

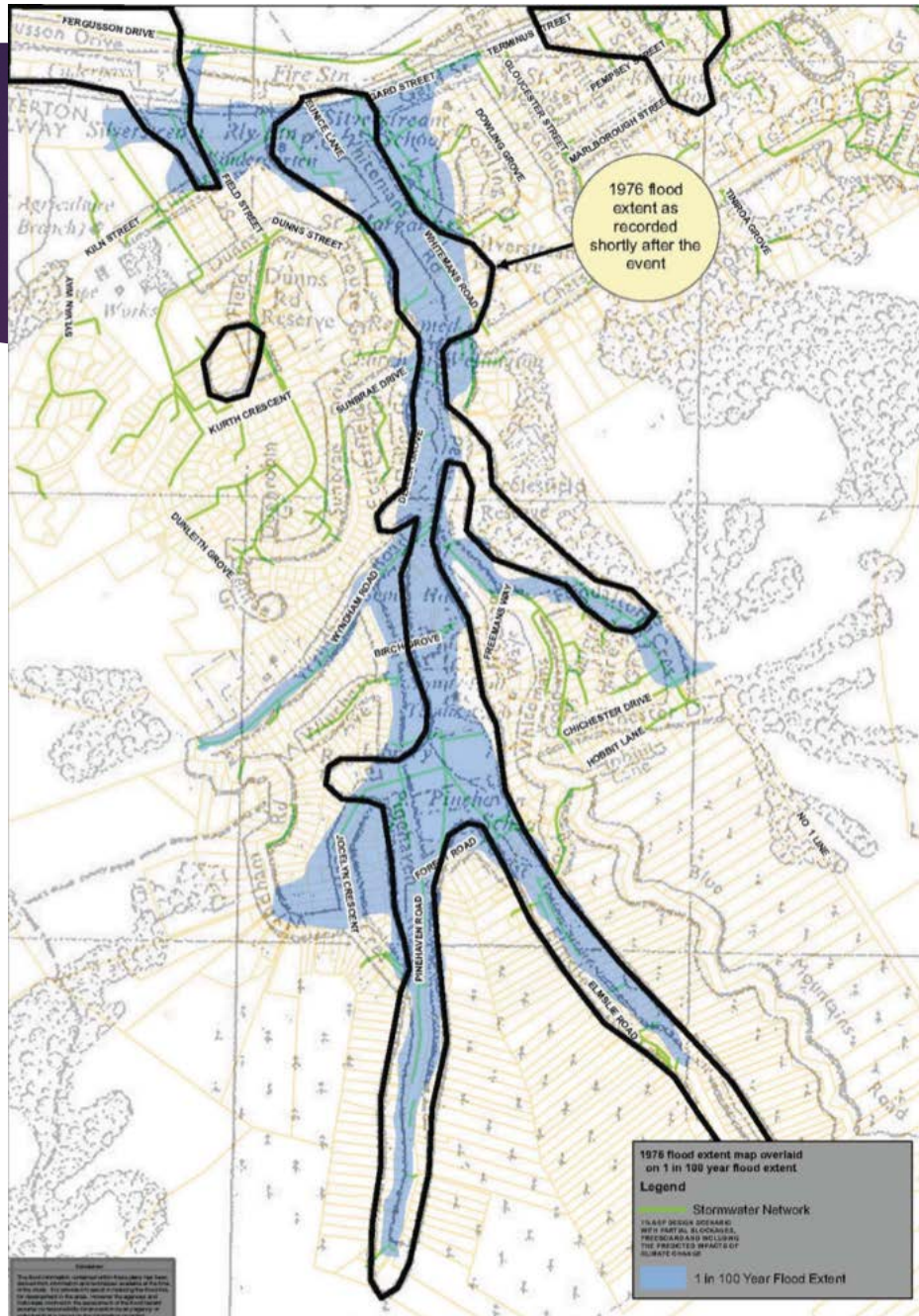
1980s Significant Drainage Upgrade

Save Our Hills (Upper Hutt) Inc.

Current 1-in-100 year flood maps don't show any benefit from “significant work” in the 1980s (after 1-in-100+ year flood in 1976) to improve stormwater drainage in Pinehaven and Silverstream; this work doubled the capacity of the drainage network and should result in less flooding in future.

Yet, due to climate change, blockages and freeboard, GWRC's flood maps predict more rather than less flooding if a similar storm re-occurred? This is not plausible, and SOH wants this independently investigated before current flood maps are accepted by UHCC into the District Plan.

GWRC 2010 map vs 1976 flood



Both maps (GWRC 2010 flood map in blue) and the 1976 flood map are overlaid on the same drainage network plan (stormwater drains in green) giving the visual impression that the network was the same in 1976 as today, which is misleading.

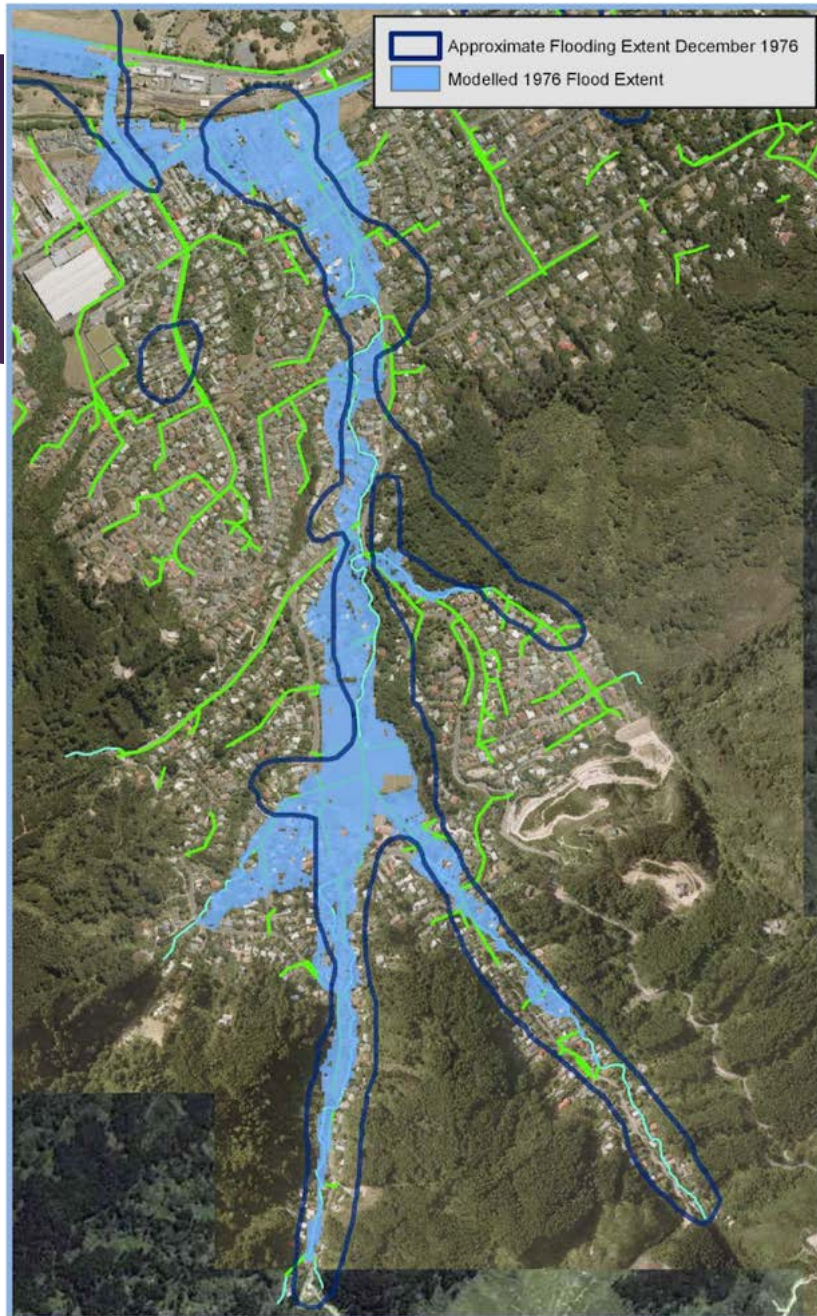
The late John Christensen, Civil Engineer, Pinehaven, told Stephen Pattinson (SOH) about the new drains that went in after the 1976 flood so that it wouldn't flood that badly again.

John said: "GW's map looks worse than 1976 flood, which can't be right because of all the new drainage now - there's something wrong with GW's flood maps!"

GWRC – Building a Flood Map p10

<http://www.gw.govt.nz/assets/floodprotection/Pinehaven-for-web-FMP-volume-2-update-6-September-2016.pdf>
(link from UHCC website page for consultation for PC42)

GWRC flood map comparison misleads public



The map on the previous slide (comparing a 1976 flood map with GWRC's actual 2010 flood map) was not released on GWRC's website until after the consultation period for PC42 closed on 8/5/17.

The public have only seen this Figure 14 (opp.) comparing a reduced version of GWRC 2010 map with a slightly enlarged version of the 1976 map.

Eg. Fig. 14 shows less blue around Silverstream and around Jocelyn Cres than in the previous slide, and no blue to Chichester Dr or up Wyndham Rd.

RESULT:

The public is misled by Fig. 14 to believe that GWRC's 2010 1-in-100 year flood modelling is correct because it roughly matches the 1976 flood. In actual fact, it exceeds the 1976 flood extent.

Pinehaven Stream Flood Hazard Assessment_May 2010
Rev E_Vol 1_Figure 14, p24

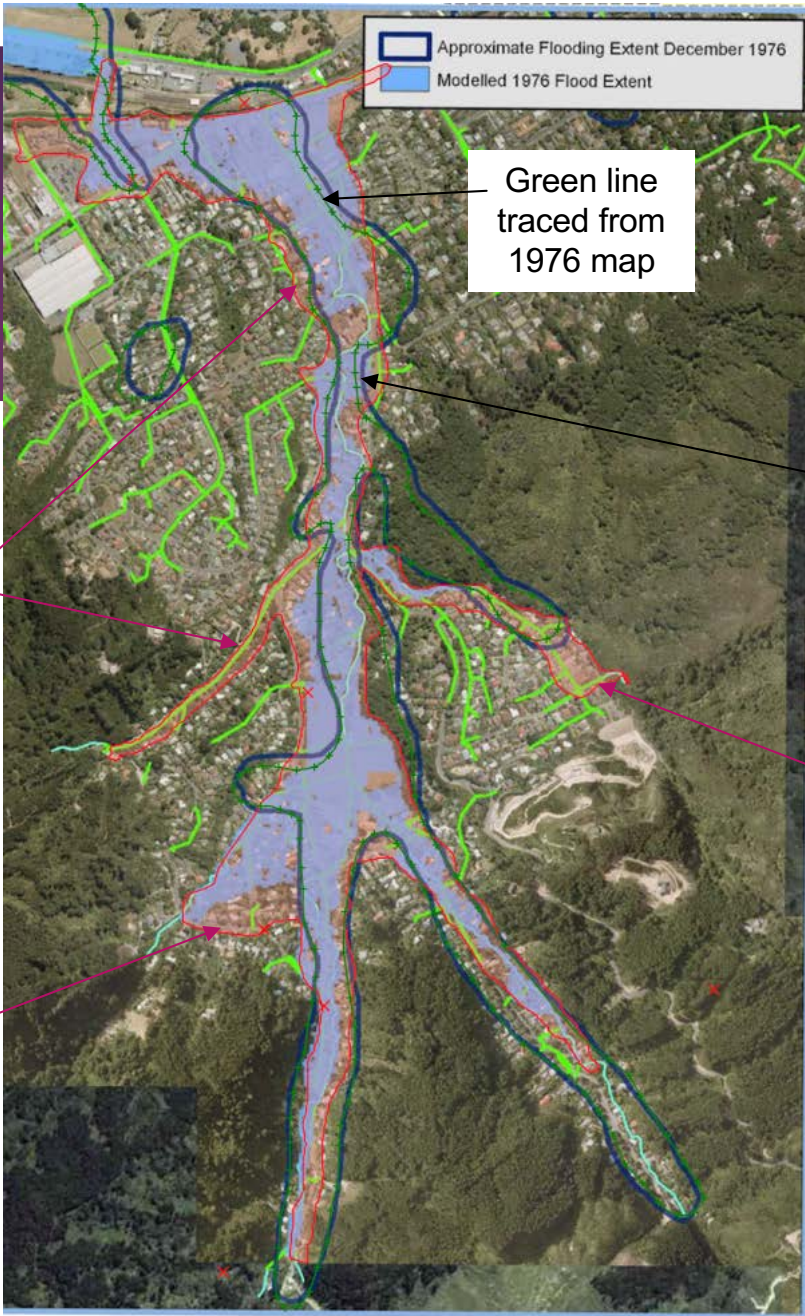
■ Figure 14 Comparison of 1976 and Modelled Flood Extents

Checking reveals GWRC 2010 map is significantly more than 1976 flood

Red line shows actual GWRC 2010 map and is more than the blue shown in Fig. 14. The extra cannot be attributed to climate change, which according to GWRC is less than 100mm cross the catchment.

If Figure 14 was drawn correctly, it would be less convincing that GWRC's flood modelling matches the 1976 flood extent

Red line shows actual GWRC 2010 map and is more than the blue shown in Fig. 14



In Fig. 14, the 1976 map is slightly exaggerated

Red line shows actual GWRC 2010 map and is more than the blue shown in Fig. 14

Analysis of Figure 14 by Save Our Hills (Upper Hutt) Inc.

■ Figure 14 Comparison of 1976 and Modelled Flood Extents

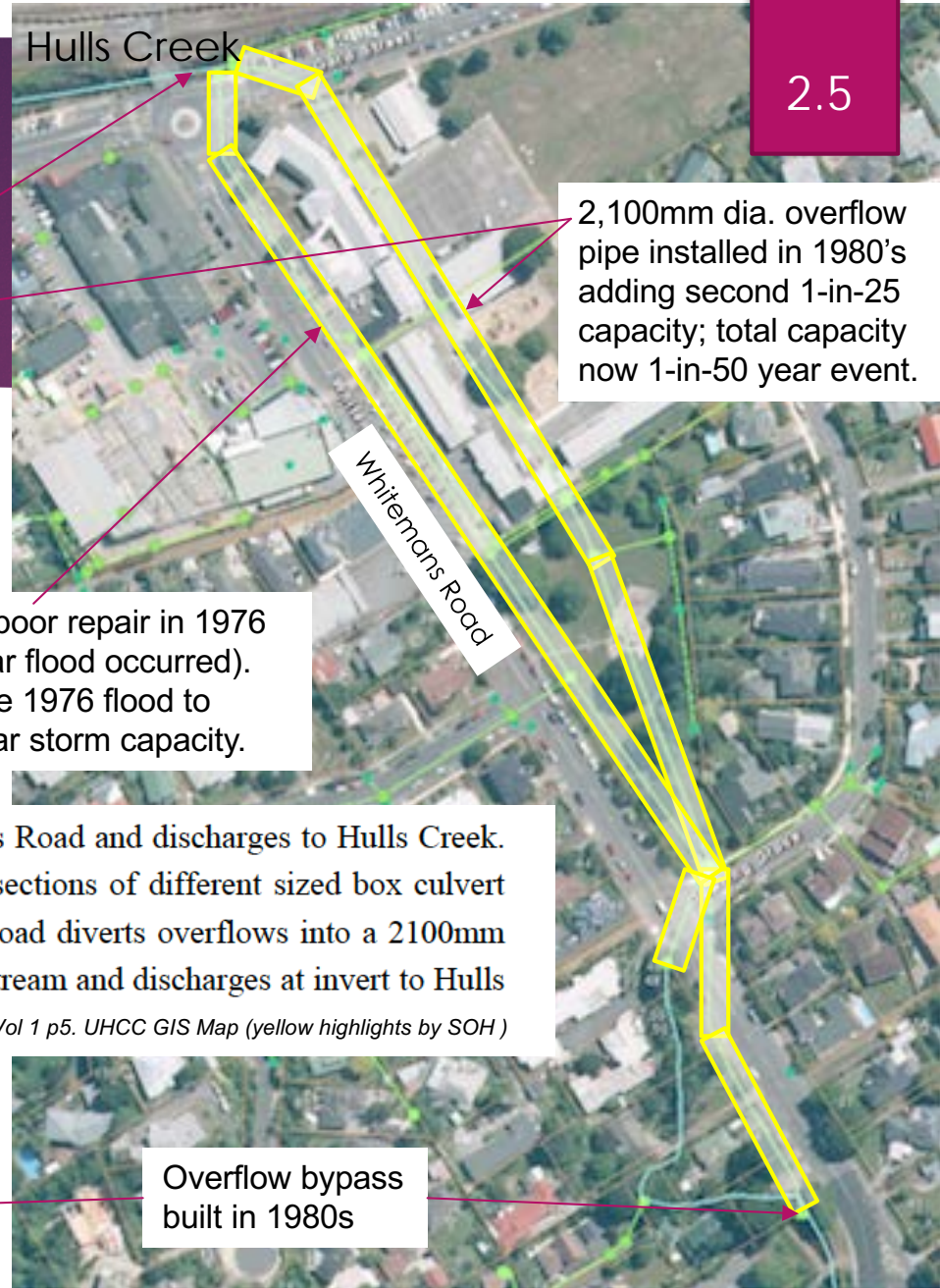
1980s improvements: lower catchment

2.5

Pinehaven Stream
discharging into
Hulls Creek



1,800mm dia. pipe (in poor repair in 1976 when the 1-in-100+ year flood occurred). It was repaired after the 1976 flood to reinstate its 1-in-25 year storm capacity.



2,100mm dia. overflow pipe installed in 1980's adding second 1-in-25 capacity; total capacity now 1-in-50 year event.

Pinehaven stream ...

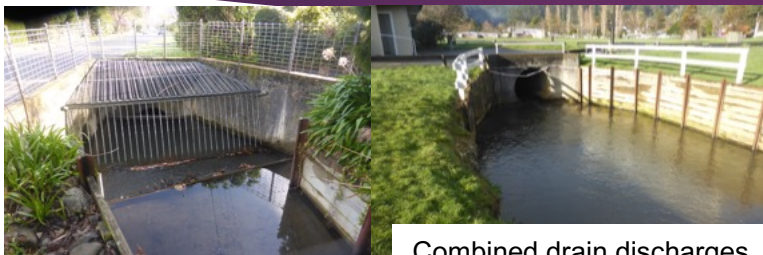
... enters a pipe network that drains under Whiteman's Road and discharges to Hulls Creek. This particular piece of pipe network is comprised of two sections of different sized box culvert and an 1800mm diameter pipe. A bypass on Whiteman's Road diverts overflows into a 2100mm diameter pipe that follows a similar alignment to the piped stream and discharges at invert to Hulls Creek. *Quote from GWRC Pinehaven Stream Flood Hazard Assessment 2010 Vol 1 p5. UHCC GIS Map (yellow highlights by SOH)*



Overflow bypass
built in 1980s

1980s improvements: Pinehaven Reserve

Open stream feeds holding pond on lower field



Overflow bypass built in 1980s at 105 Pinehaven Road

Combined drain discharges to open stream & ponding area in Pinehaven Reserve



Improvements after 1976 flood ...

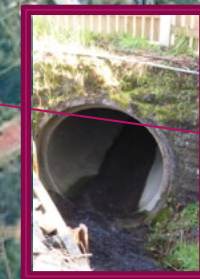
This event led to the construction of a 2100mm diameter bypass under Whiteman's Road to provide protection against a 50 year event (UHCC, 1983). A smaller 1200mm diameter bypass was also constructed in Pinehaven Road upstream of Pinehaven Reserve.

The flooding of December 1976 also prompted significant work to be undertaken on Hulls Creek, the downstream boundary of the Pinehaven stream. This work included the construction of a detention dam upstream of the Pinehaven/Hulls Creek confluence to control the Hulls Creek water level.

An overflow bypass in Pinehaven Road also drains into the pipe network in the reserve. In Elmslie Road the stream passes beneath Forest Road in a culvert before entering the stormwater pipe network in Pinehaven Reserve.

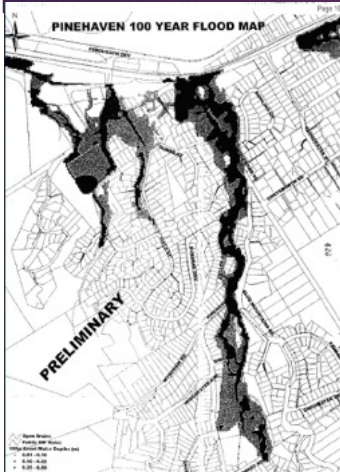
Quotes from GWRC Pinehaven Stream Flood Hazard Assessment 2010 Vol 1 pp 3, 6. UHCC GIS Map (yellow highlights and ponding by SOH, as described to S Pattinson by the late John Christenson, Civil Engineer, Pinehaven)

Overflow bypass at 105 Pinehaven Road built in 1980s



Elmslie Rd culvert

GWRC's 2010 map (blue) treats 1980s improvements as all blocked and useless



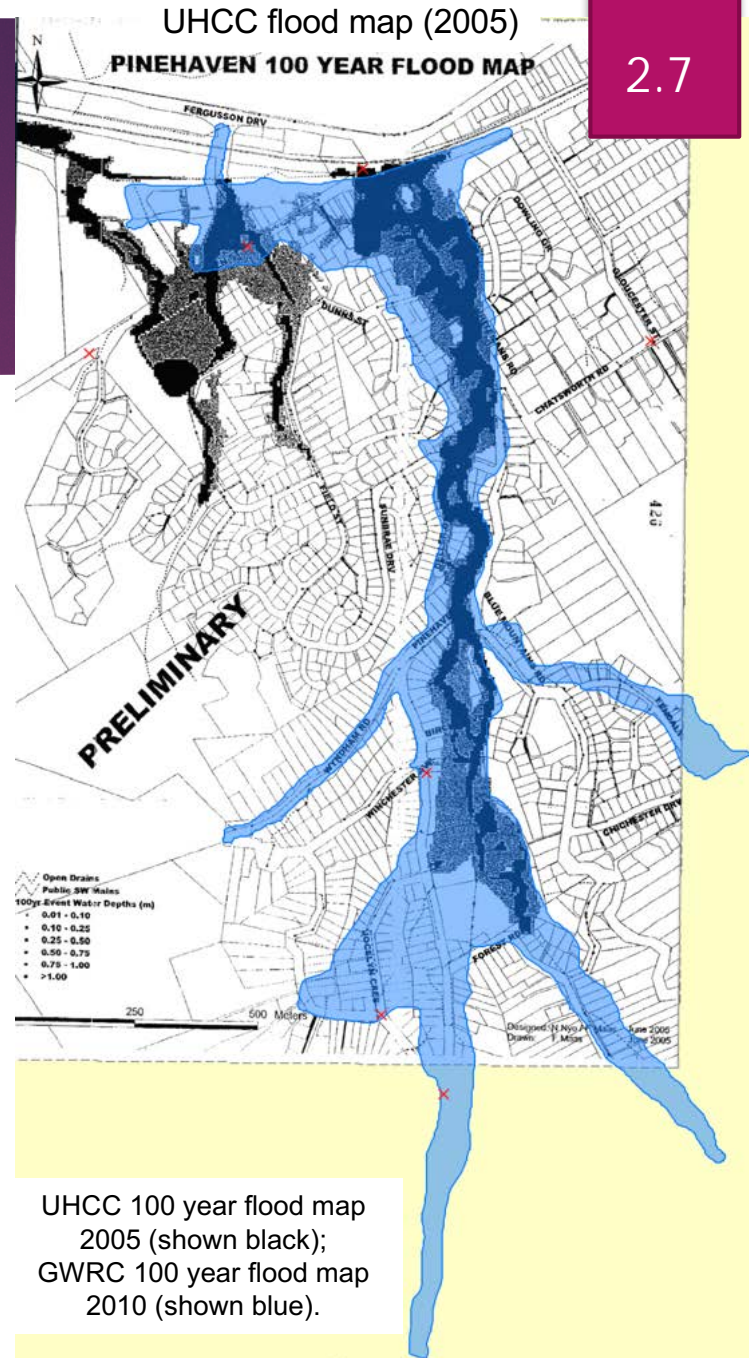
UHCC flood map (2005)

UHCC 100 year flood map 2005 (above) shows flooding only as far as Pinehaven Reserve, and as might be expected following improvements to drainage in the 1980s.

Pinehaven Stormwater Management Study, Attachment 2 to Report 05.626 4th August 2005, Approved by Lachlan Wallach, Director, Infrastructure Services, UHCC

The same flood modelling software was used to create UHCC's 100 year flood map 2005 (shown black) as was used to create GWRC's 100 year flood map 2010 (shown blue). Why is GWRC's blue map showing much greater flooding?

GWRC's 100 year flood map 2010 (shown blue) treats all the 1980s improvements as blocked and useless, and therefore shows much more flooding. Is it reasonable to assume all 1980s drainage improvements to be blocked? SOH wants this checked by an independent expert before UHCC accepts GWRC's flood maps into the District Plan.



UHCC 100 year flood map 2005 (shown black);
GWRC 100 year flood map 2010 (shown blue).

Building a flood map on unsound assumptions

SOH wants the following issues investigated by an independent expert before UHCC adopts GWRC's PC42 flood maps into the District Plan :

1. Misleading graphics were used to convince the public that GWRC's 2010 flood model matches the 1976 100-year flood. In actual fact, the 2010 map shows much more flooding than 1976. X
(needs to be investigated)
2. Why wasn't an assessment carried out in the 2010 flood modelling of the effectiveness of the 1980s drainage improvements, and reflected in the 2010 flood maps? X
(needs to be investigated)
3. Major improvements were made to the drainage network after the 1976 flood. Is it sound to assume they will all be blocked and useless every time there is a 100 year flood event, resulting in the same flooding again as 1976? X
(needs to be investigated)
4. UHCC's 2005 flood map used the same flood modelling software as GWRC's 2010 flood map. Why such a striking difference in the two flood maps? Why does GWRC's 2010 flood map predict much more widespread flooding than both the 1976 and the 2005 flood maps? X
(needs to be investigated)