FLOOD HAZARD MAPS - THE BEST KEPT SECRETS AREN'T ALWAYS BEST KEPT SECRET

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ABSTRACT

Tauranga City Council (TCC) has embarked on a stormwater 2D modeling project that at its conclusion will see the whole of the City remodelled.

A critical workstream within the project, focused on ensuring that landowners were kept informed of any new or existing information that affected their land. As a result TCC took a "no secrets approach" in a bid to ensure the process was transparent to the public.

TCC's goal was:

- To provide accurate and understandable information (and meet legislative requirements) to landowners and give them an opportunity to engage with suitably qualified TCC staff around the impacts of the information provided.

The workstream was active in the roll out of information to landowners in two catchments in 2011. Six catchments were released in 2014 and a further seven are planned to be released in 2015.

The project deliverables are:

- To ensure that information that is received by a landowner is specific to their own property.
- To provide landowners with various options to engage with TCC staff around the information that they have been supplied.
- To ensure the information that is received by the landowner is accurately recorded and held in TCC's business systems.

The process has been massive, but highly valuable. The process of direct communication hasn't been as scary as we first anticipated. We have tweaked and adjusted our approaches as our experience has grown. To date, we have released approximately 6,000 letters and held 19 public information days. As flooding events occur and this modelling information is more widely known in the public domain, TCC's elected members are also engaging with our communities. They have a greater understanding that by having a "no secrets" approach we are able to make better decisions around funding and priorities for infrastructure investments than we have in the past

KEYWORDS

Customer Communication, Flood Hazard Maps, Stormwater Project, Engagement

PRESENTER PROFILE

Cathy Davidson: Cathy is the Team Leader of Operational Services for the City Waters team for Tauranga City Council and has lead the workstream around the delivery of information to affected customers. She has had in excess of twenty years in the local government environment. Roles and responsibilities have included managing front line customer service delivery, information management, project management and contract management.

Campbell Larking: Campbell is the Senior Policy Planner and Integrated Stormwater Project Manager for Tauranga City Council. Campbell has over ten years in urban planning and natural hazard management planning. Over the past year he has lead the Councils Integrated Stormwater Project, bringing together the aspects of Council strategic and policy planning, infrastructure planning and delivery.

1 INTRODUCTION

Tauranga City Council (TCC) released its first 2D modelled flood maps in 2011 to a robust process, however it was not until 2013 when it formed an Integrated Stormwater Project where it really sought to push forward the modelling program and engage with communities about potential flood risks.

For TCC, this project was not only set up to treat the symptoms experienced in recent years from flooding, but also to develop knowledge and rules that would better serve Tauranga in future years and engage with the public on the information gained and enable them to make decisions about resilience.

The project had a primary aim of mitigating and reducing stormwater damage and impacts on property, both residential and commercial/industrial in the City.

A critical work stream within this project focused on ensuring that landowners were kept informed of any new or existing information that affected their land. This delivered against the stated objective:

- *We will provide much better quality information to allow people to make informed decisions.*

The focus of this workstream was based on communicating with all affected land owners and providing them with understandable flood hazard maps that clearly outlined the likely extent of flooding in a 100year Annual Recurrence Interval (ARI) and associated information to aid in the interpretation thereof, with the expectation that this information would also be enduring and easily understood by potential future landowners.

As flooding events occur and the outcomes of the modelling program and the released information is more widely known in the public domain, our communities are enabled to be more appropriately informed about flood risk and the potential ways to manage/mitigate the risks.

We have learnt a lot as a result of customer feedback. It has given us the opportunity to refine and change the way we are doing things and the information we are displaying.

The process that we have followed has brought everything out into the open in our community. It has provided us with opportunities to engage face to face. The Elected Members are on board with the process and they too have attended the public days that we have held so that they were seen to support the process we followed. That has proven valuable for when the staff found themselves responding to Elected Members on landowner issues, and engaging on potential future capital works programs.

2 BACKGROUND

In the very early stages of this project a team was established. The goal of this team was to put into place a process that would see the modelled flood catchments, received and brought into our live business systems.

As part of this process a great deal of thought was given to how we would communicate with our customers. We knew we had to do this, because part of this project was to release the modelled information onto property files and would be used in the LIM/PIM/ Building Act and RMA subdivision processes immediately following receipt.

Engaging with customers over what is potentially a very contentious subject was scary to say the least. We didn't know whether we would stir up a hornet's nest of controversy or whether, since we would be in a much stronger position through the knowledge obtained through the modelling, we would get some other response.

One key decision was that **we couldn't keep information like this a secret**. We felt strongly that we were better to have this type of information out in the public domain. We did not want to be in the position whereby we were held accountable for having and/or holding information about private property that the property owner was not aware of.

We also felt strongly that it was more desirable to have the conversation debated at the political level rather than at an operational level. Remediation of significant flood issues is generally solved through capital investment. Decisions on capital investment could only happen through the long term plan process and through support by the community to any adopted approach to flood risk management.

We knew that there were affected properties where owners were avoiding any sort of record of flooding by purposefully not contacting the Council following a flooding event. We knew that these properties were changing hands or building work was taking place regularly where the issues of flood risk were not being appropriately addressed, or even recognised.

That led us to think through what the key messages were that we needed to communicate to our customers as part of the information delivery. Those were seen as:

- This is updated information – it's not new information;
- We are required to release the updated information as part of the legislative requirements – it's not our fault we are doing this;
- You're not the only one;
- There are ways forward – talk to us!

2.1 THE OPTIONS WE CONSIDERED

We came up with 3 options, (1) put the data into our GIS system and on the property file and let the customer find out about it if and when they ever applied for a LIM/PIM, subdivision consent or looked at their own property information; (2) put the data into our

GIS system and on the property file and develop a media release plan that would let the community know that we were up to something; (3) put the data into our GIS system and on the property file and develop a personalised, individualised communication plan with all the affected land owners. We chose to undertake the third option.

2.2 WHO WERE OUR CUSTOMERS?

We recognised that as part of this project we actually had two types of affected land owners. Not everyone affected by our modelling was going to be upset with the news.

The first group was those land owners who owned property that, according to our modelling, would be affected by a 100 year ARI rainfall event. These we would refer to as the bad news group. The second group were land owners who previously had been noted on our natural hazards GIS layer as being flood affected, and who now were flood free. These we would refer to as the good news people.

We recognised that if we decided to communicate with our customers, we should tell everyone who was affected, regardless of whether there was a negative impact or a positive impact on their property. Recognising this point helped us to understand one of our key messages, we were updating existing information; we weren't undertaking a new exercise.

2.3 THE LETTER

The other struggle we had, even amongst ourselves, was understanding how we could communicate what is a very technical modelling process, at a level that was understandable by the general public.

We wanted to ensure that the letters that were sent were individualised with the correct customer information and that they ensured that the customer understood the key messages we wanted to communicate. See *Figure 1*.

Dear Sir/Madam

Flood Hazard Information – Property Information Update

As at 5 May 2014, Tauranga City Council has updated the existing flood risk information for the Matua catchment area. The flood hazard information shows which properties are less likely or more likely to be affected during extreme rainfall events.

The updated information shows that your property located at ## EATON CRESCENT, legal description LOT ## DPS ##, is in an area that is potentially at risk of flooding in an extreme rainfall event.

It is important to note straight away that this potential flood risk is for an extreme rainfall event only. (For a definition of 'extreme rainfall event', otherwise known as a 100 year event, please see the Q&A section on the reverse of Map C, attached.)

This flood hazard information updates the information about your property that was previously noted in our records. We have attached some maps that show how the updated information relates to your property.

Map A – this shows how the updated information impacts your property. It shows that in an extreme rainfall event your property would be in the predicted flood hazard area.

Map B - this shows the information that previously related to your property. As at 5 May 2014 this information is no longer current.

Map C – this shows the updated flood risk area for the Matua catchment as a whole. The reverse side of Map C contains some questions and answers about flood hazard mapping.

All of the attached information has been placed on your property file and is now live in our electronic mapping and document systems. The flood hazard maps will be updated as and when any work is done on the stormwater systems in and around your catchment area.

You can view the electronic mapping systems and other information online at www.tauranga.govt.nz. Enter the keywords 'flood hazard' into the search box for instructions.

We have contacted you as the property owner. If you rent or lease your property we expect that you will notify your tenant or lessee about the contents of this letter and the attached information.

Contacting us about flood risk information

Two drop-in days have been offered to all Matua residents that are affected. If the above time is not suitable, then you are welcome to attend one of these days.

Venue: Otumoetai Sport and Recreation Club, Ferguson Park
Dates: 21st and 22nd May, 2014
Times: From 4.00pm to 6.00pm both days.

For all enquiries about this flood hazard information please phone 07 577 7000 weekdays between 8am – 5.30pm to discuss.

Yours faithfully

Figure 1: The Letter

2.4 THE FAQ SHEET

A Frequently Asked Questions (FAQ) sheet was developed so that we could support the letter with more technical messages around what Flood Hazard Mapping was all about. See *Figures 2 and 3*.

A great deal of discussion went into developing this FAQ sheet. The difficulty we had was how we communicated a complex modelling process in easy to understand language.

Each catchment released had as FAQ sheet that was specific to the catchment. We knew that the message for each catchment would not always be the same and this was our opportunity to tailor key themes with our customers. See Figures 2 and 3 below.

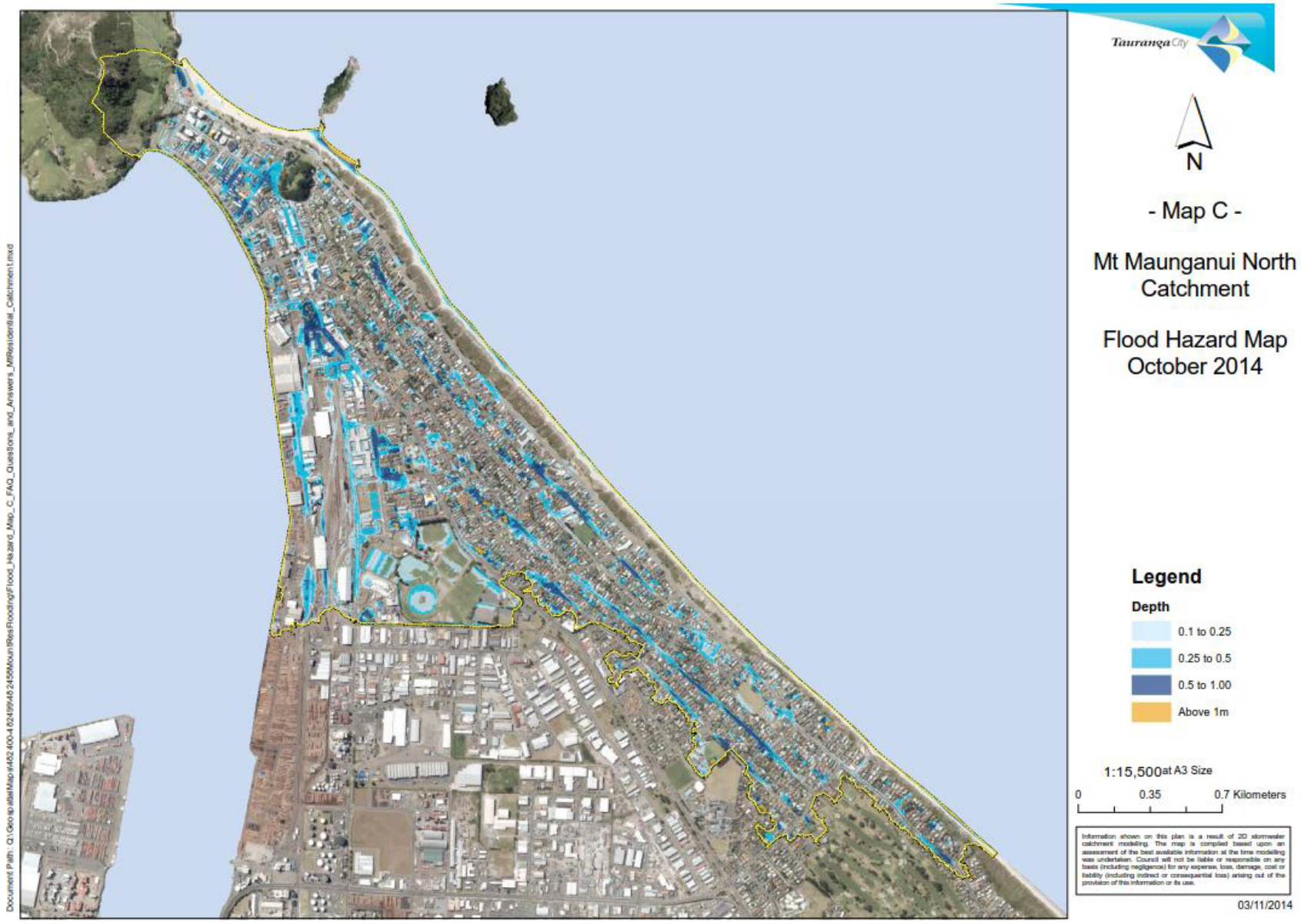

Figure 2: FAQ – Page One

Questions and Answers About Flood Hazard Mapping

Mount North

The map on the reverse side of this sheet shows which parts of Mount North are predicted to be affected by flooding in an extreme rainfall event.

Tauranga City Council is flood-mapping the whole city to better understand how flooding from extreme rainfall affects each area. The map updates flood hazard information that Council has previously held about this area. Using more accurate technology, the potential floodable area is shown to have changed since our records were last updated.

Tauranga City

Why update flood hazard information?

Flood hazard maps show which areas of the city might be flooded in an extreme rainfall event, and to what extent.

It is part of normal Council business to know the effects of natural hazards that could impact our community. Flood hazard maps for Tauranga City have been evolving since the early 1990s. The information is used for building consents, subdivisions and infrastructure planning.

A lot has changed in recent years and we need our records to be as accurate as possible, so Council is in the process of updating flood hazard maps for the whole city. This will put Council in a better position to plan for stormwater management.

What is a 100 year rainfall event?

An extreme rainfall event is an unusual scenario, something that doesn't happen very often. It is a dump of rain that you could reasonably expect to experience at least once in your lifetime.

The flood hazard map is modelled for a 100 year rainfall event. The term '100 year event' can be confusing because such an event could actually occur more than once every 100 years. Technically, a 100 year event means there is a 1% chance that it might happen in any given year.

Tauranga City Council has chosen to model flood hazard maps for the 100 year event because it will allow us to consider building consent applications under the Building Act 2004 and subdivision consent applications under the Resource Management Act 1991.

How are the flood hazard maps prepared?

The area of land being studied is called a catchment. When rain hits the ground it all drains down hill to a particular stream or outlet. The stormwater catchment is the defined area of land that contains and collects all of that water.

To plot the potential flood hazard we build a computer model of the area that we wish to study. The flood hazard map predicts what happens to the water in the catchment under extreme rainfall conditions. We then use computer software to simulate different rainfall intensity on that catchment.

The basis of the flood hazard information is a system called LIDAR (Light Detection and Ranging) which measures the ground levels of the land using laser pulses. This generates an accurate contour map which we place into the stormwater computer model. LIDAR is very reputable technology used by most councils in New Zealand.

Our first job is to work out which criteria will be entered into the computer model. The sorts of things that need to be considered include:

- How hard is it raining?
- How long has it rained for?
- What is the contour of the ground?
- Where will rain water soak into the ground (e.g. grass)?
- Where will rain water flow over hard surfaces (e.g. roofs, concrete)?
- How long will it take for rain water to flow from one part of the catchment to another?
- What stormwater systems are already in place?

Technology today is able to take all of these variables into account. Once the criteria have been set we can run the flood hazard model. There is a huge amount of information to be computed so it takes longer than real time for the software to process each model. We run the model to calculate how, when and where the rainwater flows. The result tells us which parts of the catchment are likely to be covered by water, and to what depth.

When the model is complete it gets loaded into our GIS (Geographical Information System) mapping system for further analysis and processing. The information needs to be tidied up to the point where it can be presented as an accurate map. Once this is done the final map is peer reviewed. The flood hazard map is now valid and active.

Overland flow paths

As well as modelling for depth, we also model the speed and direction of flood water. This gives us important information about where flood waters flow during a heavy rain event. This 'overland flow path' information is not shown on the general flood hazard map but it is viewable on the Council's mapping website and is publicly available along with the rest of Council records.

What is Council doing about flooding?

The more accurate our information is, the better Council is able to plan for stormwater management in the most efficient and cost effective way.

The updated flood hazard maps will be used to help prioritise where and when spending should be invested into stormwater infrastructure across the city. A city-wide strategy is being developed to help Council address stormwater issues now and into the future using a combination of infrastructure and planning tools.

The strategy will be created for the Council's next round of major decisions about stormwater investment which will be made when preparing the Long Term Plan in 2015.

Does this flood hazard information go on my property file?

Yes, the updated information has been stored on the files relating your property and on our GIS mapping system. Flood hazard information for every property has always been publicly available on request. It is noted in Land Information Memorandum (LIM) reports and used when reviewing building and resource consents.

We are required by several acts of Parliament to hold this information and to make it publicly available. As custodians of this information we will always provide the most up to date information that we have available about your property.

Will this affect my insurance?

Council can not advise you about any effect that this information might have on insurance. In this matter you may wish to contact your insurance company.

If you have any other questions...

Please call Council on **577 7000** or visit our website **www.tauranga.govt.nz**

Figure 3: FAQ Page Two

2.5 THE MAPS

An early decision that we had to make was how we would show the flooding on a property map. We had to decide on the colour, and decide whether we would show it at various depths. Previously information was shown in yellow, but this didn't appear to be an obvious choice for going forward, as we also wanted to show what the potential depth of the flooding could be to appropriately convey the risk. The decision made was to use shades of the colour blue, up the depth of 1.m. See *Figure 4 and 5 below.* Depth over 1.m would be a pumpkin colour. The colour blue might sound like an obvious choice, but we have had to defend the use of this colour on a few occasions with members of the public. They think it looks like water!! Surprise.

We wanted to avoid engaging with very low level of risk customer and provoking more angst than we needed to. On that basis we decided that we would not show anything below 100mm on our property information. That meant that we were concentrating on properties that had flooding possibilities over and above getting your feet wet.

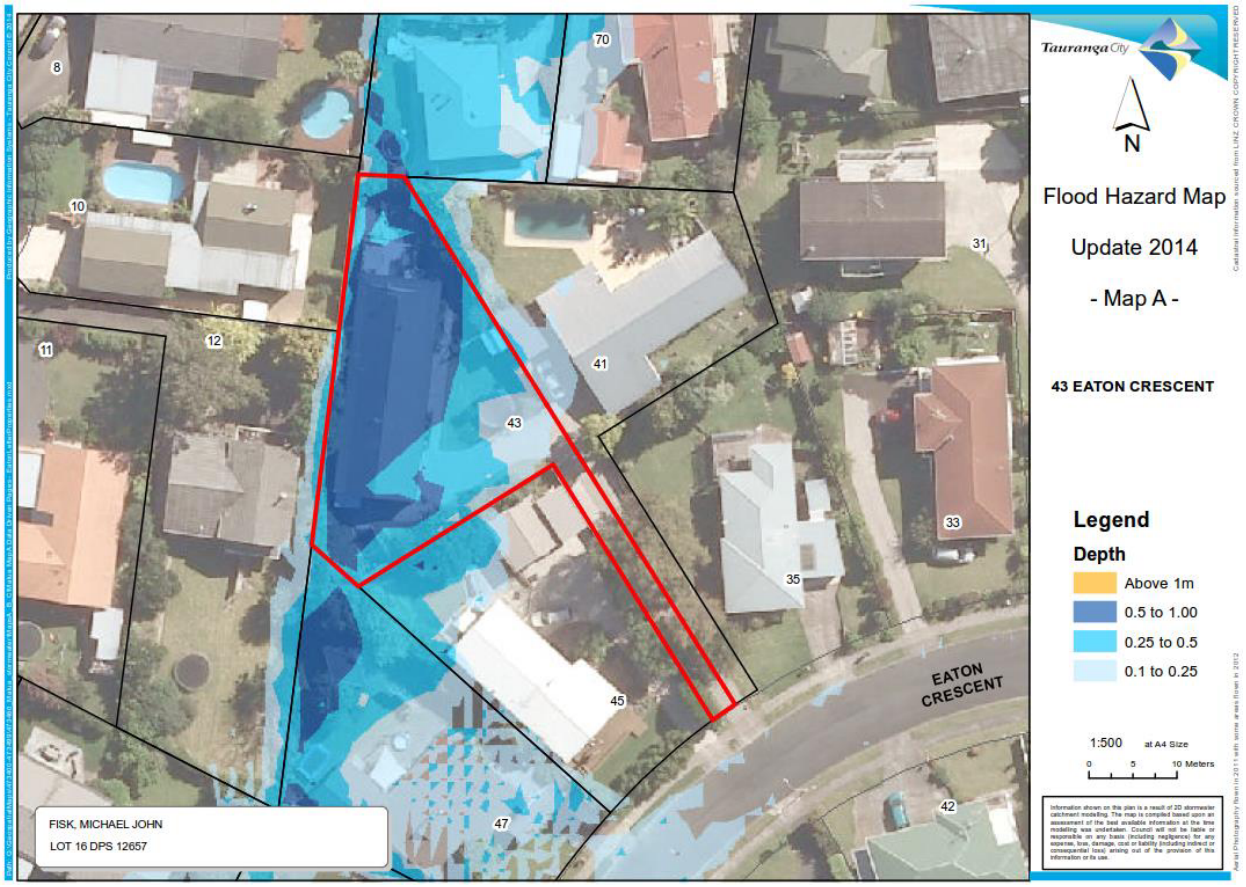

Figure 4: Map A – Revised Flood Risk Layer

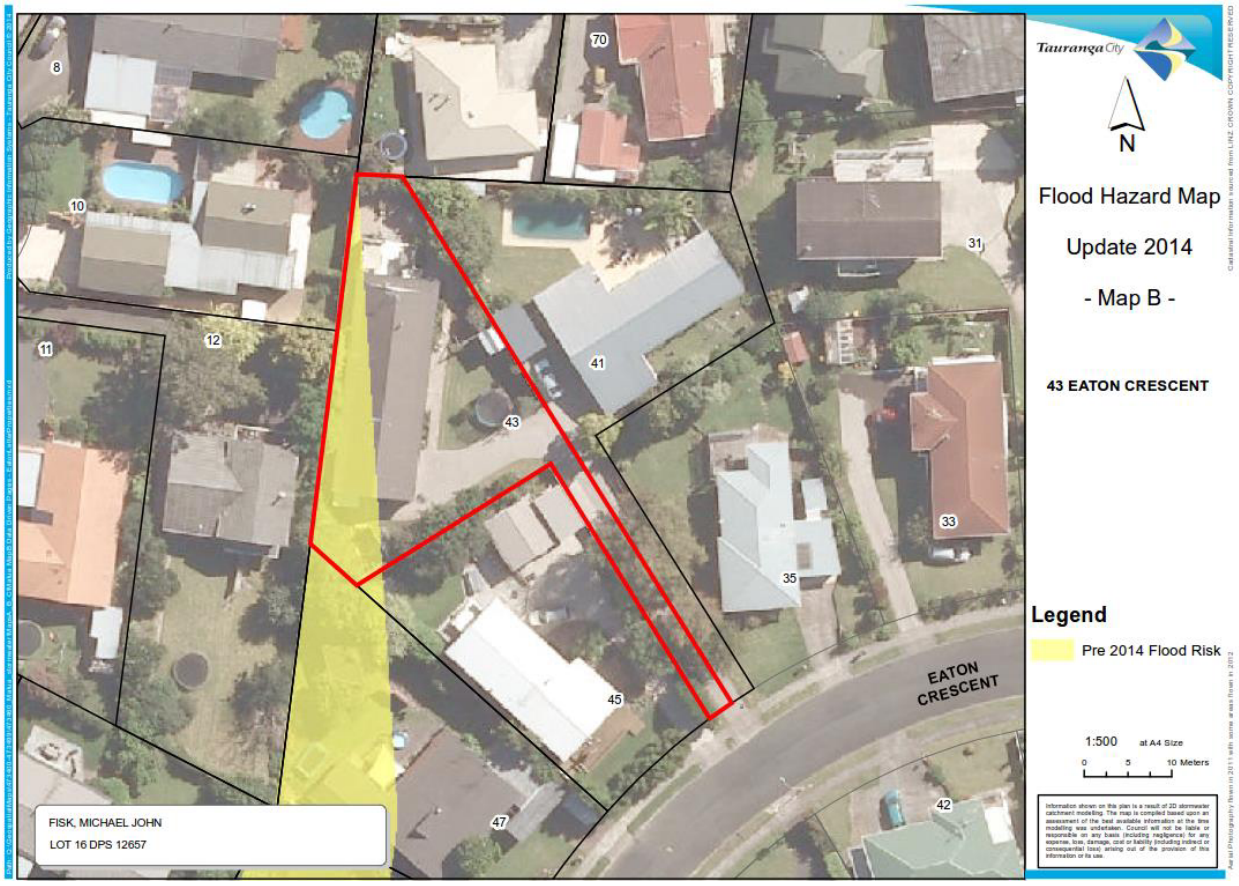

Figure 5: Map B - Pre 2014 Flood Risk Layer

2.6 THE GOOD NEWS LETTERS AND MAPS

One of our key decisions was also to engage with those landowners who were positively affected as part of the Flood Hazard Map process. Their letters were tailored to deliver the message that they were previously considered to flood, but through the new modelling process we now deemed their properties to be free from any adverse effects. Hence our reference to these being the "good news letters".

Map A showed them - this is what you look like now (i.e. your property is now clear from any modelled flood risk). See *Figure 6*.

Map B specifically showed them - this is what you used to look like. See *Figure 7*.

Figure 6: Map A - Revised Flood Risk Layer

Figure 7: Map B - Pre 2011 Flood Risk Layer

2.7 OUR "NO GO" AREA

Before we released our first catchment we had already identified two key questions that we knew would be asked.

- What is going to happen to the value of my property?
- What is going to happen about my insurance?

We recognised that these were not matters that we should be engaging with a customer about. They are questions that we do regularly receive from customers and understandably there is some "angst" in and around these subjects and we recognise this as a negative result of our "no secrets" approach. The key issue is that it is not our field of expertise to be able to engage on these matters. These issues are more appropriately dealt with by both the insurance industry and market indicators. The key thing from our perspective was that we were being fair in not answering these questions, but also by ensuring that those questions would be answered by the most appropriate parties.

Whether there truly is a great deal of impact in these two areas (value and insurance cover) for a landowner is still an unknown. We see properties buying and selling all the time, the purchasers are now just better informed.

2.8 THE DROP IN DAYS

Each time we released letters and maps out to the public, we would offer the opportunity for them to engage with our staff face-to-face. It was with some trepidation that we held our first drop in days, but at their completion we were unanimous in our opinion that they held a lot of value.

These sessions are always the big unknown for us and we have adapted these sessions for each catchment that we have released information into. In other words, we have tailored them to each community's needs.

When we released the letters and maps into a couple of contentious catchments, these drop in days were readily used by our Elected Members as an opportunity to engage and discuss concerns with the community. This was a real bonus for us as staff, as the Elected Members had not wanted to engage with our earlier catchments. But as the profile of stormwater and flooding was being raised in the community, and with a couple of significant enough rain events occurring in quick succession, these drop in days were quickly recognised as an opportunity for political purposes and also provision of an educational opportunity.

The focus was on providing quality one on one information to customers. Our format for these sessions generally has been along the lines of:

- Two drop in days are offered for each catchment.
- The dates are within 7 days of receipt of the letters into a customer's letterbox.
- Drainage engineers (generally four to five) attend the sessions with the flood hazard model loaded onto a laptop (ARCGIS). Each laptop has a large screen attached for easy viewing.
- We offer a cup of tea and coffee and a biscuit.
- The Elected Members are advised of the dates of the sessions so that they can attend if they wish.
- For larger catchments we have held a higher number of sessions.
- We also provided one on one sessions with landowners outside of the drop in days for people who are unable to attend.

In most cases so far we have not offered any group sessions, although they have not been excluded. In one particular catchment it was necessary to hold a group session for areas where they had just experienced flooding. These sessions were largely focused on what Council would be doing in the short term. These sessions were more politically contentious than our other sessions and had a different sensitively attached as many of the people attending had just been flooded.

It has never been our intention to hide the facts and not face up to discuss the modelled outputs and the problems being experienced by our customers and the community.

The big news is that we have all survived these days to tell the tale. There have been a few tough conversations, but overall these open days have been about building trust and establishing rapport. They also enable staff to gain more understanding on what is

occurring in the affected areas which helps further understanding of the realities of flooding.

2.9 OUR NUMBERS

Table 1 shows the numbers of affected properties and letters that we have sent out.

We initially started this process for the Flood Hazard Mapping in 2011. Two catchments, Greerton and Mount Industrial were released. Following a "pause", the project restarted in 2013 with the balance of the catchments stated below being released.

Modelled Catchment	Number of properties affected by Flood Hazard	Number of properties where stormwater touches the dwelling.	Number of properties in the catchment	% of affected properties in catchment	% of affected buildings in catchment
Greerton	337	287	1,452	23	19
Mount Industrial	719	472	1,132	63	41
Pillans/Bureta	289	287	1,452	19	19
Matua	373	331	2,486	15	13
Mount South	1,460	1,307	2,976	49	43
Waimapu	361	194	2,723	13	7
Avenues	301	252	1,043	28	24
Mount North	2,335	2,045	4,204	55	48
Total	**6,175**	**5,175**	**17,468**	**35**	**29**

Table 1: Numbers of Affected Properties

2.10 CAPTURING THE ENQUIRIES AND MANAGING COMPLAINTS

We made the call in 2013 to capture all enquiries through our customer service request system. This gave us the ability to gauge the level of work that was being generated due to the roll out of the customer communications and track requests for further information, follow up site visits and also a record that the customer had contacted us.

Many of the 296 service requests that have been captured have been the result of the drop in days that we have held. Capturing the fact that a customer has been into one of our public sessions gives us the opportunity to create a link/history against the customer and the land parcel about which they are making the enquiry. Again, this approach of capturing who we've engaged with supports our no secrets approach.

It also gives us the opportunity to measure the number of customers who want to engage further about this process in a more technical nature. It is also used to capture the level of services that we are providing back to our customers.

The statistics provide us with the ability to inform our organisation of the resource required to provide such a service, and the continued need for the service.

Although 296 service requests following the release of over 6,000 letters doesn't sound like a great deal (4.8%), they generally involve an in depth discussion. In around a quarter on those cases it will result in a site visit from one of our engineers and

potentially a site survey (which TCC undertakes free of charge including determining the floor level to identify habitable floor flooding potential).

We have learnt a lot as a result of customer feedback. It has given us the opportunity to tweak and change the way we are doing things, including the information we are displaying.

It doesn't however mean that when we are phoned by a customer who says "I want you to take this off my file because it is a load of c#%*p" that that will happen. It means that we will look at the data, listen to their reasons and if necessary attend the site. On occasions we have found reason to update our data, but if that happens it is only after a full investigation has occurred.

2.11 THE GROUND PROOFING OF OUR MODELS

Ground proofing is something that we've been learning and developing as we mature with this project. Our ground proofing consists of two stages. We undertake a desktop exercise whereby we will "scrub" back very minor flooding effects. Thought is given to whether the minor effect is significant enough to warrant communication or not.

In *Figure 8* below, properties 51 and 45 initially showed a flood extent that just crossed their boundaries. The desktop exercise and knowledge of the properties supported the decision to scrub the flood layer back from the boundary and to remove them from our list of "bad news" letters.

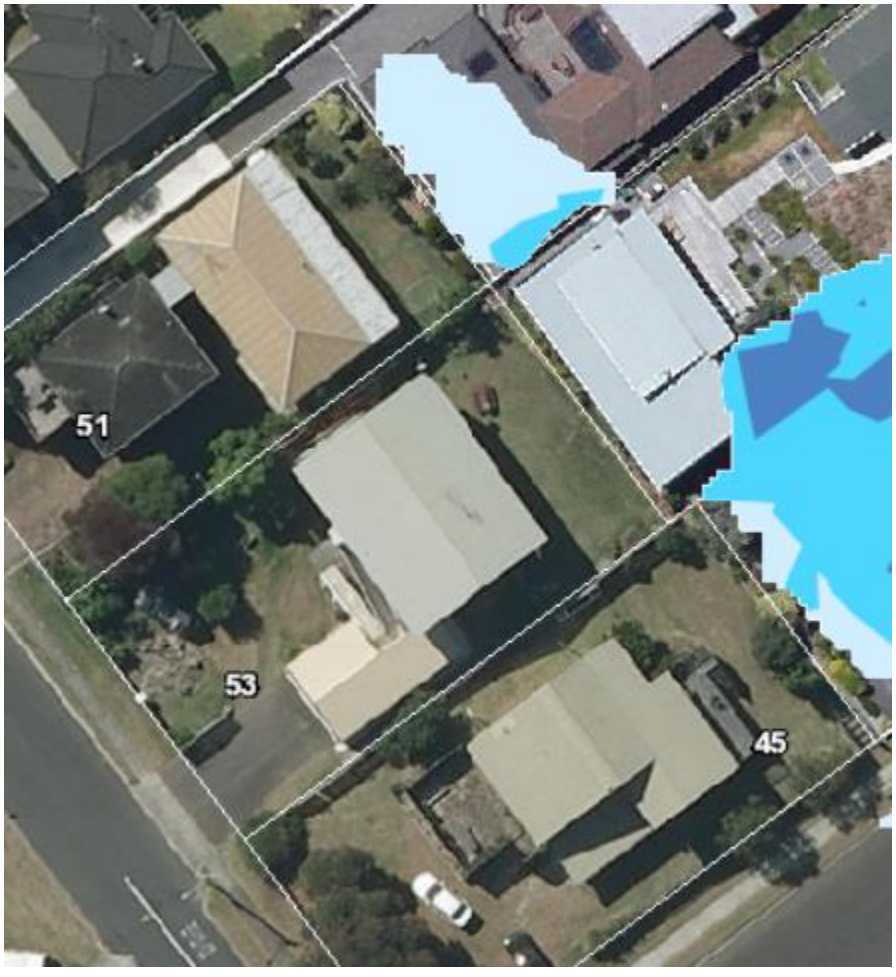

Figure 8: Example of Where Data Scrubbing Occurs

2.12 LETTING THE ELECTED MEMBERS KNOW WHAT WE WERE UP TO

Very early in the process we engaged with The Elected Members. This process was new to us and we did not know exactly what we would "provoke" in the community. We felt that it was in our best interest to get them on board with what we were doing and to educate them on exactly what a 100 year ARI rainfall event meant. The learnings in socialising this with Elected Members would be invaluable when communicating this further afield with affected landowners.

We spent some time in the council chamber working with Elected Members updating them with what we were doing, why we needed to do it, and why we needed their support. It was important to us that they understood that the process supported good long term fiscal decisions and enabled community understanding on the issues.

The key themes to them were:

What is flooding and how do we model it (i.e. what do we take into account):

- Graphic presentation of possible extent of flooding/ponding from an extreme rainfall event.
- Ground contours (LIDAR).
- How heavy rain falls and for how long.
- How much water runs off & how much soaks away.
- Drainage paths e.g. pipe systems & overland flows.

How we were going to inform the public:

- Letters sent including individualised maps.
- Staff trained to respond to phone enquiries – mixture of Call Centre & professional staff.
- Engaging with the Community - "drop-in" sessions.
- Communication via the web (FAQs) and links to the flood hazard map GIS layer.

Initial conversations with the Elected Members were hard. Whilst they understood the why and the how, their biggest issue was the unknown – how the news would be received, how would it affect them politically. There was a large amount of caution embarking on our first catchment, and the Elected Members were adamant they wanted to use the term "Extreme Rainfall Event" rather than "Flood Hazard Map".

Although this was eventually changed to what we now know as "Flood Hazard Map" details, the key messages that we started with have stood the test of time and we are still communicating the key themes today.

We have also found that over a period of time the caution (fear) that our Elected Members held has vastly reduced and they now front the issues in the communities on the odd occasion.

3 CONCLUSION

Prior to the Flood Hazard Map modelling exercise, we knew that there was flooding in our community that not finding its way onto Council records. We were aware that the community was keeping secrets from us; we also knew our systems were likely to not be totally accurate either.

Some properties were changing hands and the new owners were oblivious to the risks of flooding of their newly acquired properties. We had gaps in our information and our official records and information held on such properties could not provide evidence to support what we thought we knew.

When we assess the process that we have been through, we recognise the true benefits that we've achieved in Tauranga. Property owners are now better informed and we are also able to make truly informed decisions in relation to the priorities of budgets.

The process that we have followed has brought everything out into the open in our community. It has provided us with opportunities to engage face to face. The Elected Members are on board with the process and they too have attended the public days that we have held so that they are seen to support the process we followed. This has proven valuable for when the staff found themselves back in the Council chamber aiding in the discussions on flooding, capital budgets and levels of service.

Although this process has kept our team very busy and consumed a lot of our resources, the numbers of customers who wanted to engage with us was less than what we were expecting. We have had to have some fairly tough conversations where we had to communicate that not everything can be or will be fixed and in many cases there is a recommended 'do nothing' approach.

It hasn't been a "bed of roses" and we have had to defend our methodology on a few occasions. We are still strongly of the opinion that we want everything out in the public domain and we are happy to front up to our process. This is why we are committed to this process as we continue into this year with another 7 catchments to go, and in 2016 another 4 to go.

We feel that these are conversations that are going to be had sooner or later, and we would rather that it happen sooner so that we can ensure all parties are fully informed.

No more secrets.

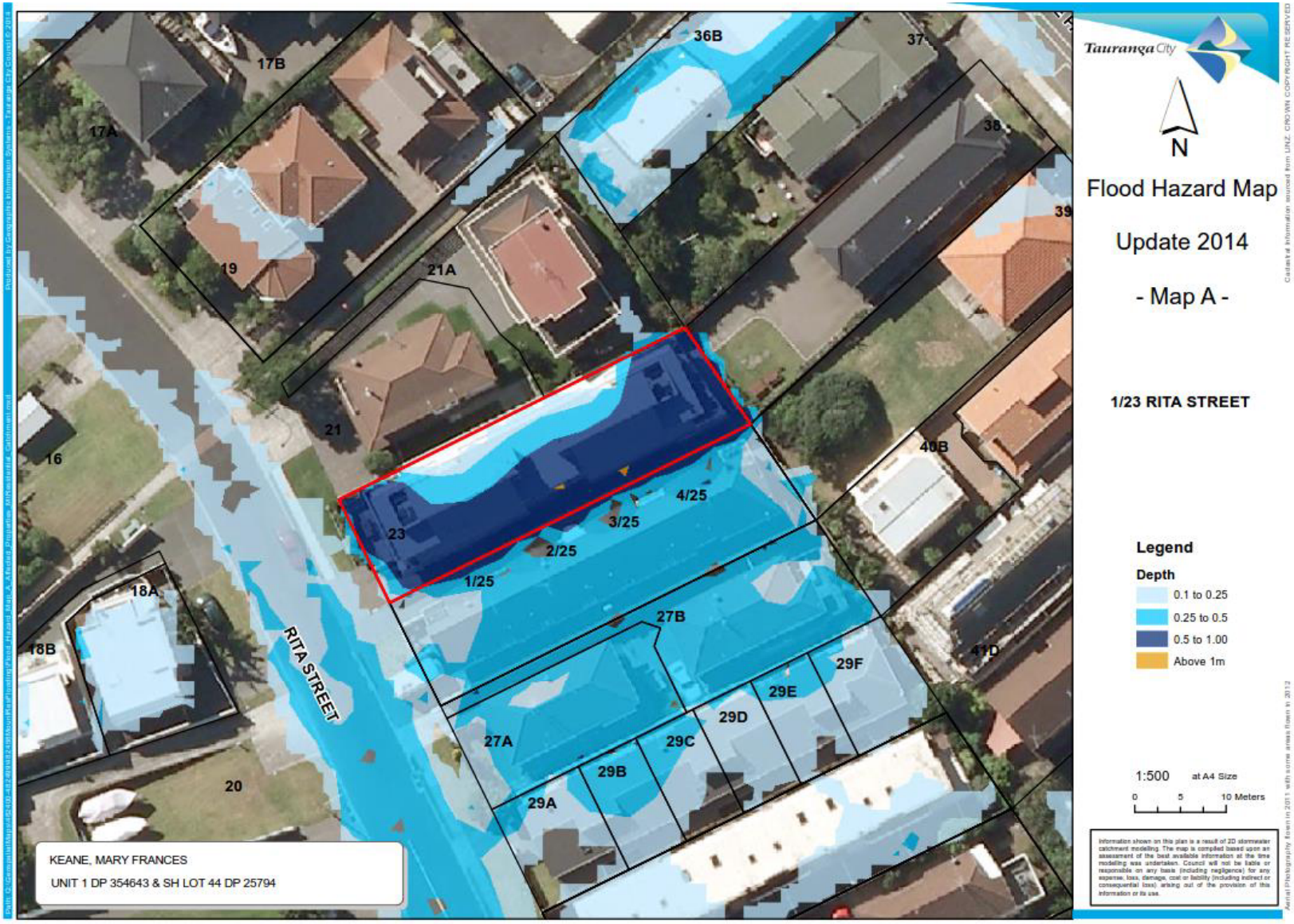

Figure 9: The Flood Hazard Map

Photograph 1: Flooding affecting properties

Photograph 2: Flooding on Streets – Kids are always innovative.

Photograph 3: Flooding Affecting Properties

Photograph 4: Flooded Dwelling – Note the Water Level