

## ***Floor level for a house on a flood-prone site***

### **1 THE MATTER TO BE DETERMINED**

- 1.1 The matter before the Authority is a dispute as to whether building consent should be granted for a house on a flood-prone site with proposed floor levels lower than is required in the territorial authority's catchment management plan.
- 1.2 The Authority takes the view that it is being asked in effect to determine whether the proposed building complies with clause E1.3.2 of the building code (the First Schedule to the Building Regulations).
- 1.3 In making its determination the Authority has not considered whether the proposed building work will comply with any other provisions of the building code or of the Building Act.
- 1.4 The Authority has also not considered whether the floor level required by the catchment management plan is a legitimate requirement under the Resource Management Act or any other Act except the Building Act. The Authority reads section 34(3) of the Building Act as a positive obligation on a territorial authority to grant building consent if satisfied on reasonable grounds as to compliance with the building code irrespective of requirements under other Acts. Section 35(3) makes it clear that issuing a building consent under the Building Act will not prevent the enforcement of any other Act.

### **2 THE BUILDING**

- 2.1 The proposed building is a new detached house on an almost level site (ground levels varying from approximately RL 53.7 to 54.2 m). Habitable rooms on the ground floor are shown as having a finished floor level of RL 54.6 m and the garage as having a finished floor level of RL 54.3 m.

### 3 THE PARTIES AND THEIR SUBMISSIONS

3.1 The applicant was the owner. The other party was the territorial authority.

3.2 The applicant submitted a report by a consulting engineer. The report recommended a floor level for habitable rooms of RL 54.6 m on the basis that:

- (a) The flood level in a storm having a 2% probability of occurring annually (“the 50 year flood”, also referred to as the 2% AEP event) would be RL 54.3 m.

The consulting engineer arrived at that level from consideration of the 100 year flood level of RL 54.4 m shown in the catchment management plan for a point about 50 m upstream from the proposed house.

- (b) A freeboard of 300 mm would be adequate for the site concerned.

The consulting engineer arrived at that freeboard from a site survey which led him to conclude that flood waters in the RL 54.2 to 54.4 m range can spread over a significantly greater area than is shown in the catchment management plan and that there was no risk of backwater effects.

The consulting engineer also considered that because the area was comparatively flat lesser freeboard was required than in a narrow steep-sided valley.

3.3 The territorial authority’s submission was in effect that the catchment management plan specified that floor levels for habitable rooms were to be 600 mm above the 100 year flood level shown in the catchment management plan. That equated to a minimum floor level for habitable rooms of RL 55.0 m. The territorial authority said:

We see the 2% AEP floor level requirement of the Building Act as minimum guidelines which we enhance to 1% to apply to [our local] conditions well proven by detailed analysis and many years of practical stormwater management.

The catchment management plan also specified floor levels for non-habitable rooms, which are presumably intended to apply to the garage, see 5.2 below.

- 3.4 The Authority drew the attention of the parties to the draft revision of its Approved Document E1, which had been made available for public comment towards the end of 1998, and in particular to the following proposal with respect to freeboard:

The level of the floor shall be set at the height of the secondary flow plus an allowance for freeboard. The freeboard shall be:

- 500 mm where surface water ponds to a depth of 100 mm or more and extends from the building to a road or car park, other than a car park for a single dwelling.
- 150 mm for all other cases.

The Authority also sought the views of an engineer whom it had engaged as an adviser in respect of that draft. That advice was given orally, and the Authority repeated it to the parties in the following words:

We understood [the Authority's adviser] to explain that:

- (a) Freeboard allows for both:
- (i) Uncertainties in determining flood level, and
  - (ii) Wave action.

See also Determination 98/003.

- (b) The 500 mm freeboard mentioned in the draft is made up of:
- (i) 150 mm for uncertainties in determining flood level.

That is considered a reasonable allowance for the general case of a 100 hectare catchment to which the draft is limited, and it is also considered appropriate for the much bigger [catchment concerned] on the basis that the Catchment Management Plan was no doubt the result of sophisticated modelling and calculation.

- (ii) 350 mm for a wave generated by a vehicle. This in turn is made up of 200 mm wave height plus 150 mm run-up when the wave hits the building.

A 200 mm wave will be sustained so long as there is a minimum 100 mm depth of water, and will travel a considerable distance. A reduction in the depth of 100 mm between the source and the building will cause the wave to break.

3.5 The territorial authority responded by saying:

- (a) Finished floor level of any habitable room should be at the 100 year flood level plus 600 mm freeboard as indicated in the catchment management plan.
- (b) “Freeboard is the design margin to allow for factors omitted in the overall designs such as wave action and settlement of foundations and uncertainties in the estimation of flood levels. Should freeboard criteria be considered for amendment we would expect more intensive review of the [catchment management plan] model based on newly acquired and appropriate data.”

3.6 The applicant’s consulting engineer responded by saying:

- (a) “Given the wide flowpath downstream from [the house concerned] . . . an allowance of 150 mm for uncertainties is reasonable”.
- (b) “[The house] is about 30 m from the road carriageway. Fencing can be expected to limit wave action.”

(c) “. . . in terms of the 100 mm flood depth criteria:

“50 year (2% AEP) flood level      RL 54.30 m

“Driveway level at road boundary      RL 54.19 m

“This gives a floodway depth of 110 mm at the road boundary of the property. The client can provide a 170 mm hump in the driveway and front yard, if necessary, to ensure that wave action cannot affect [the house].

“in view of the above factors, the proposed floor level of RL 54.60 m (2% AEP flood level plus 300 mm) is considered adequate.”

3.7 Neither party wished the Authority to hold a hearing at which it could speak and call evidence.

#### 4 THE BUILDING CODE

4.1. The relevant provision of the building code in respect of floor levels, in clause E1 “Surface water”, is:

<b>Provision</b>	<b>Limits on application</b>
<b>E1.3.2</b> <i>Surface water</i> , resulting from a storm having a 2% probability of occurring annually, shall not enter <i>buildings</i> .	Performance E1.3.2 shall apply only to <i>Housing, Communal Residential</i> and <i>Communal Non-residential buildings</i> .

## 5 DISCUSSION AND CONCLUSIONS

- 5.1 The Authority takes the view that section 34(3) of the Building Act prevents a territorial authority from refusing a building consent for work which complies with the building code even if it does not comply with requirements under any other Act. Such a requirement is to be enforced under the Act concerned, not by the refusal of a building consent under the Building Act. Thus the catchment management plan, issued under the Resource Management Act, is irrelevant to this determination, which is not to say that the catchment management plan cannot be enforced under the Resource Management Act.
- 5.2 The floor levels for non-habitable rooms specified in the catchment management plan are not discussed below because clause E1.3.2 of the building code applies only to the classified uses Housing, Communal Residential, and Communal Non-residential as defined in clause A1 of the building code (see 4.1 above) and a domestic garage does not come within any of those classified uses, but within the classified use Outbuildings. Thus the building code has no requirement for the floor level of the garage and the proposed floor level of RL 54.3 m must be accepted.
- 5.3 The territorial authority was unwilling to consider any freeboard other than as specified in the catchment management plan.
- 5.4 The applicant's consulting engineer was of the opinion that the freeboard appropriate for comparatively flat land is less than the freeboard appropriate for a narrow steep-sided valley. That opinion appears to relate to uncertainties in the estimate of surface water level and not to wave-type effects.
- 5.5 The applicant's consulting engineer estimated the 50 year flood level at RL 54.30 m on the basis of the 100 year flood level specified in the catchment management plan. That estimated flood level was not disputed by the territorial authority, and therefore the Authority is prepared to accept it for the purposes of this determination.
- 5.6 The applicant's consulting engineer suggested that fencing might limit wave action. However, the house is served by a straight drive to the road, approximately 30 m long. The Authority does not consider that fences beside the drive will have a significant effect on wave action along the drive. The Authority therefore considers that wave action must be allowed for so that 500 mm freeboard is appropriate. The Authority therefore considers that the house will comply with clause E1.3.2 of the building code if the finished floor level of habitable rooms in the house is at or above RL 54.80 m.
- 5.7 The Authority recognises that the allowance for wave action will not be necessary if the house will not be exposed to wave action. That will be the case if the depth of

water at some point in the path of any waves is less than 100 mm or if there is an effective barrier to prevent the passage of waves. The applicant suggested a “170 mm hump” on the drive, and the Authority considers that the suggested hump having its top at or above RL 54.36 m would be effective to prevent wave action along the line of the drive. However, the Authority does not have sufficient information to determine whether similar provisions would need to be made to prevent wave action along different stretches of flood water between adjacent roads and the house concerned. Such precautions might include the provision of fences sufficiently solid to prevent the passage of waves. All necessary provisions would need to be specified in the building consent. If all necessary provisions were made to prevent waves reaching the house then an appropriate freeboard is 150 mm above the 50 year flood level of RL 54.30 m, so that the finished floor level of habitable rooms in the house could be RL 54.45 m.

## 6 THE AUTHORITY'S DECISION

6.1 In accordance with section 20(a) of the Building Act the Authority hereby determines:

- (a) That the house will comply with clause E1.3.2 of the building code if either:
  - (i) The finished floor level of habitable rooms is at or above RL 54.80 m; or
  - (ii) The plans submitted to the Authority are amended to incorporate, to the satisfaction of the territorial authority, provisions to prevent waves reaching the house as discussed in 5.7 above, and the finished floor level of habitable rooms is at or above RL 54.45 m; and
- (b) Clause E1.3.2 does not apply to the garage, so that the proposed garage floor level of RL 54.3 m is to be accepted.

Signed for and on behalf of the Building Industry Authority on this 15<sup>th</sup> day of June 1999

W A Porteous  
Chief Executive