

# Determination 2023/028

## Regarding the compliance of a pool barrier with section 162C of the Building Act 2004

56 Fairfield Road, Fairfield, Hamilton

### Summary

This determination considers whether a metal pool barrier, with gaps larger than 100mm and surrounding vegetation, complies with section 162C of the Building Act 2004. The determination discusses the various means of establishing compliance, including the Fencing of Swimming Pools Act 1987, clause F4 of the Building Code applicable at the time pool was constructed and clause F9 of the current Building Code.



In this determination, unless otherwise stated:

- “sections” are sections of the Building Act 2004 (“the Act”)
- “clauses” are clauses in Schedule 1 (“the Building Code”) of the Building Regulations 1992
- “FOSPA” is the Fencing of Swimming Pools Act 1987
- “FOSPA Schedule” is the Schedule to FOSPA.

The Act and the Building Code are available at [www.legislation.govt.nz](http://www.legislation.govt.nz). Information about the legislation, as well as past determinations, compliance documents (eg Acceptable Solutions) and guidance issued by the Ministry, is available at [www.building.govt.nz](http://www.building.govt.nz).

## 1. The matter to be determined and the parties

- 1.1. This is a determination made under due authorisation by me, Charlotte Gair, Manager Advisory, Determinations, Building Resolution, Ministry of Business, Innovation and Employment (“the Ministry”), for and on behalf of the Chief Executive of the Ministry.<sup>1</sup>
- 1.2. The parties to the determination are:
  - 1.2.1. the owners of the property, J and M Hall (“the owners”), who applied for the determination.
  - 1.2.2. Hamilton City Council (“the authority”), carrying out its duties as a territorial authority or building consent authority.
- 1.3. This determination arises from a failed periodic inspection of a residential pool barrier (the “pool barrier”) in which the authority considered specific elements of the barrier did not meet the requirements of FOSPA. The authority stated its intention to issue a notice to fix unless the items identified as not compliant were rectified. These items were:
  - 1.3.1. The trees planted outside the pool barrier within 1200mm of the barrier which create footholds to climb the fence
  - 1.3.2. The gaps below the metal bar fence, which are larger than 100mm
- 1.4. The matter to be determined<sup>2</sup> is whether the owners’ pool barrier, at the time of the inspection, complied with section 162C of the Act. Section 162C requires every residential pool to have physical barriers that restrict access to the pool by unsupervised children under the age of five.

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<sup>1</sup> The Building Act 2004, section 185(1)(a) provides the Chief Executive of the Ministry with the power to make determinations.

<sup>2</sup> Under section 177(1)(a) of the Act.

## Matters outside this determination

- 1.5. The determination is limited to considering only the two specific elements currently disputed by the parties. I do not consider any other aspects of the pool barrier or the compliance of the barrier as a whole.

## 2. Background and building work

- 2.1. The owners' property is in a residential area in Hamilton. The house is located at the northwest end with the pool located towards the rear (south-east) of the property. The pool barrier consists of a metal fence on three sides, namely the southeast, southwest, and northwest side (the "pool barrier"). The remainder of the barrier is a timber paling boundary fence on the northeast side but the compliance of this section of pool barrier is not in dispute (see Figure 1).

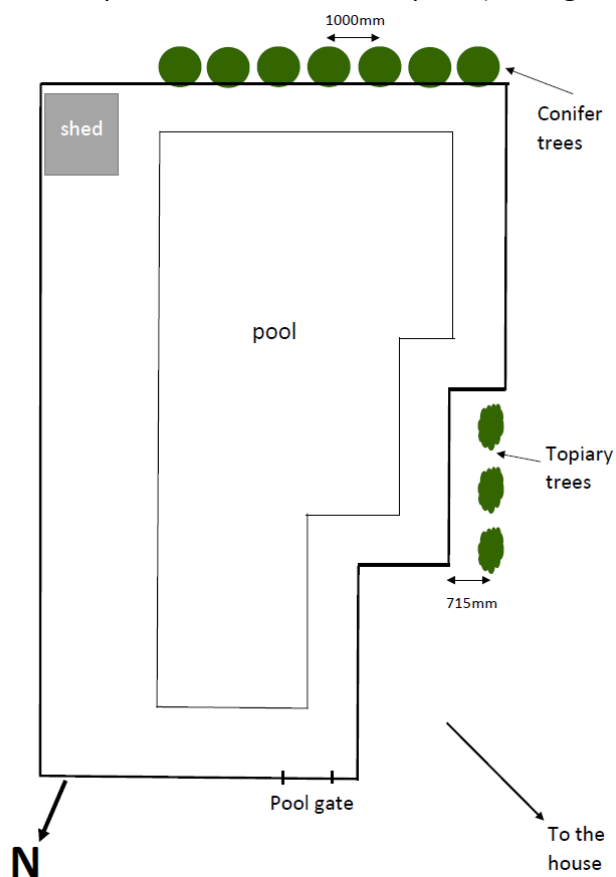


Figure 1: The pool area (not to scale)

- 2.2. The authority granted building consent 2004/9978 for the pool on 28 June 2004, with construction starting shortly after. On 14 January 2014, the authority issued a code compliance certificate.
- 2.3. On 11 August 2020, the authority carried out a periodic inspection of the pool barrier as required by the Act. The inspection failed for two main reasons<sup>3</sup>:

<sup>3</sup> The inspection report identified additional items which have since been addressed and are not in dispute.

- 2.3.1. The trees in close proximity to the pool barrier which creates footholds to climb the fence (see Figures 2 and 3).
- 2.3.2. The gaps below the metal bar fence, which are larger than 100mm (see Figures 3 and 4).
- 2.4. Large conifer trees (“the conifer trees”) are planted outside the south side of the pool barrier and measure approximately 3.6m high. They grow up against and, at the time of the authority’s inspection, through the south section of the pool barrier (see Figure 2)<sup>4</sup>. They are roughly 1m apart and planted some 200mm to 300mm back from the pool barrier.



**Figure 2: Conifer trees outside the south pool barrier**

- 2.5. The trees planted on the west side of the pool fence (“the topiary trees”), are a different variety of conifer and are approximately 1.7m in height. The topiary trees are planted roughly 700mm from the pool fence (see Figure 3).



**Figure 3: Topiary trees west of the pool**

- 2.6. Parts of the pool barrier have a clearance between the bottom of the fence and the ground level exceeding 100mm. Based on the photographs from the authority’s

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<sup>4</sup> The owners later provided photographs that showed the trees trimmed back.

inspection, the gaps over the paved area and pebbled areas range respectively between 112-157mm and approximately 118-160mm (see Figures 4 and 5).



**Figure 4: Gaps between fence and paving**



**Figure 5: Gaps between fence and pebbled garden**

- 2.7. Following correspondence between the parties, the owners applied for a determination.

### **3. Submissions**

#### **The owners**

- 3.1. The owners consider that:

- 3.1.1. While there are gaps greater than 100mm under the fence, the difference of 10mm to 20mm is minor and the request to rectify it is 'excessive' given the smallest child would not be able to fit through the gap.
- 3.1.2. The topiary trees are not close enough to the fence to provide a foothold, nor can they support a child's weight. In addition, the prickly foliage is painful to hold and is a deterrent to climbing.
- 3.1.3. While the conifer trees are fully grown, they have "small fine branches that are flimsy and are not climbable". The owners state, "There is no risk in a child under the age of six years being able to use the trees as leverage to access the pool area".
- 3.1.4. The cost of altering the pool barrier to meet the Act and the Building Code would be prohibitive.

### **The authority**

- 3.2. The authority considers that:
  - 3.2.1. The pool fence needs to comply with the regulations in force at the time it was built, which is the FOSPA Schedule.
  - 3.2.2. The barrier does not comply due to having trees located in proximity to the pool fence with multiple horizontal branches able to hold the weight of a child, and could be used as footholds to climb the fence.
  - 3.2.3. Additionally, there are gaps exceeding 100mm under the fence.
- 3.3. The authority did not comment on other means to comply with section 162C.

### **Submissions in response to the draft determination**

- 3.4. A draft determination was issued to the parties for comment on 15 November 2022.
- 3.5. The authority accepted the draft determination without comment.
- 3.6. The owners also accepted the draft determination, but raised two queries or points of clarification, which I have addressed in my discussion at paragraphs 4.13 and 4.55.
- 3.7. The owners have since trimmed the conifer trees both in height and away from the fence. The owners reinforced their views that the small twig-like branches would give way rather than provide footholds, and the trunk itself is not climbable due to the surrounding branches.

- 3.8. I have considered the parties' submissions in response to the draft and amended the determination as I consider appropriate.

## 4. Discussion

### Legislation

- 4.1. On 1 January 2017 FOSPA was repealed and new provisions relating to residential pools were added to the Act (sections 162A to 162E, 450A and 450B). The purpose of these provisions is to prevent drowning of, and injury to young children by restricting unsupervised access to residential pools.<sup>5</sup>
- 4.2. The overall effect of these provisions is that pool barriers must continue to perform to the standard they were intended to perform to when they were constructed. In general terms, a barrier that complies with the Building Code that was in force at the time of construction is not required to be upgraded when there are later changes to the Building Code requirements.

### Section 162C and potential means of compliance

- 4.3. Section 162C(1) of the Act requires "Every residential pool that is filled or partly filled with water must have physical barriers that restrict access to the pool by unsupervised children under 5 years of age." Subsection (2) sets out various ways for pool barriers to comply. It states:
- (2) The means of restricting access referred to in subsection (1) must comply with the requirements of the building code—
- (a) that are in force; or
- (b) that were in force when the pool was constructed, erected, or installed (after 1 September 1987) and in respect of which a building consent, code compliance certificate, or certificate of acceptance was issued (in relation to the means of restricting access to the pool).
- (3) In the case of a small heated pool, the means of restricting access referred to in subsection (1) need only restrict access to the pool when the pool is not in use.
- ...
- 4.4. Section 450A<sup>6</sup> and section 450B of the Act were also enacted at the same time as section 162C. Section 450B sets out the savings provisions that apply to existing residential pools constructed prior to 1 January 2017. It states:

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<sup>5</sup> See section 162A.

<sup>6</sup> Section 450A is no longer available as a means to comply with section 162C. On 27 April 2017, the acceptable solution contained in section 450A was revoked by way of Gazette notice ("Notice of Issue of Acceptable Solutions F9/AS1 and F9/AS2 and Revocation of the Acceptable Solution Issued by Section 450A of the Building Act 2004" (27 April 2017) 45 *New Zealand Gazette* No 2017-go2003). This means it was only available between 1 January 2017 and 27 April 2017, being the date that the new acceptable solution for clause F9 of the Building Code (F9/AS1) was published.

**450B Savings provision for existing residential pools**

- (1) This section applies to a residential pool that was constructed, erected, or installed before 1 January 2017 (an existing pool).
  - (2) An existing pool is deemed to have barriers that comply with section 162C if the barriers—
    - (a) complied with the Schedule of the Fencing of Swimming Pools Act 1987 (as that schedule was in force) immediately before 1 January 2017; and
    - (b) continue to comply with those requirements subject to—
      - (i) any exemption that was granted under section 6 or clause 11 of the Schedule of that Act and that was subsisting immediately before 1 January 2017; and
      - (ii) the conditions of any such exemption.
- 4.5. Section 450B provides that if existing pools had barriers that complied with the FOSPA Schedule immediately before section 162C was enacted, and if those barriers continue to comply with that schedule, then those barriers are deemed to comply with section 162C.<sup>7</sup>
- 4.6. In summary, there are three potential means available to establish compliance of the owners' pool barrier for the purpose of section 162C:
- 4.6.1. compliance with the Building Code that was in force when the pool was built, as provided for in section 162C(2)(b)
  - 4.6.2. compliance with the FOSPA Schedule, as provided for in section 450B(2)
  - 4.6.3. compliance with the current Building Code, as provided for in section 162C(2)(a).
- 4.7. For sections 162C(2)(b) and 162C(2)(a), the barrier can comply by way of a prescribed Acceptable Solution or as an alternative solution. Each clause of the Building Code has an associated Acceptable Solution which, if conformed with, must be taken as demonstrating compliance with the clause it relates to. However, an Acceptable Solution provides just one means of establishing compliance. It is also open to the owners to demonstrate that their pool barrier achieves compliance with the Building Code clause by another means, known as an 'alternative solution'.

**Does the barrier comply under section 162C(2)(b)?**

- 4.8. The owners constructed the pool in 2004. The requirements of the Building Code relating to pool barriers that were in force at that time were found in Clause F4 *Safety from Falling*. The relevant performance criteria relating to swimming pools in clause F4 are set out below:

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<sup>7</sup> There is a further requirement for pools that have been granted exemptions, and provisions for pools with walls 1.2m above ground, but these are not relevant to the owners' pool.



**F4.3.3** Swimming pools having a depth of water exceeding 400mm, shall have barriers provided.

**F4.3.4** Barriers shall:

...

(f) In the case of a swimming pool, restrict the access of children under 6 years of age to the pool or the immediate pool area.

**F4.3.5** Barriers to a swimming pool shall have in addition to performance F4.3.4:

...

(b) No permanent objects on the outside of the barrier that could provide a climbing step.

...

### **Compliance with F4 as an Acceptable Solution**

4.9. The Acceptable Solution for clause F4 (that was in effect in 2004)<sup>8</sup> cited the FOSPA Schedule as a means of establishing compliance with the Building Code.<sup>9</sup>

4.10. Clause 1 of the Schedule outlines the height requirements for fencing around pools:

1(1) The fence shall extend—

(a) At least 1.2 metres above the ground on the outside of the fence; and

(b) At least 1.2 metres above any permanent projection from or object permanently placed on the ground outside and within 1.2 metres of the fence.

...

4.11. I consider that the conifer and topiary trees are “permanently placed objects” as they are planted in the ground and not readily movable. The trees are also within 1.2m of the fence. As it is clear from Figures 2 and 3 that the fence does not extend at least 1.2 metres above these trees, I do not consider that clause 1(1)(b) is met.

4.12. Clause 2 of the Schedule states, “Any clearance between the bottom of the fence and ground level shall not exceed 100 mm.”

4.13. From the inspection photos it is apparent that sections of the fence are more than 100mm above the ground. In response to the draft determination, the owners sought clarification about whether the ground clearance of 100mm is to be taken from the lowest part of the fence, ie the vertical bars which protrude past the bottom horizontal rail, or from the horizontal rail itself.

<sup>8</sup> Acceptable Solution F4/AS1 *Safety from falling* (second edition, amendment 4) effective 06/01/2002 until 24/09/2007.

<sup>9</sup> Paragraph 3.1.1 of F4/AS1 stated “Fencing for swimming pools shall be constructed to no lesser standard than is required by the Schedule to the [FOSPA] 1987, to restrict the access of children.”

- 4.14. As I am assessing this fence against the FOSPA Schedule, I must only look at the wording provided in the Schedule. The plain meaning of 'bottom' is "the lowest part" and 'clearance' means the "amount of clear space between two objects". I note that it is the resulting clearance that is relevant. Accordingly, due to the nature of the construction of the fence I consider both the lower horizontal railing and the bottom of the protruding vertical bars are effectively the lowest part of the fence.
- 4.15. I note that the clearances underneath the metal fence exceed 100mm regardless of whether this is taken from the bottom of the protruding vertical rails or the bottom horizontal railing.
- 4.16. Accordingly, I consider that neither clause 1 nor clause 2 of the Schedule has been met, and the pool barrier does not comply with the designated Acceptable Solution for clause F4.

#### **Compliance with F4 as an alternative solution**

- 4.17. Acceptable Solutions are not the only means of demonstrating compliance. Building work can achieve compliance as an alternative solution, provided that the performance requirements in the Building Code are being met. I note section 7 of the Act defines performance criteria as "qualitative or quantitative criteria that the building is required to satisfy in performing its functional requirements." Functional requirements are defined as "those functions that the building is required to perform for the purposes of this Act".
- 4.18. Section 18 states that "building work is not required to achieve performance criteria which are additional to, or more restrictive than the performance criteria". However, that is not to say that the performance criteria are to be applied in a vacuum. Broadly speaking, the Building Act is concerned with the design and construction of buildings, and the Building Code seeks to accomplish the purposes and principles of the Act by setting objectives and prescribing functional and performance requirements with which building elements must comply. Therefore, the performance criteria, functional requirements and objectives of the Building Code, and the principles and purposes of the Act are all linked and must be interpreted and applied consistently with each other.
- 4.19. In this case, the relevant performance requirement F4.3.5(b) states that the barrier must have "no permanent objects on the outside of the barrier that could provide a climbing step". As earlier discussed, the conifer and topiary trees are permanent objects planted into the ground outside the barrier. The question is whether they are capable of providing a climbing step for children. The relative distance these objects are from the barrier, the rigidity and structure, which are needed to hold a child's weight, and the ease with which they can be grasped or used as leverage by children, are all relevant in this consideration.
- 4.20. I agree with the owners' comments regarding the topiary trees. Overall, I consider that as these are planted some 700mm back from the barrier, with spiky foliage

which is not painlessly graspable and are unlikely to support a child's weight, that they do not provide a climbing step for children.

- 4.21. However, I note that the conifer trees are planted much closer to the pool barrier with dense foliage that could be easily grasped between adjacent trees, with solid trunks readily accessible. A child may use a combination of these features to gain enough leverage to climb the tree or shimmy up between it and the barrier. The barrier also does not meet F4.3.4(f), which requires a barrier to "restrict the access of children under 6 years of age to the pool or the immediate pool area" given the effectiveness of the barrier in performing this function has been compromised by the location and structure of the conifer trees.
- 4.22. Now I move onto assessing whether the barrier meets F4.3.4(f) in terms of restricting access with relation to the gaps identified. Under my earlier assessment against the FOSPA Schedule, the barrier did not comply as it had clearances exceeding 100mm. Figure 3 shows that these range between 112-158mm, taken respectively from the bottom of the vertical bars, and the horizontal railing, in relation to the ground.
- 4.23. The owners submitted that this gap is at most 100mm<sup>10</sup> wide and 120mm high, and the smallest child would not fit through it. I acknowledge the owners' view, but I disagree with the conclusion. I acknowledge that gaps that are slightly larger than 100mm may restrict the movement of unsupervised young children through to the pool area. However, that raises the question of what the upper limit might be for gaps in pool barriers. FOSPA, New Zealand Standard 8500:2006<sup>11</sup> and Acceptable Solution F9/AS1 all consistently prescribe 100mm as the effective quantitative measure in restricting access, and in the following paragraphs I will comment on why I consider 100mm is an appropriate limit for gaps in pool barriers, and how that should be applied to the owners' pool barrier.
- 4.24. In 1994, MBIE's predecessor, the Building Industry Authority (BIA)<sup>12</sup> published an article entitled "Barriers-why the 100 mm diameter sphere?"<sup>13</sup>. The article noted the dimension concerns the size of a child's head – once the head is pushed through an opening, the body is flexible enough to follow. It noted, with reference to a New Zealand standard<sup>14</sup>, that the 100mm sphere test was appropriate because head widths for children under 6 years of age ranged from 110-130mm for 1-year olds, to 130-140mm for 5-year-olds. It also noted that the 99-percentile head width for a 2-year old child is about 115mm and the corresponding chest width was about 105mm.

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<sup>10</sup> I note that an inspection photo taken by the authority shows 95mm gaps between the vertical bars.

<sup>11</sup> NZS 8500:2006 at paragraph 3.3.7.

<sup>12</sup> The BIA was replaced in Nov 2004 by the Department of Building and Housing (DBH) and in July 2012 it became part of MBIE.

<sup>13</sup> BIA News, no. 32, April 1994. See Appendix D for the full article.

<sup>14</sup> NZS 5828: Specifications for playgrounds and playground equipment, Part 3:1986 Design and construction – safety aspects

- 4.25. International standards also take this approach. In 2008 the European Consumer Voice in Standardization (ANEC) commissioned a report on “Dimensions and Designs of Swimming Pool fences and balcony and stairs barriers to protect children from falling and from passing through, below or above”<sup>15</sup>. The study included, by way of illustration, several photographs showing that a gap of 110mm allows the child’s body to pass while entrapping the head.
- 4.26. The following year ANEC published another report on “Child Safety Barriers”<sup>16</sup> observing that 100mm was the consistent measure for both pool fences and barriers in general across the United States, Australia, France, United Kingdom and Sweden, with the exception of Europe and France setting it respectively at 89mm and 102mm.
- 4.27. As flagged earlier at 4.18, I must interpret the performance criteria consistently with the preceding functional requirement, the objective, and the wider purposes and principles of the Act.
- 4.28. The objective in F9.1 is to “prevent injury or death to young children involving residential pools”. The means by which this is achieved is by using a barrier to restricting access to the pool and its immediate area by unsupervised young children.
- 4.29. As to the wider purposes of the Act, I turn to section 3(a), which ensures that “people who use buildings can do so safely without endangering their health...”. In satisfying the performance criteria, functional requirement and objective of the Building Code, the way a pool barrier restricts children from moving into the pool area must not endanger the health of its intended users.
- 4.30. I am also mindful of section 4 of the Act and the principles to be applied in performing functions or duties or exercising powers under the Act, as applicable to me under section 4(1)(b). In particular, under s4(2)(a), the importance of building code compliance as it relates to household units and the role it plays in the lives of people that use them. More specifically, s4(2)(b) states there is a need to “ensure that any harmful effect on human health resulting from the use of particular building methods or products of particular building design, or from building work, is prevented or minimised.”
- 4.31. In assessing compliance with the relevant performance criteria, I must also ensure that the building design seeks to prevent or at least minimise any harmful effects on building users, which, in this case, are young children.

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<sup>15</sup> Carlos Neto and others *Dimensions and Design of swimming pool fences and balcony and stairs barriers to protect children from falling through and from passing through, below or above* (study commissioned by ANEC (European Association for Consumer Representation in Standardisation)). An extract is in Appendix E.

<sup>16</sup> Ann-Sofie Engdahl, Patrik Spanglund and Erika Waller *Child Safety Barriers* (study commissioned by ANEC (European Association for Consumer Representation in Standardisation)). An extract is in Appendix B.

- 4.32. Consider all of the above, I consider that a pool barrier should perform its function to restrict access by children, in a safe and effective way. Pool barriers that allow a 100mm or greater diameter sphere to pass through pose a risk of entrapment and may run the risk of allowing children to pass through.
- 4.33. In the particular circumstances of this case, I consider that the design of the owners' pool barrier, with variable heights in the openings resulting from the bottom horizontal rail as well as the protruding bottom vertical rails measuring approximately 112-157mm from the ground, could allow both a child's head and body to pass through.<sup>17</sup> Therefore I do not consider that the barrier meets the performance requirement to restrict access.
- 4.34. For the reasons I have considered above, I conclude the sections of the pool barrier with openings exceeding 100mm do not comply with clause F4 as an alternative solution.

### **Does the barrier comply under section 450B?**

- 4.35. Section 450B deems the FOSPA Schedule to be a means of compliance with section 162C for residential pools constructed before 1 January 2017.
- 4.36. I have already assessed the fence against the criteria of the FOSPA Schedule as an Acceptable Solution for Building Code Clause F4 (see paragraphs 4.8 to 4.16), and concluded the fence does not comply.
- 4.37. I am unaware of any exemptions granted for the owners' pool (as provided for in section 450B(2)(b)(i)), my assessment remains the same. Consequently, the pool barrier does not comply with section 162C by way of section 450B(2).

### **Does the barrier comply under section 162C(2)(a)?**

- 4.38. Section 162C(2)(a) is available as a means of compliance for all residential pool barriers, irrespective of when they were constructed.
- 4.39. The applicable clause of the current Building Code is Clause F9 *Means of restricting access to residential pools*. The objective of clause F9 is "to prevent injury or death to young children involving residential pools".<sup>18</sup> The relevant performance clauses are:

**F9.3.1** Residential pools must have or be provided with physical barriers that restrict access to the pool or immediate pool area<sup>[19]</sup> by unsupervised young children (ie, under 5 years of age).

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<sup>17</sup> This is illustrated in Figure 6.

<sup>18</sup> See clause F9.1.

<sup>19</sup> An "immediate pool area" is defined in section 7 of the Act as "the land in or on which the pool is situated and so much of the surrounding area as is used for activities carried out in relation to or involving the pool".

**F9.3.2** Barriers must either—

- (a) surround the pool (and may enclose the whole or part of the immediate pool area);
- (b) in the case of a small heated pool, cover the pool itself. ...

**F9.3.3** A barrier surrounding a pool must have no permanent objects or projections on the outside that could assist children in negotiating the barrier.

...

4.40. As with clause F4, compliance with clause F9 of the current Building Code can be achieved via an Acceptable Solution or as an alternative solution.

**Compliance by way of Acceptable Solution F9/AS1**

4.41. As a starting point, I will consider whether the pool barrier has been constructed in accordance with Acceptable Solution F9/AS1.

4.42. The following paragraphs of F9/AS1 are relevant:

**2.1 Pool barriers**

...

2.1.3 Pool barriers shall not be angled more than 15° from vertical and may only slope away from the pool. Any rails, rods or wires forming a part of a pool barrier that are not themselves vertical shall be at least 900 mm apart vertically to restrict climbing. There shall be no openings in the pool barrier that a 100 mm diameter sphere could pass through.

2.1.4 Figure 1 shows acceptable ways of constructing pool barriers that are not on a property boundary.

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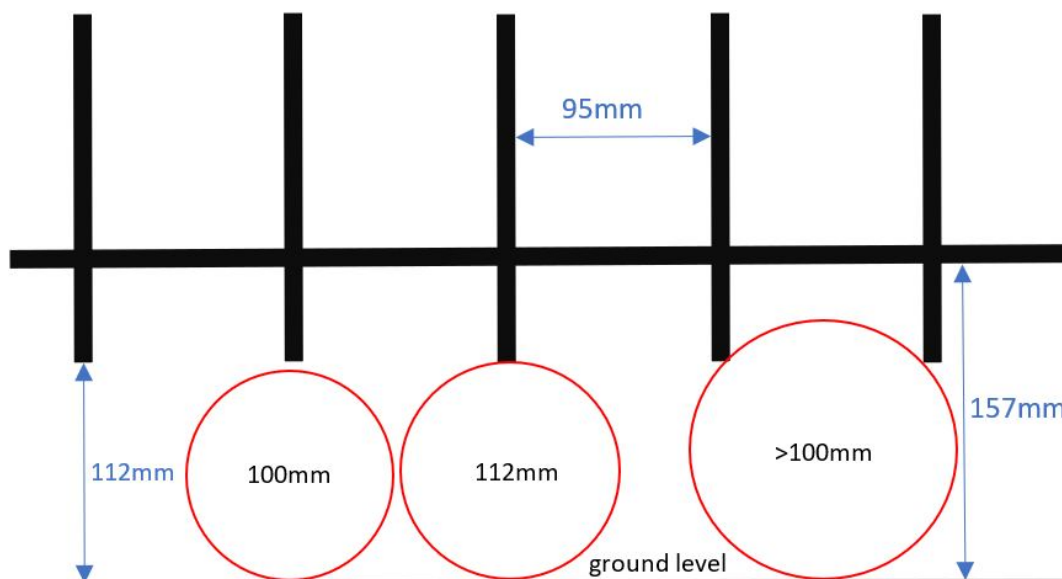
2.1.6 There shall be no ground features or objects outside a pool barrier within 1200 mm of the top of the barrier that would assist a child in climbing. Figure 2 gives acceptable methods for evaluating this requirement.

[See Appendix A of this determination for Figures 1 and 2 of F9/AS1]

...

4.43. The fence does not meet the criteria of the Acceptable Solution, as follows:

4.43.1. **F9/AS1 2.1.3** –The design of the pool barrier means that it could allow a sphere greater than 100mm to pass through (see Figure 6).



**Figure 6: Applying the F9/AS1 assessment to the pool barrier (not to scale)**

- 4.43.2. **F9/AS1 2.1.6** – The conifer trees are objects outside the barrier that are within 1200mm of the barrier. As discussed earlier at 4.21, due to their proximity to the fence and rigidity of structure, the conifers are like to assist a child in climbing. While I accept that individual branches may be relatively weak and would not sustain a child’s weight, the foliage is dense and graspable, and the given that the core trunk is planted only some 200-300mm back from the barrier, a child could utilize the combination of these factors to gain leverage and find hand and footholds to negotiate the barrier.
- 4.44. The topiary trees are also within 1200mm of the top of the barrier. However, I consider that the branches of the topiary trees are unlikely to support the weight of a young child as they are attempting to climb the fence given the distance between the trees and the barrier would significantly reduce the amount of support they could effectively provide, in addition I consider that the nature of the foliage of the topiary trees would act as a deterrent to children who may consider using them to attempt to navigate the barrier.
- 4.45. I am satisfied that at the point in time when this determination was applied for, the topiary trees would not assist a child in climbing. However, I leave it open to the authority in subsequent monitoring inspections, to determine whether this continues to be the case. I am mindful that trees are likely to be impacted by seasonal growth patterns and will prove to be a hugely variable element in assessing pool barrier compliance throughout its lifetime.
- 4.46. As such, the owners’ pool barrier does not comply with paragraphs 2.1.3 and 2.1.6 of the Acceptable Solution.

### **Compliance with clause F9 as an alternative solution**

- 4.47. As noted at 4.17, alternative solutions assess compliance against the performance criteria in the relevant Building Code clause.
- 4.48. Clause F9.3.1 requires that residential pools have physical barriers to restrict access to the pool or immediate pool area by unsupervised young children.
- 4.49. Acceptable solution F9/AS1 allows the barrier to have no openings that a 100mm sphere could pass through. As earlier discussed, 100mm was consistently the standard for barriers across international standards, multiple previous compliance documents and New Zealand standards and FOSPA. I consider 100mm is an effective measure for assessing a barrier's ability to restrict access to young children.
- 4.50. In paragraphs 4.17 to 4.34 above, I assessed the barrier's compliance by way of an alternative solution against the performance requirements in clause F4. I consider that the same reasoning applies in relation to clause F9. As there are openings in the owners' barrier where a 100mm sphere could pass through, I do not consider the barrier can effectively restrict access.
- 4.51. Additionally, clause F9.3.3 requires a pool barrier to not have permanent objects or projections on the outside that could assist a young child in climbing the barrier. As discussed in paragraphs 4.19 to 4.21, the conifer trees are permanent objects on the outside of the barrier that could assist children in negotiating it.
- 4.52. Having regard to the above, I do not consider the barrier complies via an alternative solution for clause F9.

### **Ongoing compliance obligations**

- 4.53. It is important to note that the owners have an ongoing obligation under section 162C(4) of the Act for the pool barrier to remain compliant. The compliance of a pool barrier involving trees in close proximity can change over time.
- 4.54. The topiary trees have not been found to be an issue at this point in time. However, they may grow larger, stronger and closer to the barrier over time, becoming objects that would assist a young child in negotiating the pool barrier. At that stage, the owner would need to take steps to rectify that noncompliance.
- 4.55. I also note that after the draft determination was provided to parties for comment, the owners provided an update advising that the conifer trees have been trimmed back, both in height and away from the fence. Determinations can only be made in relation to the state of matters at the time the application was made. While the outcome of this determination will remain unchanged, it remains open to the authority to reassess the situation as it now stands.



## **5. Decision**

- 5.1. In accordance with section 188 of the Building Act 2004, I determine the pool barrier does not comply with section 162C of the Building Act.

Signed for and on behalf of the Chief Executive of the Ministry of Business, Innovation and Employment on 20/10/2023.

**Charlotte Gair**

**Manager Advisory, Building Resolution**

## Appendix A: Fencing of Swimming Pools Act 1987

### 2 Interpretation

In this Act, unless the context otherwise requires,—  
fence—

- (a) means a fence that complies with the requirements of the building code in force under the Building Act 2004 in respect of swimming pools subject to this Act; and
  - (b) includes any part of a building and any gates or doors that form part of the fence
- Fence: this definition was amended, as from 1 July 1992, by section 92(1) Building Act 1991 (1991 No 150) by substituting the words “building code in force under the Building Act 1991 in respect of swimming pools subject to this Act;” for the words “Schedule to this Act”.

fence: this definition was substituted, as from 31 March 2005, by section 414 Building Act 2004 (2004 No 72). See subpart 4 of Part 5 of that Act (comprising sections 416 to 451) as to the transitional provisions.

#### Schedule

##### Means of compliance for fences under this Act

###### *Height*

- 1(1) The fence shall extend—
  - (a) at least 1.2 metres above the ground on the outside of the fence; and
  - (b) at least 1.2 metres above any permanent projection from or object permanently placed on the ground outside and within 1.2 metres of the fence.
- (2) Notwithstanding subclause (1), where the fence is constructed of perforated material, netting, or mesh and any opening in the material, netting, or mesh has a dimension (other than the circumference or perimeter) greater than 10 mm, the fence shall extend at least 1.8 metres above the ground or the projection or object.

###### *Ground clearance*

- 2 Any clearance between the bottom of the fence and ground level shall not exceed 100 mm.

###### *Materials*

- 3 All materials and components shall be of a durable nature and shall be erected so as to inhibit any child under the age of 6 years from climbing over or crawling under the fence from the outside.

...

## Appendix B: Acceptable Solution F9/AS1

### ...2.0 Barriers surrounding the immediate pool area

#### 2.1 Pool barriers

2.1.1 A *pool* barrier can be a fence but may also take other forms of construction, such as a concrete block wall. ...

2.1.2 *Pool* barriers not on a property boundary shall have a height of not less than 1200mm from the finished floor or ground level outside the *pool* barrier.

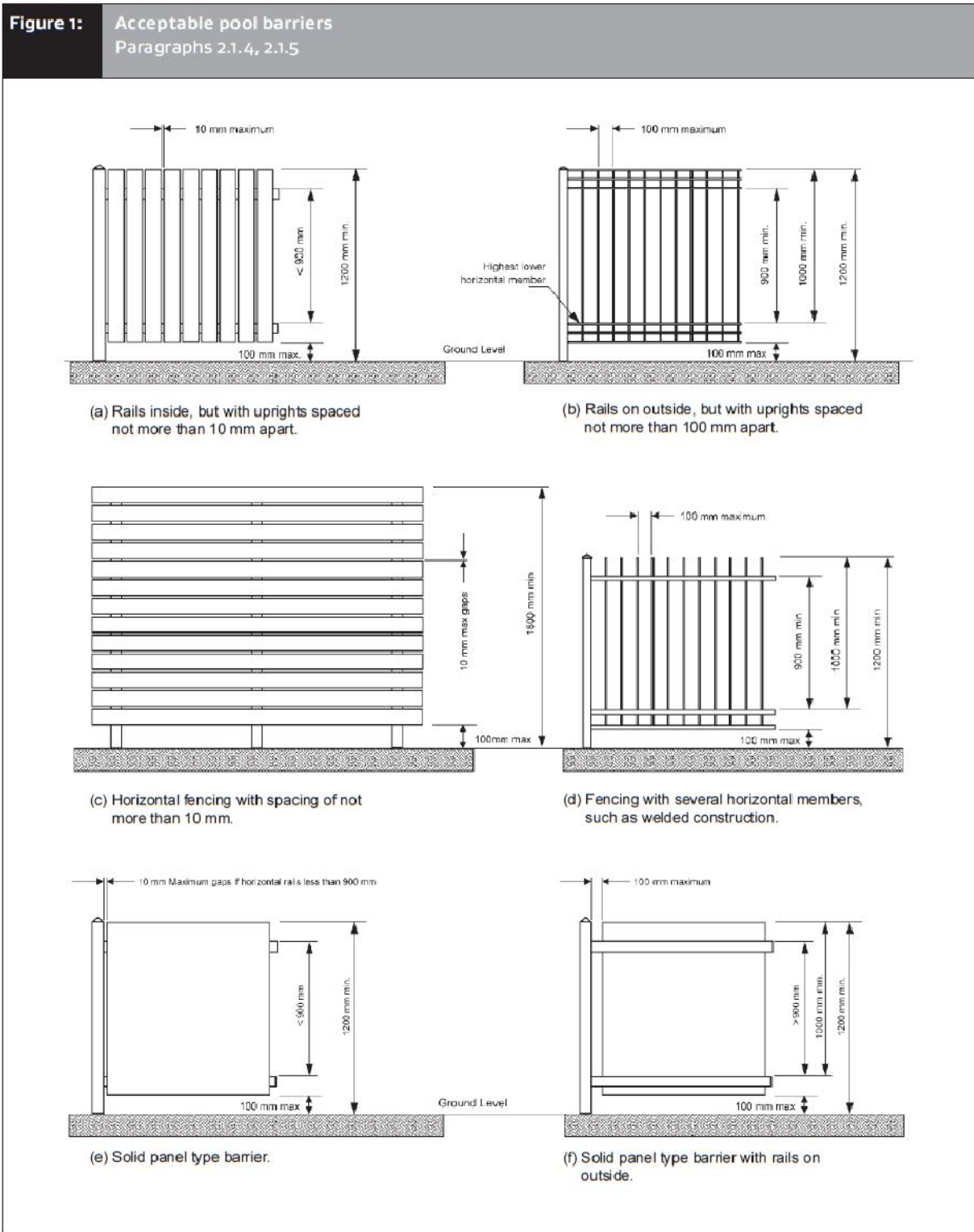
2.1.3 *Pool* barriers shall not be angled more than 15° degrees from vertical and may only slope away from the *pool*. Any rails, rods or wires forming a part of a *pool* barrier that are not themselves vertical shall be at least 900mm apart vertically to restrict climbing. There shall be no openings in the *pool* barrier that a 100mm diameter sphere could pass through.

2.1.4 [Figure 1] shows acceptable ways of constructing *pool* barriers that are not on a property boundary. ...

2.1.6 There shall be no ground features or objects outside a *pool* barrier within 1200mm of the top of the barrier that would assist a child in climbing. [Figure 2] gives acceptable methods for evaluating this requirement.

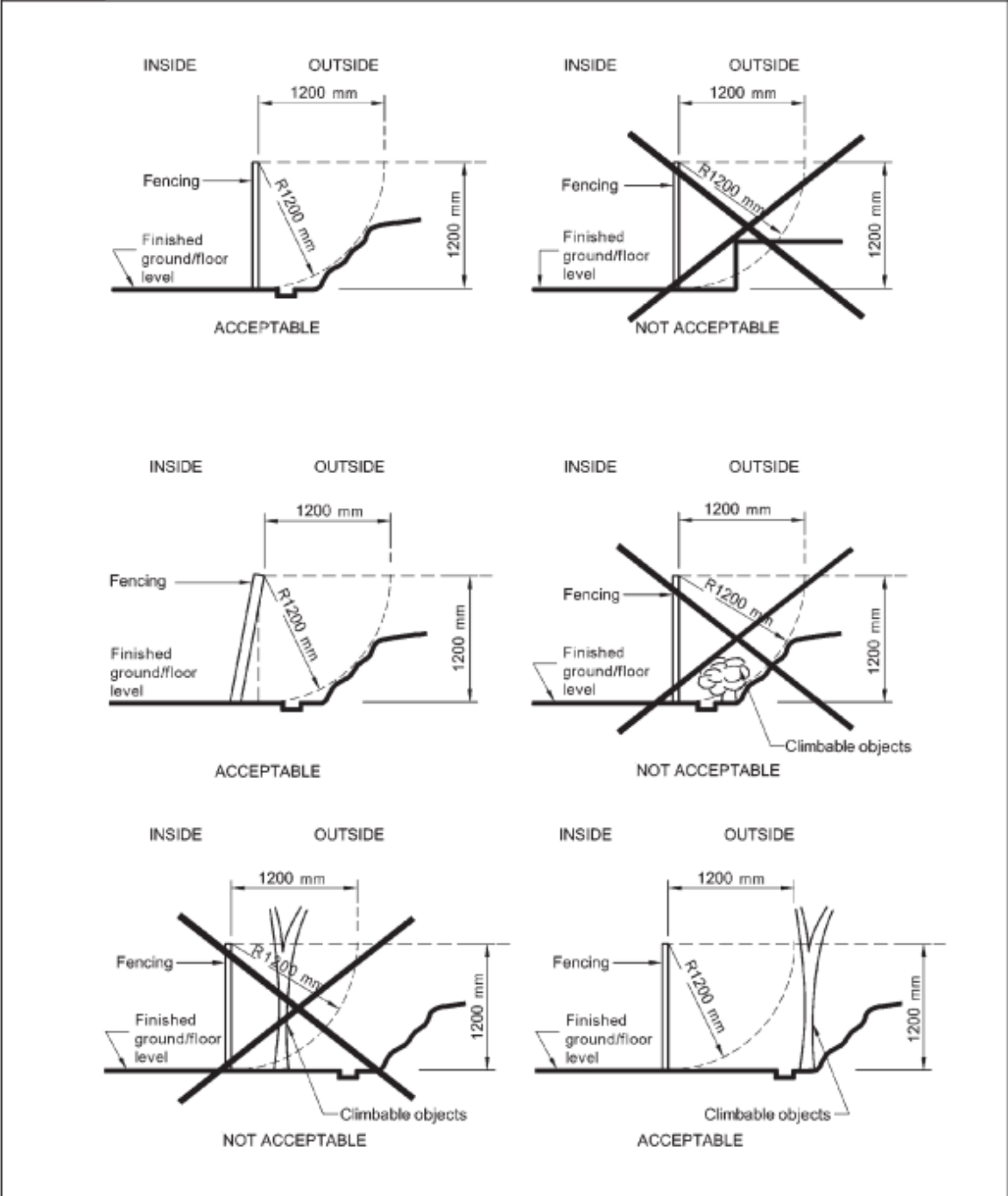
2.1.7 Any projections or indentions on the outside face of a pool barrier shall not have a horizontal projection from the face of the pool barrier greater than 10mm unless they are at least 900mm apart vertically.

...



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**Figure 2: Determining pool barrier height**  
Paragraph 2.1.6



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## Appendix C: Extract from *Child Safety Barriers*

### 1.4 Rules, regulations and standards

Present rules and standards are varying, see Table 1.1, both for pool fences and for barriers in general. The first five of the standards in Table 1.1 address barriers for swimming pools and the others address general barriers. The specifications are also normally general and allow for variations that may unintentionally facilitate climbing. This should be kept in mind when analysing and proposing different solutions aimed at uniformity and at a better and more transparent correlation between the design of a barrier and its ability to prevent climbing. It is worth noting that pool accidents are most common for smaller children up to 3 years, while children of all ages are subjected to fall accidents.

Table 1.1 Regulations and standards.

Standard/ Regulation	Country/ Region	Height [m]	Gaps [mm]	Mesh [mm]	NCZ* [m]	Age*** [year]
WHO	World	1.2	100	-		
CPSC	US	1.2	100	45.5		
AS 1926.1-2007	Australian	1.2	100	13-100**	0.9	5
NZS 8500:2006	New Zealand	1.2	100	10-53**	0.9	6
NF P 90-306	France	1.1	102		1.1	5
BS 6180:1999	UK	1.1	100			5
EN 1176-1:2008	Europe		89			
BFS 2008:6 BBR 15	Sweden	1.1	100			

\* NCZ - Non climbable zone

\*\* Depends on height of the barrier

\*\*\*Upper limit of protected age group

To help preventing drowning of young children in swimming pools, the WHO [1] recommends that barriers should be 1.2 m high and have no hand- or footholds that could enable a young child to climb it. It is also concluded that the safety barrier is not a hazard itself in terms of entrapment if the gaps are smaller than 10 cm. These two measures, height and gap between bars, seem to be the ones that are specified in most standards. There is some variation even in those.

Regarding gaps, it is recommended by the US Consumer Product Safety Commission (CPSC) [6] that they should be less than 4 inches (10.16 cm) to prevent a child from being squeezed. According to the Swedish code BFS 2008:6 BBR 15 [9] horizontal openings above the balcony front should be designed so that children cannot get stuck with the head, and the range of 110-230 mm should be avoided. To prevent small children from getting through with the torso and getting stuck with the neck/head, the gap should be limited to 89 mm [10]. In EN1176-1:2008 the range of 89-230 mm must be avoided for openings (89 x 157 mm being the dimensions for the "torso" probe). [14], [15] and [16] give maximum gaps of 100 mm. To find a reasonable limit, anthropology data of head and body dimensions for small children 6-12 months can be studied. According to BS 7231-1:1990 [8] a 6 month old infant's head has a diameter of 140 mm. Because the head is not round, the test probe for a small head is between 100 and 130 mm in diameter SS-EN 1176-1:2008 [10].

## Appendix D: BIA news no. 32, April 1994

# Barriers

## why the 100 mm diameter sphere?

**W**hat is the purpose of Paragraph 1.2.1 (a) of acceptable solution F4/AS1 which states that barriers where children are likely to be present shall have "No openings through which a 100 mm diameter sphere can pass"?

The important dimension in any barrier intended to resist children is the size of a child's head. Once the head is pushed through an opening a child's body is flexible enough to follow.

The heads of babies and young children are very large in proportion to their bodies. Tests have shown that a child's body can fit through an opening that is approximately 90 percent of the size of the opening through which the head can pass. Much research has been done overseas on the dimensions needed to restrict young children and provide a safe environment for them. These design considerations apply not only to gaps in a barrier balustrading but also to cots, playpens and similar equipment.


A key dimension that became apparent was that the 99 percentile head width for a 2-year-old child is about 115 mm; the chest width therefore corresponds to about 105 mm. Thus a figure of 100 mm for the maximum opening in children's equipment became a standard dimension.

The New Zealand Building Code, along with the British, Canadian and Swedish codes, adopted the 100 mm sphere dimension to stop not only a child passing completely through a barrier but also to prevent its body passing through and the head becoming trapped.

A New Zealand standard\* which gives specific data on head widths for New Zealand children shows that the 100 mm sphere test is appropriate in this country. Head widths for children under 6 years of age range from 110-130 mm for 1-year-olds to 130-140 mm for 5-year-olds.

Preventing the passage of children through barriers is a necessary requirement of the building code. Injury from falls from buildings rates significantly among child hospitalisation statistics. In 1989 alone, 204 children under 6 were admitted to hospital from falls from buildings, and of these, 53 fell from a balcony, veranda or patio.

*NSZ 5828: Specification for playgrounds and playground equipment, Part 3:1986 Design and construction - safety aspects.*



## Appendix E: Report commissioned by ANEC “Dimensions and designs of swimming pool fences and balcony and stairs barriers to protect children from falling and from passing through, below or above”

generally occurs when children place their heads through an opening in one orientation, turn their heads to a different orientation, then are unable to withdraw from the opening.

- Advanced (outwards) guards, outside the building profile: guards can have a space between them and the front wall of the building or the edge of the balcony floor. Children that walk or

crawl in a balcony with that type of protection might easily lose support of their feet or hands and a total or partial fall might occur.

- Handholds and footholds: many balconies are designed with gaps in their structure or may have chairs, flowers, plants or other decorative elements in the vicinity, that provide good support if a child wants to climb.



Figure 1 - A gap of 11 cm allows the child's body to pass entrapping the head.

The design of good barriers has probably the same cost as the design of unsafe barriers, but safe barriers will save lives and money spent on fall related injuries. Some aspects of barrier design are discussed next.

**Maximum height of a barrier** – measured from the floor to the top of the barrier.

The value for the height of the barrier is frequently defined in the interval from 0,90 m to 1,10 m. Despite these values there are some cases where we can see extreme values as 0,70 m (French Standard for non housing barriers with top  $\geq 0,60$  m) and 1,40 m (Italian Standard).

