water storage ponds.	+ Similar to the status quo, this option has a lower threshold than other OECD countries, such as Australia and America. However, this option will support the Government's wider commitments to cut red tape by allowing a broader range of productive rural activities such as on-far water storage ponds.	++ This option brings the classifiable dam threshold closer to OECD countries, such as Australia and America[14]. This option also better supports the Government's wider commitments to cut red tape by allowing a broader range of productive rural activities such as on-far water storage ponds.
Confidence	0 The status quo maintains public confidence in the dam safety scheme by ensuring it captures a wide range of dams and manages potential risks. It excludes a small number of medium or high impact dams (around 19 dams)	- This option may impact public confidence in the dam safety scheme, as it will exclude around 45 medium or high impact dams.	- - This option may further diminish public confidence in the dam safety scheme compared to option one as it would exclude more medium or high impact dams (around 60).
Overall assessment	0 The status quo will not address the issues identified.	+ This option balances the cost of compliance to the risk posed by a dam and enables more effective implementation without excluding as many medium and high impact dams compared to option two.	+ Although this option will enable effective implementation, it will exclude more medium and high impact dams, impacting public confidence in the safe management of dams.

[14] https://nzsold.org.nz/wp-content/uploads/2024/01/Post-event-responses-to-questions.pdf

What option is likely to best address the problem, meet the policy objectives, and deliver the highest net benefits?

23. The overall assessment scores option one and two equally.

24. Options one and two will both free up specialist engineering resources to focus on the classification of medium and high potential impact dams and support the development of DSAPs and physical risk reduction works.

25. Although option two will further reduce the compliance costs on small dam owners and ensure technical resourcing is focused on medium to high potential impact dams, it may leave public confidence in the dam safety scheme much worse than the status quo.

26. Option one better balances capturing dams that may present a hazard to people, property and the environment (by reducing the number of classifiable dams that are likely to be low potential impact by 1,900), against imposing a regulatory burden on small dam owners that are not hazardous. It's also estimated that this option could reduce compliance costs by approximately $13.3 million every five years due to the reduced number of dams being captured[15].

Example key for qualitative judgements:

++	much better than doing nothing/the status quo/counterfactual
+	better than doing nothing/the status quo/counterfactual
0	about the same as doing nothing/the status quo/counterfactual
-	worse than doing nothing/the status quo/counterfactual
- -	much worse than doing nothing/the status quo/counterfactual

27. On balance, option one is preferred as it excludes less medium and high potential impact dams compared to option two. Option one will also mean there is reduced risk to people, property and the environment downstream.

28. There is also scope within this option for the Minister for Building and Construction to revise the threshold or define 'referrable dam' (enabled through the Act) at a later date, if required, to ensure dams that are outside the classifiable dam category but could still pose risks to public safety could be identified and referred for classification.

[15] Based on an average cost of $7,000 per dam for classification.

What are the marginal costs and benefits of the option?

Affected groups *(identify)*	**Comment** *nature of cost or benefit (eg, ongoing, one-off), evidence and assumption (eg, compliance rates), risks.*	**Impact** *$m present value where appropriate, for monetised impacts; high, medium or low for non-monetised impacts.*	**Evidence Certainty** *High, medium, or low, and explain reasoning in comment column.*
Additional costs of the preferred option compared to taking no action			
Regulated groups (dam owners)	No direct costs associated with this option.	Nil	High
Regulators (regional authorities)	One-off costs may be incurred to update communications to reflect the new threshold. Where the classifiable dam threshold informs other polices, regional authorities may also incur costs to reflect these updates e.g. dangerous dams policy	Low	High
Others (e.g., wider govt, consumers, etc.)	There is a risk that a dam excluded by the proposed change fails, causing harm to people, property and environment. The likelihood of these dams failing are unknown, but historically the failure rate post-construction is low[16].	Low-Medium[17]	Low
Total monetised costs		Nil	
Non-monetised costs		Medium	Low
Additional benefits of the preferred option compared to taking no action			
Regulated groups	Significantly reduces compliance costs on small dam owners and farmers that will be excluded from the dam safety scheme.	$13.3 million every five years in reduced compliance costs.[18]	Medium

[16] An estimated 45 known medium or high impact dams would be excluded (additional 26 medium or high impact dams compared to the status quo).

[17] The 2017 cost-benefit analysis used to inform the existing Regulations estimated the cost of typical dam failure at near $5.8 million. However, this estimation does not take into account the likelihood of a dam incident or failure.

[18] Based on an average cost of $7,000 per dam for classification.

Regulators	Reduced pressure and workload to support implementation of the Regulations.	Low	High
Others (e.g., wider govt, consumers, etc.)	Scarce engineering and technical resources are focused on identifying and addressing dam safety issues, therefore reducing the likelihood of failure and associated impacts on people, property and the environment. This will ensure the benefits of the Regulations (safe management of dams) can be more readily achieved compared with the status quo.	Medium	Medium
Total monetised benefits		$13.3 million every five years in reduced compliance costs[19].	
Non-monetised benefits		Medium-high	

[19] Based on an average cost of $7,000 per dam for classification.

Section 3: Delivering an option

How will the new arrangements be implemented?

29. Regional authorities are responsible for the ongoing operation and enforcement of the Regulations.

30. Once decisions have been made, the changes will be communicated through public communications and targeted communications to the industry and stakeholders.

31. As noted in the problem definition section, MBIE has taken a number of actions in partnership with regional councils, Engineering New Zealand and Irrigation New Zealand to support the implementation of the Regulations.

32. MBIE will continue to deliver a number of non-regulatory actions to support the implementation of the Regulations. This includes:

    - Launching two awareness campaigns to ensure dam owners, engineers and regulators are aware of the Regulations;
    - Publishing a resource pack on the Building Performance website that has also been sent out to impacted parties; and
    - Producing a resource to help agricultural dam owners calculate the volume of their dam and understand if they are impacted by the Regulations.

How will the new arrangements be monitored, evaluated, and reviewed?

33. Regional authorities are required to collect information from classifiable dam owners based on the prescribed criteria and standards and maintain regional dam registers. MBIE will use this data to monitor change in the sector and compliance with the Regulations. As data is collected, MBIE will be able to develop a better understanding of the conditions, locations, ownership arrangements and the general state of unsafe dams and how they are changing.

34. This information can be used to update the NZID and subsequently allow a more accurate assessment of the number of “known dams” captured by the Regulations.

35. MBIE will work with regional authorities to assess the impact of the changes to the classifiable dam thresholds on compliance with the requirement to submit a certified PIC. As part of this, MBIE will consider if any further intervention is required.

36. In addition to this, MBIE intends to do a full review of the regulatory framework following implementation. This will need to occur once the Regulations have been embedded and dam safety activities identified through the DSAP are implemented in order to measure the impact.

Annex One: Influences on Dam Safety in New Zealand [20]

Period	Event or action	Fatalities	Comment	Gov. Dept.	Legislation
1967	NZ Matahina Dam	0	Core cracking and erosion on first filling in 1967 and had to undergo repair		
1972	USA Buffalo Creek flood	125			
1972	USA Canyon Lake Dam	238			
5th June 1976	USA Teton dam - earthen dam on the Teton River in Idaho, suffered a catastrophic failure as it was filling for the first time.	11 people, 13,000 cattle	It was not until the string of significant dam failures in the 1970s that awareness was raised to a new level among the states and the federal government – and internationally		
1977	USA Laurel Run Dam (Johnstown)	40			
1977	USA Kelly Barnes Dam	39			
1980	USBR SEED manual published		Safety Evaluation of Existing Dams manual – spread internationally		
20th Sept 1981	NZ Ruahihi power station canal failure	0	One day after its official opening by then Prime Minister Robert Muldoon		
1981	**NZSOLD formed**			Ministry of Commerce	Standalone legislation
30th Dec1982	NZ Wheao canal failure	0	Low probability high impact		
1983	USBR SEED manual revised				
2 March 1987 & 25 Dec 1987	NZ Matahina dam earthquake and later discovery of further voids	0	ECNZ		
Dec 1988	First New Zealand Dam inventory published		Ministry of Works		
Dec 1994	NZ dam inventory published		MOC		
1995	NZ Coeur Gold tailings dam	0	Land on which dam and stored tailings are located moved. No release of tailings occurred.		
1990s	Failure of two irrigation dams in Northland; Failure of three dams in Marlborough	0	Northland dams – deep seated failure through foundations before water was impounded; Marlborough dams - one dam embankment erosion, one spillway washout, one dam stability failure		
1995	NZSOLD Dam Safety Guidelines (DSG) version1		Result of a lack of faith in governments to provide guidance and legislation in the foreseeable future		

[20] https://nzsold.org.nz/wp-content/uploads/2019/03/190307-NZSOLD-Letter-to-Minister-Salesa.pdf

Period	Event or action	Fatalities	Comment	Gov. Dept.	Legislation
Apr 1996	NZ Poihipi Reservoir	0			
11th Apr 1996	NZ Poolburn farm irrigation dam	0			
1st May 1996	MOC discussion paper on proposed statutory requirements and procedures				
6th Feb 1997	NZ Opuha irrigation dam	0	Failed during construction, fatalities narrowly avoided		
2000	NZSOLD DSG version 2				
Aug 2004	Building Act includes specific Dam Safety Assurance clauses			BIA	Building Act
2008	Dam Safety assurance Regulations		Approved for later implementation		
Aug 2013	NZ Haldon Farm dam, Seddon	0	Dam was damaged in Seddon earthquake. A controlled breach of the dam was undertaken to reduce stored water volume to reduce risk of uncontrolled breach		
30th June 2015	Regulations revoked			MBIE	
Aug 2015	NZSOLD DSG version 3		Authored to align with regulations in specific areas. Serving as default Regulations		
Sep 2015	NZ Waihi Dam gate failure	0	Severe silting downstream		
2016	MfE develops TWG for a National Environmental Standard		Minister advises that the content of the NES is to be leaner and less costly than the previous Regulations.	MfE	RMAct (NES)
2017	MfE developed draft discussion document		Document was not released prior to the 2017 election		
November 2018	MBIE indicate intention to return to Building Act			MBIE	BAct

Annex Two: Determining a dam's PIC

Table 1: Determination of assessed damage

Once all categories have been assessed, the highest damage level identified out of all the categories must be selected for determining the dam's PIC in Table 2.

Specified categories					
Damage level	Community	Cultural[8]	Critical and major infrastructure[9]		Natural environment
			Damage	*Time to restore critical or major infrastructure to pre-dam failure operations (see Note one)*	
Catastrophic	One or more of the following apply: › 50 or more household units rendered uninhabitable[10] › 20 or more commercial or industrial facilities rendered inoperable › two or more community facilities rendered inoperable or uninhabitable	Irreparable loss to two or more historical or cultural sites	Two or more critical or major infrastructure facilities rendered inoperable	One year or more	Extensive and widespread damage, with permanent, irreparable effects on the natural environment
Major	One or more of the following apply: › four or more but less than 50 household units rendered uninhabitable › five or more but less than 20 commercial or industrial facilities rendered inoperable › one community facility rendered inoperable or uninhabitable	One or more of the following apply: › Irreparable loss to one historical or cultural site › loss to one or more historical or cultural sites where it is possible, but impracticable, to fully restore the site	One critical or major infrastructure facility is rendered inoperable	Three months or more but less than one year	Extensive and widespread damage where it is possible, but impracticable, to fully restore or repair the damage
Moderate	One or more of the following apply: › one or more but less than four household units rendered uninhabitable › one or more but less than five commercial or industrial facilities rendered inoperable › loss of some functionality of one or more community facilities	Significant loss to one or more sites of historical or cultural significance where it is practicable to restore the site	One or more critical or major infrastructure facilities are affected by the loss of some functionality	Less than three months	Significant damage that is practicable to restore or repair
Minimal	Minor damage that does not materially affect the functionality of any household unit, commercial or industrial facility, or community facility (or no damage)	Loss to one or more historical or cultural sites that will require minor restoration only (or no loss to any historical or cultural site)	Minor damage to one or more critical or major infrastructure facilities (or no damage)	One week or less	Only minor rehabilitation or restoration may be required or recovery is possible without intervention (or no damage)

Table 2: Determination of dam's PIC

Assessed damage level	Population at risk (number of persons)				Potential loss of life
	0	1–10	11–100	more than 100	
Catastrophic	High	High	High	High	No persons
	N/A (see Note 1)	High	High	High	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Major	Medium	Medium	High	High	No persons
	N/A (see Note 1)	Medium	High	High	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Moderate	Low	Low	Medium	Medium	No persons
	N/A (see Note 1)	Medium	Medium	Medium	One person
	N/A (see Note 1)	High	High	High	Two or more persons
Minimal	Low	Low	Low	Low	No persons
	N/A (see Note 1)	Medium	Medium	Medium	One person
	N/A (see Note 1)	High	High	High	Two or more persons

Notes

1. Not applicable. Population at risk is zero therefore no potential loss of life.