

## 21. FLOODING AT THE CORNER OF WAITAKI STREET AND BEXLEY ROAD

RR 9708

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The purpose of this report is to consider whether the dwelling at 1 Waitaki Street should be raised now by the City Council to reduce the risk of flood damage.

### BACKGROUND

On 28 August 1992 during the “snowstorm” event flood water inundated the floorboards of the dwelling at 1 Waitaki Street to a depth of up to approximately 200 mm for a period of about five hours. Flood water has entered the house twice during the 26 years the present owners, Mr and Mrs Clarkson, have lived at 1 Waitaki Street.

A request from the owners to the City Council to raise the house above extreme flood levels was declined by the Community Board at its November 1992 meeting until the raising of houses in the Avon River floodplain could be considered within the context of an overall floodplain management strategy.

Several flood mitigation measures which in aggregate reduce the risk of house flooding at 1 Waitaki Street significantly have been implemented by the City Council.

House raising was investigated in more detail by the Water Services Unit during late 1998. A preliminary quote of \$20,800 (excluding GST) was obtained from a contractor for the work. In December 1998 I visited Mr Clarkson to explain my decision to postpone further consideration of house raising until the Avon River floodplain management strategy was more advanced. I also explained how the various mitigation measures implemented since 1992 have reduced the risk of house flooding significantly.

During February this year Mr and Mrs Clarkson wrote to the City Council again requesting that either:

- (a) their house be raised within the next few months, or
- (b) the City Council give a guarantee of full security from future flooding and an undertaking to meet the cost of any future flood damage

### 1992 RESOLUTION AND SUBSEQUENT ACTION

The November 1992 report to the Board concluded that:

The following measures are considered an appropriate response:

- (a) The immediate raising of all low spots on the Lower Avon stopbanks
- (b) Under the 1981 Lower Avon Stopbanking Scheme, the raising of banks to full height and the completion of the banks, commencing in the 1993/94 financial year
- (c) A new grille at the pumping station inlet
- (d) Investigating the feasibility of providing an automatic grille clearance device

- (e) The option of the raising of houses in the Avon River floodplain as an integral part of the overall Avon floodplain management investigation

The Board's recommendation was:

1. That this report be supported by the Board and referred to the Operations Committee for adoption of the measures set out in the conclusion.
2. That Mr and Mrs Clarkson be advised of the Council's decision.
3. That the Drainage and Waste Manager's report on the entry of flood water into the home of Mr and Mrs Clarkson at 1 Waitaki Street be supported by the Board and referred to the Operations Committee for the adoption of the measures set out in the report's conclusion.
4. That alternative methods of power for the pumping station on Knights Drain be investigated.
5. That maintenance of Knights Drain be improved to prevent debris from blocking the inlet grille.

The following flood mitigation measures have been implemented subsequently:

**(a/b) Stopbank raising**

Between 1993 and 1995 all stopbanks throughout the lower Avon scheme area were raised to full height in terms of the resource consent granted for the 1981 Lower Avon Stopbanking Scheme. Filling up to 250 mm depth was required in the Bexley area to achieve a stopbank west level of RL 11.2 m.

Peak flood levels of RL 10.95 m to 11.0 m were reached during the August 1992 event which resulted in overflows from the river accumulating at the Waitaki Street/Bexley Road corner until flood water eventually entered the home at 1 Waitaki Street (floor level = RL 10.25 m).

The risk of backflow from the Avon River through the piped stormwater reticulation system during very high tides has also been reduced. A critical manhole on Bexley Road towards Wainoni Road has been modified to prevent backflow up on to the road.

House flooding would not have occurred during August 1992 with stopbanks at their present crest level.

**(c) Pumping station inlet grille**

A new grille much less susceptible to blockage was installed at the Waitaki Street stormwater pumping station which drains Knights Drain catchment in 1992.

**(d) Automatic grille clearance device**

Installation of an automatic grille clearing device was investigated but found to be impractical. However, not only has the new inlet grille been installed but a large artificial wetland is under construction on Knights Drain approximately 100 m upstream from Bexley Road. The wetland will intercept and store debris conveyed down the drain. Once Knights Drain is piped under the Burwood/Woolston expressway only debris direct from Waitaki Street and Bexley Road or debris small enough to pass through sump grates and the wetland will reach the pumping station. The risk of blockage at the pumping station will have been reduced greatly.

Another benefit of the wetland is that it will increase flood storage within Knights Drain catchment reducing the peak pumping demand on the pumping station.

**(e) Floodplain management strategy**

A floodplain management strategy for the Avon River catchment is being proposed jointly with the Canterbury Regional Council. The Strategy will consider all options, including house raising, for reducing flood damage on land along the lower reaches of the Avon River. Public submissions on the Issues and Options document have been processed. The Water Services Unit is committed through the Council's 1999/2000 Annual Plan to adoption of a Floodplain Management Strategy by both the Canterbury Regional Council and Christchurch City Council by 30 June 2000.

Eight dwellings including 1 Waitaki Street plus two other buildings (10 buildings in total) within the Bexley area have floor levels below mean high water spring tide level (RL 10.35 m). From a floodplain management point of view house raising at 1 Waitaki Street should not be considered alone. In terms of risk of inundation the case for raising the other seven houses is of similar merit.

Before June next year further community consultation will be sought on a suite of flood damage reduction measures including house raising prior to the adoption of a comprehensive strategy by both councils.

**4. Alternative power for the pumping station**

A comprehensive investigation by City Design into the operation of the Knights Drain pumping station identified inlet grille blockage, overloading pump discharge capacity and cabbage tree leaf blockage of pump impellers rather than power outage as the principal causes of operational failures at the pumping station. All three issues have been addressed: a new inlet grille installed, in-line storage through the wetland resulting in reduced pumping demand, and a street cabbage tree replacement programme throughout Bexley.

## 5. Knights Drain maintenance

The maintenance regime on Knights Drain has been reviewed. The pumping station inlet grille is on a special maintenance list for priority treatment. However, of more significance in debris reduction is the new wetland and proposed waterway piping under the Burwood/Woolston expressway which will reduce the amount and size of debris reaching the pumping station.

### DISCUSSION AND CONCLUSIONS

Not only have all flood mitigation measures recommended in the November 1992 report been carried out but in addition stormwater pipeline backflow has been reduced and the new wetland on Knights Drain will result in improved operation of the Knights Drain pumping station during storms.

The risk of a recurrence of floodwater entering the house at 1 Waitaki Street has been reduced significantly by the suite of flood mitigation measures implemented since the August 1992 storm. For example, the 1% AEP event (or "100 year flood") with an expected peak level of RL 11.09 m in the Avon River is now contained within the stopbanks (new crest level = RL 11.2 m).

While all the flood mitigation measures implemented have reduced the flood risk at 1 Waitaki Street significantly they have not provided Mr and Mrs Clarkson with "peace of mind". This is understandable because it is very disconcerting to observe Avon River levels higher than floor level during every above-average spring tide. Like the people in Holland, the residents of Bexley are living behind a dike. Raising the lowest houses in Bexley including 1 Waitaki Street would provide peace of mind to residents but may not be the most cost-effective measure to reduce overall flood damage risk. This will be determined through the floodplain management strategy process which will be nearing completion in 12 months time.

The Clarksons have asked for assurances that house flooding will not occur in future and that the City Council will meet the cost of any future flood damage. These assurances cannot be given because flood hazard scenarios most likely to cause house flooding are beyond City Council control. For example, the "engineering lifelines" study identified the risk of Avon River stopbank overtopping due to tsunami conditions and the risk of stopbank collapse due to the liquifaction of underlying soil during a large earthquake. These risks are low, but nevertheless real.

However, part of the Clarksons' request can be met. All flood mitigation measures implemented since August 1992 should be listed clearly on the property file for 1 Waitaki Street and provided in response to any property enquiry.

- Recommendations:**
1. That the previous Board recommendation for the raising of homes including 1 Waitaki Street in the Avon River floodplain be considered within the context of the joint Christchurch City Council/Canterbury Regional Council floodplain management strategy expected by 30 June 2000 be re-affirmed.
  2. That the Water Services Manager ensure that information on all flood mitigation measures implemented since August 1992 is provided with any Land Information Memorandum or other property enquiry for 1 Waitaki Street.

**Chairperson's  
Recommendation:** For discussion.