

A total of 185 Houses could be expected to have flood water above floor level in this scenario

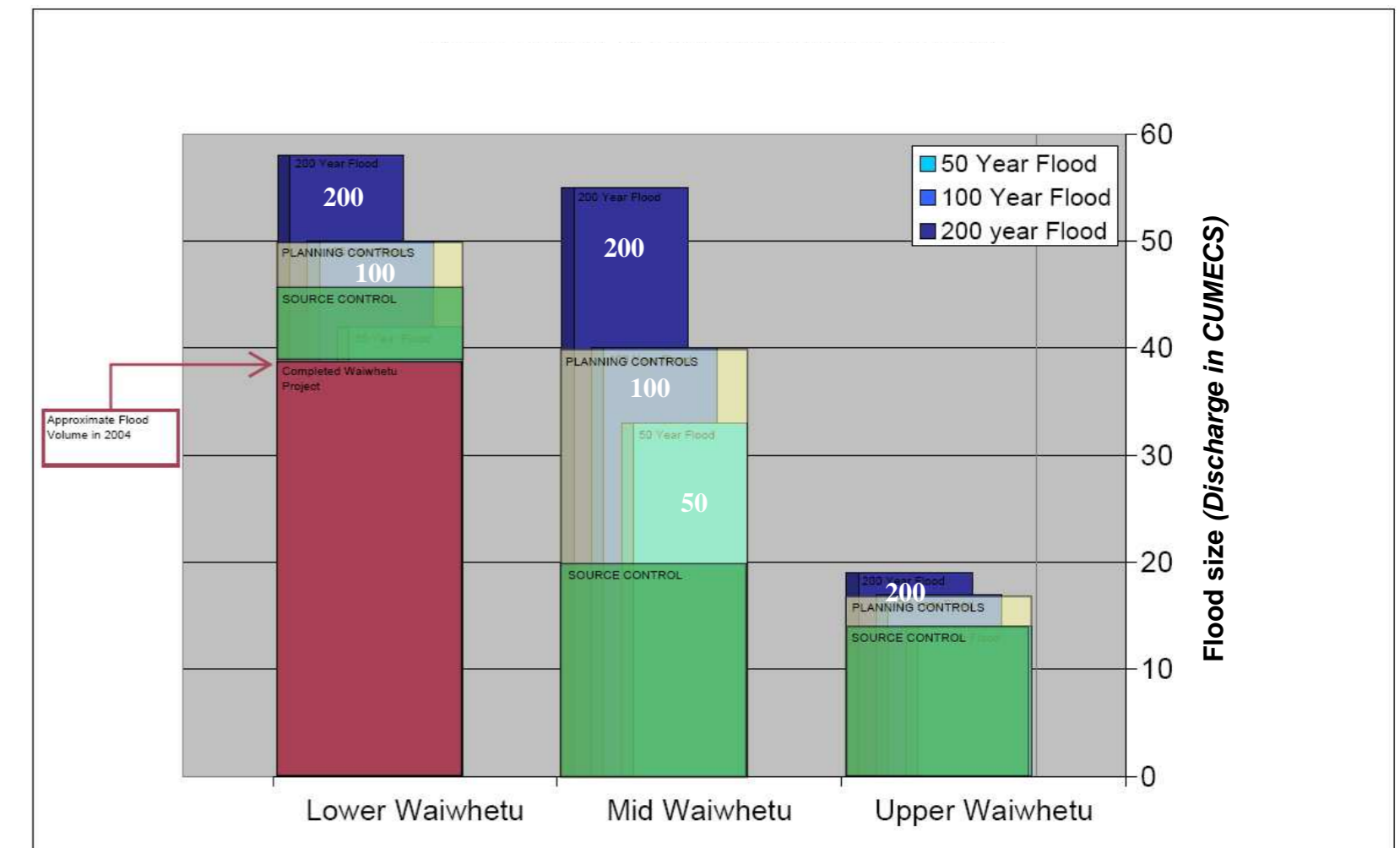
Option 3 Planning Control Implications (area inside orange dotted line);

- Density** - Planning controls how small a section can be in flood prone areas
- Floor Levels** – Control to make minimum floor levels 1-in-100 year flood level for new development
- Access** – Controls to require new developments have safe access in a 1-in-100 year flood event



Option 3 Building Control Implications;

- Stormwater** – Prohibit direct discharge to street from **all** properties in catchment
- Storage Tanks** – require **all** properties to install a minimum 10,000 litre of storm-water storage



Option	Description	Estimated Cost
Education programme	Source control education programme and information support	\$0.05 Million
Run off reduction ¹	Install storage tanks and swales throughout catchment	\$5 Million ¹
Planning/building controls ²	Change planning rules to prevent direct discharge of storm water from properties	\$0.05 Million
Ongoing costs ³	\$10,000 p.a to provide advice and support service [20 years duration]	\$0.2 Million
Storage areas in parks and berms ¹	Lower park areas, install subsoil storage, lower berms, encourage wetlands.	\$4 Million ¹
Total costs		\$9.3 Million

¹These dollar values are for additional cost to carry out these works for flood protection benefit in addition to cost of routine end of life replacement or upgrade works. E.g. storm-water infrastructure has a designed life of approx 80 years, this means that acceleration of this option to be completed over a shorter time period would incur additional cost.

²The prevention of discharge means that water must go through some form of primary treatment before entering the public storm-water system. This can be achieved through storage tanks, soak-away pits, ponds etc.

³This is based on funding for a part time advisor role

Total cost	\$9.3 Million
Direct damages saved (in a single 1-in-100 year event)	\$60 Million
Individual ratepayer cost per year \$100,000 of property value (HCC ratepayers over a 20 year loan funded works repayment schedule)	\$4.98 p.a./\$100,000

Disclaimer;

All dollar values used are approximations and may change during further detailed investigation; Calculations use the 2007 dollar value; Direct damages saved only consider one occurrence of a 1-in-100 year flood event; Individual rate payer cost is a guideline only and may not reflect final rating values.

Option 3 – Source Control

Description – Implementation of source control and storage options catchment wide. Assumes that each property can store 10,000 litres of water, and road side drains at front of each property are converted to swales.

Strengths - Lower cost highly sustainable solution . Delays and smoothes out flood peaks. Has direct stream flooding and surface run-off benefits. Can be implemented gradually. Great potential for environmental benefits. Can be tied into CDEM.

Weaknesses - Diminishing benefits the larger the flood size due to capacity limits (ie not all the rain water causing a flood can be stored). Requires whole of community support. Not recommended as flood control measure in Australia. Misunderstanding by users of how system is supposed to work can lead to failure.

Waiwhetu Stream Floodplain Management Plan – Options Development



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