## Hutt Central Upgrade Stage Two – Questions and Answers

In this column we'll answer your questions on Stage Two of the Hutt Central Upgrade.

### *Why don't we dredge the river rather than build higher stopbanks?*

We've often been asked the question – why build stopbanks when all we have to do is dredge the Hutt River to open up its channel and avoid flooding? The short answer is that the impact of gravel extraction on river flow is limited and insignificant compared to raising stopbanks. Even dredging a deep channel in the shallow waters below Kennedy-Good Bridge wouldn't allow enough water to drain in a flood.

Gravel is extracted to reduce flooding of the river banks in the lower part of the river where bed levels are rising because of the gravel deposition, but while this will marginally help in reducing the flood risk to the broader floodplain it won't for significant flooding. For that we have to raise the stopbanks.

In the City Centre gravel extraction is an even less effective deterrent to major floods because of tide levels in the river's lower reaches. Below the Kennedy-Good Bridge the riverbed flattens out under the influence of the incoming tide and gravel deposits from further up river, forcing the river to widen and become shallow. Only a small percentage of water would drain from deepening the channel by dredging, not enough in flood conditions. Building higher stopbanks allows the water to rise and drain more effectively down a river "slope."

GW surveys the river every five years to identify changes to bed levels along the river and where gravel extraction is necessary. The river bed in the reach from Belmont to Melling is at the right level following gravel extraction carried out in 2011 and 2012. It is planned to use gravel from Melling to Ava when constructing the City Centre project.

In the past uncontrolled gravel extraction led to extensive river bank failure, put stopbanks at risk and caused to excessive maintenance costs for the community. It is now controlled and methods have been developed to minimise the effects from instream gravel extraction on the river's environment and habitats.

### *What's meant by a flood year return period?*

Throughout consultation on changing to higher flood protection standards we used the term "return period," noting that we want to move from a 1 in 100 year flood return period to a 1 in 400 year flood return period in the CBD reach of the Hutt River.

This language isn't easy but as it's at the core of what we want to achieve – better protection against bigger floods – here's an explanation of what it means.

A return period refers to how long we estimate it will be between floods. For example, the estimated return period of a flood might be once in a 100 years (so there would be a 1% chance of one happening in any year). If the return period was 1 in 10 years the likelihood of a flood would be 10 times greater (or 10% more likely).

So what about the potential size of the flood? A good rule of thumb is the lower the return period, the smaller the flood. That makes sense because we know that smaller floods happen fairly regularly (say 1 in 5 years) but bigger floods are rarer (say 1 in 100 years). Hopefully, even larger floods (say 1 in 440 years) will be much rarer. But there's a catch: if climate change continues to go ahead as expected and we get a lot more rain we'll get more frequent and larger floods. The size of a flood associated today with a 1 in 100 year flood return period will therefore become more regular (say to 1 in 50 years).

One other thing – this is an inexact measure and ultimately nature rules. Think of floods like buses. We expect them to be regular but sometimes they all turn up at once. Our flood protection team adopts the view that we should expect the unexpected – which is why we want to get higher standards of flood protection into the CBD as soon as possible.