Date: 23 November 2023

To: Hilary Samuel, Taupō District Council

From: Rowan Sapsford, ROAM Consulting

Subject: Plan Change 41: Removal of Fault lines – Response to Minute 23 of the Independent Hearing Panel

Purpose

The purpose of this memo is to respond to questions raised by the independent hearing panel in Minute 23 (minute) as they relate to Plan Change 41 (PC41) to the Taupō District Plan (TDP). In particular, the issues that the panel has focused on are set out in paragraphs 9 and 10 of the minute, as follows:

> 9. *Essentially, in terms of Option 1, the Panel needs to understand how significant the current inaccuracies in the Operative District Plan are and what is the ability of Option 2 to address those shortcomings. In other words, as an alternative to Option 3, what would be the disadvantages and advantages of retaining the current fault line provisions in the Operative District Plan until such time as any alternative or replacement provisions are introduced by way of a First Schedule process? In answering that it would be prudent to consider both short and medium term timeframes.*
>
> 10. *Depending on the answer(s) to the above, the Panel needs to understand (as part of Option 2) whether the GNS data is sufficient or fit for purpose to replace the current fault lines on the planning maps? Depending on the answers to these questions – particularly regarding the replacement of the current fault lines on the planning maps with the GNS data - how much work would be required to enable that (albeit this would need to occur through a separate First Schedule process)? …*

I have been asked to respond to these queries as the author of the Section 42A report for PC41 and I have set out this response below.

Context

The purpose of my response is to assist in the panel's continued deliberations on PC41. Minute 23 refers to three options and includes a series of questions that refers to these options. The options are set out as follows:

Option 1: Status Quo

Option 2: Replacement of the current fault line on the planning maps with the GNS data

Option 3: Removal of the fault lines from the District Plan maps.

In my responses to these questions, I refer to the 'operative fault information' which is currently in the TDP and the subject of Option 1. The 'GNS data' is the new fault information and the subject of Option 2. Please note that for the purposes of responding to this minute Option 2 is determined to be a straight swap of the GNS data for the Operative fault information on the planning maps with no change to the current TDP policy and rule framework.

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Response to Panel Questions

In responding to the questions posed in Minute 23 I have set out each question for context using the minute para reference.

8a. Provide a 'forensic' assessment of Option 1 and 2 in terms of:

i. **For Option 1; outline the scale and magnitude of the existing fault line mapping inaccuracies; and**
ii. **Mapped and dimensioned examples of typical inaccuracies of fault lines of Option 1 compared with Option 2 mapping.**

To assist in this response, a series of maps have been developed that show the operative fault information that is proposed to be removed, and the GNS data. The GNS data is described in Appendix D to the PC41 Section 32 document.

This information can also be viewed on the TDC E-Plan here:https://taupo.isoplan.co.nz/eplan/property/0/0/110#

- For the operative fault information– click on 'Hazards' and then "Fault Lines (District Plan)". They are red dotted lines.
- For the new GNS Data – click on "Non-district Plan Info" and click on all the layers under "Earthquake". They are blue where there is no Lidar (Fault Awareness Areas), and red and orange where there is Lidar (Fault Avoidance Zones).

An inspection of these maps shows the locational differences between the older and newer faulting information.

Section 1.1 of the GNS report, describes the operative fault information as follows:

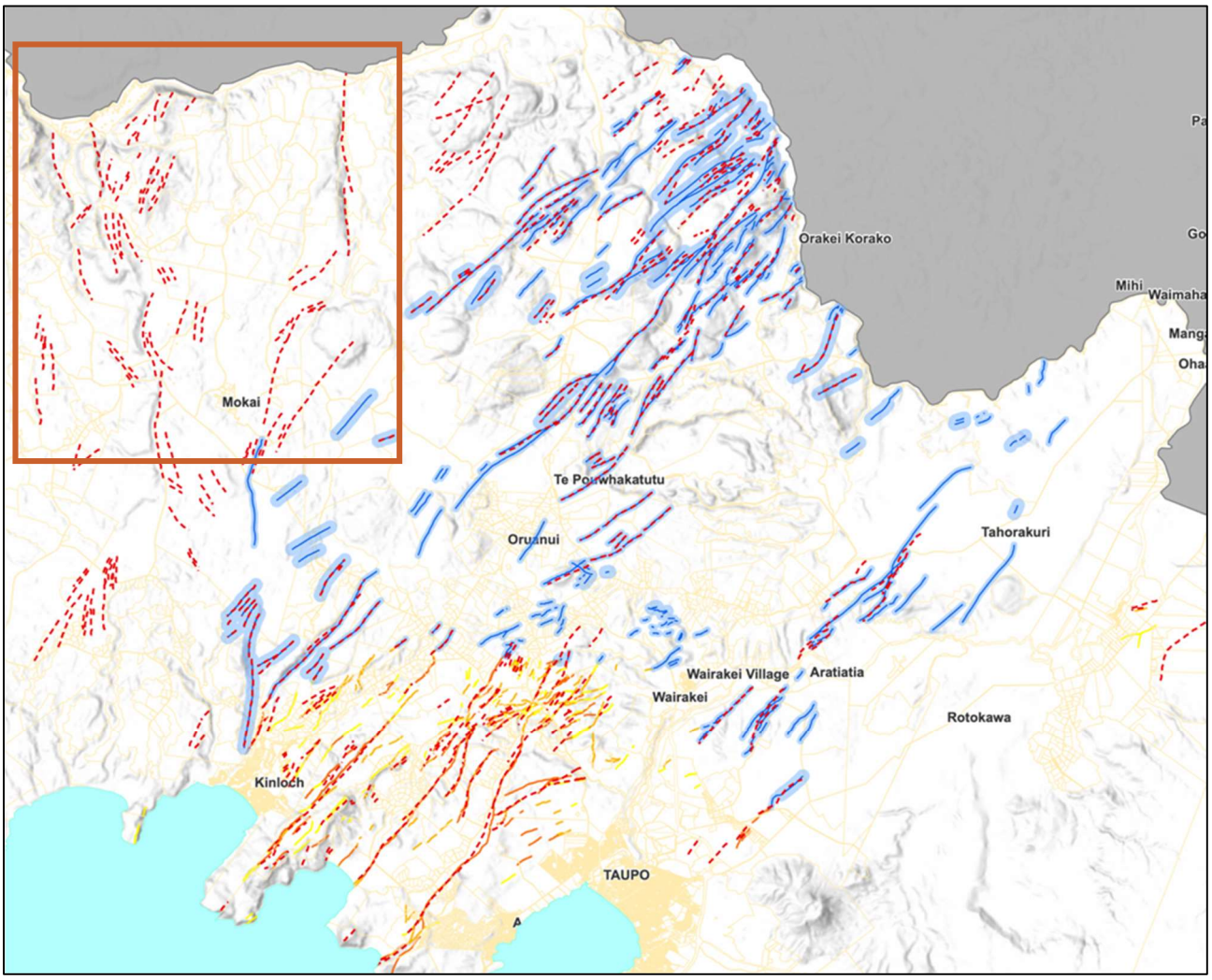
"Taupō District Council has active fault maps in its District Plan, which are thought to be from 1998 and reflect the information in GNS Science's New Zealand Active Faults Database at that time. These maps are out of date and do not adequately reflect the uncertainty of fault location. For example, pencil thin lines are shown on the District Plan, and a 20m avoidance zone is applied throughout the District Plan (Rule 4e.10 – Fault Line Hazard Area) when, in actuality, due to mapping simplification and uncertainty, the fault may be up to 200m from the indicated line."

As well as showing faults in the wrong location, the operative fault information also shows inactive faults. Active and inactive faults are shown on figure 5.5 (page 56) of the GNS report. There is a mass of faults contained within the operative layer in the northern part of the District (around Mokai and Whakamarau) which are no longer considered to be active and therefore pose no or negligible risk, and therefore constitute an unreliable basis for RMA regulation. This area of inactive faults is highlighted in the orange box on Figure 1.

The new GNS data has been developed using more contemporary data sets and techniques. The key datasets used to inform the new fault lines are set out in section 2.3 of the GNS report. These include aerial photography analysis, field mapping and more recently, LIDAR analysis. In areas where there was LIDAR data the faults were able to be mapped with a high degree of accuracy.

Overall, the GNS data is more extensive (i.e. there are more faults in more locations) and reliable than the operative fault information. The GNS fault data has been developed using more contemporary methods and technology (LIDAR). In addition, there is more information available on the level of accuracy around the data which has been used to determine how it is to be used, i.e. the more accurate data is able to be mapped as Fault Avoidance Zones (FAZ) and the less accurate data as Fault Awareness Areas (FAAs). FAAs are those faults which are identified outside of areas with available LIDAR data. FAAs show the general location of active faults and thereby highlight areas where a potential fault rupture hazard may be present.

Figure 1 Operative and GNS Fault Data for the Northern Taupō District.

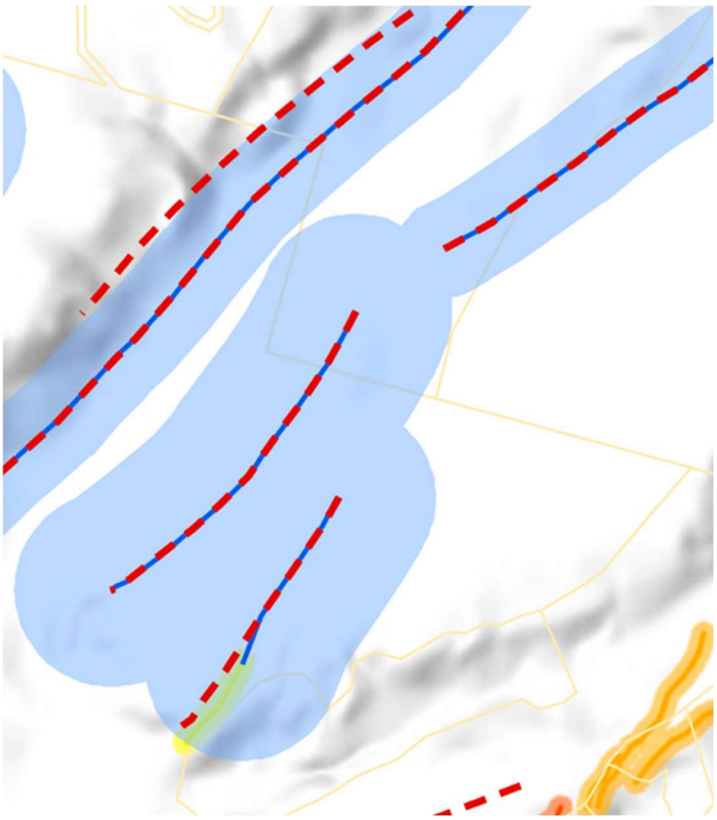


FAAs were developed by buffering the mapped faults according to the level of certainty of their surface form. These buffers ranged from between 125m on either side to 250m (total width 500m)[1]. Figure 2 shows several FAAs mapped with different buffer widths.

It should be noted that TDC now has LIDAR coverage for the whole district. This coverage was gained after the GNS report was published. As yet, the most recent LIDAR data has not been assessed or developed into FAZs.

[1] P32, GNS Report

Figure 2 Variable buffers applied to FAA



Q8b. Identify what the 'pros and cons' of Options 1 and 2 in the manner of a s32 evaluation. When identifying these consider matters such as what the inaccuracies are and how fatal are they?

In responding to this question, I have taken the approach that the S32 is to be undertaken at the point of notification and not developed incrementally throughout the plan change process. This is relevant due to the importance of the community, specifically landowner, engagement in this process. Section 2.6 of the S32 process summarises the results of community engagement associated with PC41 as follows:

> *"Key matters discussed with property owners included what this meant for their safety, assets, Land Information memoranda, property values, insurance, future building and development. Council staff also discussed the intention to put these into the District Plan (which is why Council undertook the mapping in the first place).*
>
> *There was some feedback that property owners would prefer this* [fault or hazard information] *in the District Plan rather than identified on Land Information Memoranda, and supported using the same approach as for recent flooding plan changes".*

I note that during this engagement the decision to add the GNS data was raised, however there was no discussion on what a potential policy framework might be that could accompany that new data. A potential policy framework was not discussed in the notified S32 documentation either.

This S32 assessment is set out in the following table.

Option 1 Status Quo	Option 2 Replacement of the current fault line on the planning maps with the GNS data
Benefits and Costs of Effects (s32(2)(a))	
Costs There will be unnecessary economic costs to applicants where they are required to apply for resource consents in situations where new information shows faults are not present or they are inactive. There would also be unnecessary administration time and effort required for the Council, for no useful purpose. Requires all structures, including those which are low risk such as a large garden shed to apply for a resource consent in some instances where there is no longer an active fault or the actual location of the fault is a considerable distance away. Benefits Option 1 needs to be considered against the presence of the GNS data. The presence of this new information and its ability to be considered in Building Act and other RMA processes means that there are safeguards in place to ensure that the level of risk associated with new development is able to be assessed. This new information supports the social and economic benefits associated with safer development. Note that if this new data did not exist then Option 1 would have no benefits associated with it.	Costs Requires all structures, including those which are low risk such as a large garden shed to apply for a resource consent. If the data set is to be updated in the future, it will be necessary to undertake a plan change to the TDP. Such a process has economic costs to the District and parties involved. Benefits More accurate information will mean that consents would be sought for structures where there is more likely to be an active fault. This would reduce unnecessary costs to applicants. The presence of the new information and its ability to be considered in Building Act and other RMA processes would mean that there are safeguards in place to ensure that the level of risk associated with new development is able to be assessed. This new information supports the social and economic benefits associated with safer development.
There are fewer costs associated with Option 2 however given the ability of the newer information to be able to be considered in both options, the social and economic benefits from assessing and managing the risk posed by the hazard is similar. *The unreliability and inaccuracy of the Operative fault data mean that there are significant costs to applicants under Option1.*	
Effectiveness and Efficiency (s32(1)(b)(ii))	
Effectiveness The accuracy of the data is a key determinant of the effectiveness of this option. As set out in my response to Question 8a, the operative fault information is a lot less accurate than the new GNS data and in some instances triggers the need for unnecessary consents to be sought. The operative fault information includes a large area of	Effectiveness The GNS data is considerably more accurate than the operative layer (as set out in my response to Question 8a). The accuracy of the data is better in those areas where LIDAR was used to identify the fault lines. For the wider District where LIDAR was not used there is a reliance on FAAs. While this information is not as accurate as that used to map the FAZ, it is more reliable

Option 1 Status Quo	Option 2 Replacement of the current fault line on the planning maps with the GNS data
inactive faults. Relying on out of date and inaccurate data is not an effective approach to managing hazards. Reliance on the operative fault information will not be effective in the protection of activities, development and life from the adverse effects of natural hazards. <u>Efficiency</u> My response to Q10a sets out the key aspects of administering Option 1 in consideration of the wider tools available under the Building Act. This comparison is useful when considering the efficiency of the option. At its worst Option 1 will require resource consents to be applied for where there is no fault present. In a lot of other situations (subdivisions and plan changes etc) the operative data will be disregarded in favour of the new information. Option one requires resource consent for all structures located on faults. There is no regard to the nature of the structure meaning that low risk structures are subject to the same consenting threshold as higher risk structures.	than the operative data. Utilisation of this information in the plan would be more effective than Option 1. <u>Efficiency</u> Option 2 would be more efficient than Option 1. Reliance on more accurate data would make for a more efficient consenting process, especially in areas identified as a FAZ. Option 2 does need to be considered against the wider tools available under the RMA and the Building Act. It would double up on existing processes with no significant benefits. Option two would require resource consent for all structures located on faults. There is no regard to the nature of the structure meaning that low risk structures would be subject to the same consenting threshold as higher risk structures.
In considering the efficiency and effectiveness of the two options I do consider Option 2 to be more likely to achieve the objectives of the Plan and is the better option. This is primarily due to the accuracy of the Option 2 fault data. Neither option has a responsive policy framework which reflects the nature of the hazard data.	
Risk of acting or not acting if there is uncertain or insufficient information (s32(2)(c))	
With the presence of newer and more accurate information (the GNS Data), there is a risk associated with acting, i.e. the adoption of Option 1. This risk is higher when considering the wider RMA processes and Building Act tools available that support the GNS Data being applied to new developments.	The risk of acting on this occasion is less than Option 1 due to the accuracy of the information available. There is still a degree of uncertainty associated with the information which has not been assessed by LIDAR. This uncertainty is however much less than Option 1. Option 2 does not however respond to this uncertainty in the proposed planning framework, instead it would adopt the existing operative policy and rule framework which does not reflect the nature of the fault data mapped. The risk of acting in this instance is that the rule framework in the TDP would not reflect the accuracy or type of hazard information meaning that FAZ and FAA would have the same activity status.

Option 1 Status Quo	Option 2 Replacement of the current fault line on the planning maps with the GNS data
*There is a higher risk associated with Option 1 given the inaccuracy and unreliability of the operative fault information. While the GNS data means there is less risk associated with Option 2, there **would** be a risk associated with how this information is expressed through the rule framework.*	
Decision about the most appropriate option	
When considering Option 1 and Option 2 only, Option 2 is the better option to achieve the purpose of the RMA and the relevant Objectives of the TDP. This is on the basis that the hazard data used for Option 2 is far more accurate than Option 1. The Option 2 data better reflects the extent of the faulting hazard within the Taupō District. The presence of the Option 2 data **would** provide a level of protection from the hazard through wider RMA and Building Act processes under both options, i.e. even if Option 1 is chosen the GNS data **would** still exist and need to be considered. Option 1 requires resource consents in locations where the fault or hazard no longer exists, and therefore is totally unreliable as a basis to trigger a consent. So, the consent is unwarranted, and the associated costs are unreasonable. As can be seen on the attached maps this problem is widespread throughout the District. I consider this to be a fatal element of Option 1. The key challenge with adopting Option 2 is the risks associated with the regulatory framework not reflecting the accuracy of the new data. This represents an inefficient response to the new information.	

10 a. if either Option 1 or Option 3 were adopted as part of our recommended decision as an 'interim measure', what would be the implications on administration of the regime under each regime (particularly for Option 1); and

The following table sets out the key elements of administering the options once implemented i.e. after the First Schedule process is completed for Option 1. The table lists the key occasions where the fault line data is likely to be applied.

More information can be found on the matters listed in my Section 42A report, Mr Smith's evidence and my response to Minute 7.

	Option 1	Option 3
LIM Reports	Yes, the fault layer can be included in LIM reports but does not have to be as they are mapped in the TDP. The GNS data would also appear on LIM reports.	Yes, the GNS data would be included in LIMs.
Trigger a need for a resource consent	All structures on the mapped fault lines would require a resource consent under rule 4e.10. There is a risk that the fault line triggering the consent is not present at that location or inactive. There would be cases where a consent is triggered in the absence of a hazard.	No

Considered in subdivision applications	Yes, under S106 - Likely that the information would be discounted if the new information shows that the operative fault line is incorrect or inactive.	Yes, under S106.
For Controlled and Restricted Discretionary Activities	No, for non-structure based consents unless hazards etc are listed as a matter of discretion.	No, where hazards etc are not listed as a matter of discretion.
Considered in discretionary and non-complying resource consents	Yes – Likely that the information would be discounted if the new information shows that the operative fault line is incorrect or inactive.	Yes
Considered in Plan Changes	Yes – Likely that the information would be discounted if the new information shows that the operative fault line is incorrect or inactive.	Yes
New (more accurate) data comes available on the fault lines – location and level of hazard.	The new information would be brought into the TDP via the First Schedule process. Until then it would sit outside of the TDP.	Would replace the older data as soon as it is provided to TDC.
Considered in building consents	Yes, for any structure above building level 2, would be identified on PIM's for timber framed houses and for buildings requiring engineering design or structural changes to existing buildings – Likely that the information would be discounted if the new information shows that the operative fault line is incorrect or inactive.	Yes, for any structure above building level 2, would be identified on PIM's for timber framed houses and for buildings requiring engineering design or structural changes to existing buildings

When considering the two options, there are numerous cases where the operative fault information would need to be considered and then disregarded in favour of the newer GNS data. For those situations, I do not see this as being a significant issue as robustness of the new data should always be accepted over the old. Where the old data triggers the need for a resource consent, and there is no fault line present, is a key area of concern. Even though the data is known to be inaccurate and there may not be a fault present, a resource consent process could still be required to be initiated, under Option 1. The potentially unnecessary cost of this application would be unreasonably borne by the applicant.

10 b. Would the adoption of either option (i.e. Option 1 or Option 3) as part of our recommended decision preclude Option 2 being implemented in the short to medium term (again though a First Schedule process)?

No, neither option would preclude Option 2 being implemented in the short to medium term.

I consider that it is important to note that neither option would also preclude a plan change that uses the GNS data but with a more effective policy and rule framework accompanying it. Any new policy framework should reflect the

accuracy and nature of the hazard information. So, while the Option 2 data is more fit for purpose than Option 1, the associated policy and rule framework is not. While not identified as an option in Minute 23, the introduction of the GNS data into the TDP would need to be accompanied by an appropriate policy framework which is properly socialised with affected landowners and the wider community. This option would address some of the key risks identified in my assessment in response to Q8b.

The presence of the GNS Data and its ability to be considered and applied through resource management and Building Act processes means that the risk posed by the hazards is managed over the medium term.

10 c. What is the Council's appetite and /or plans for progressing Option 2 as a medium to long term solution in light of the content of the draft NPS Natural Hazards which promotes a *precautionary approach* toward hazard planning.

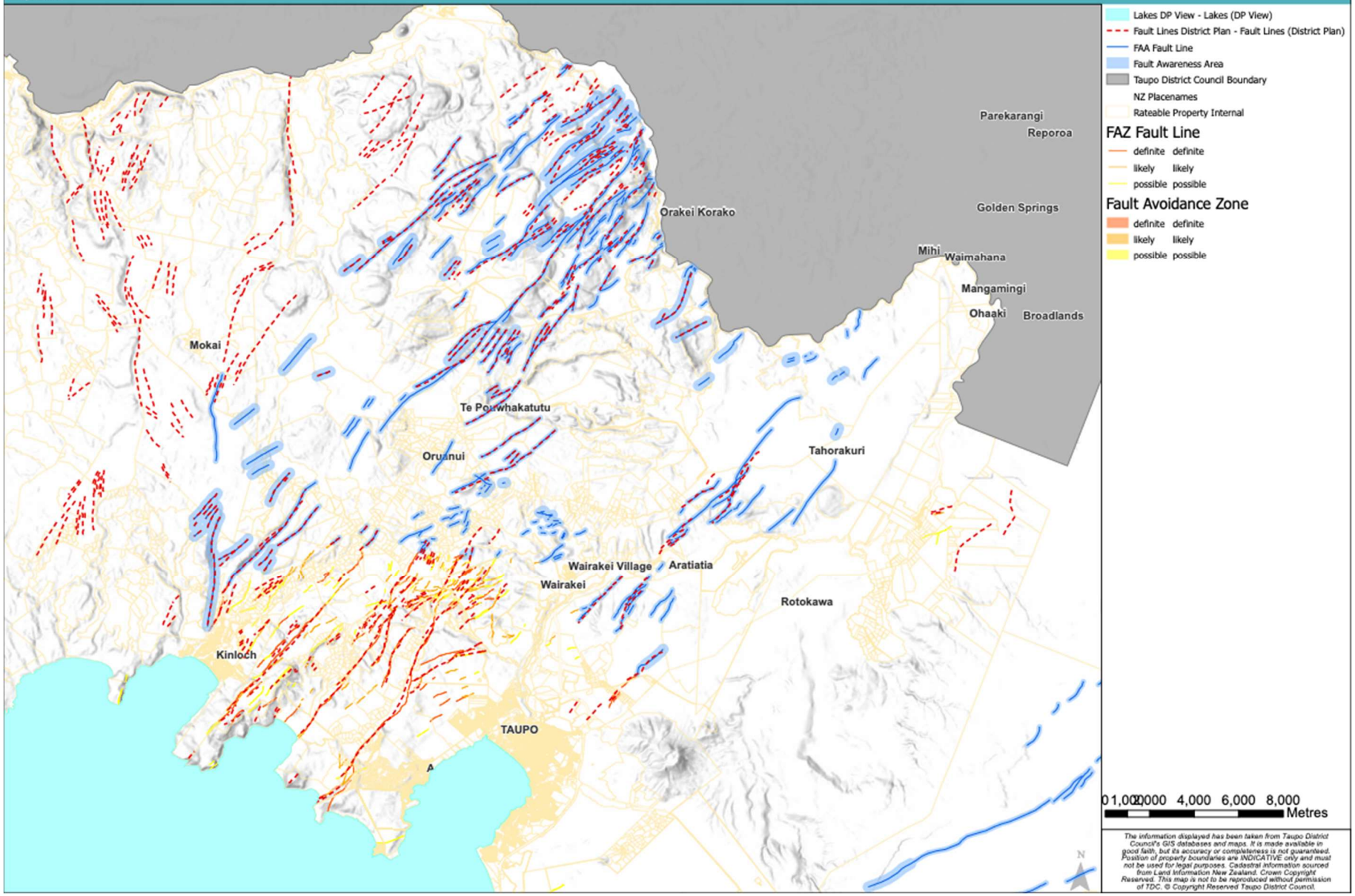
On review of the current draft of the NPS-NH, TDC would be required to undertake a plan change as soon as reasonably practicable. The NPS requires council to use the best information they have at the time which includes information which may be incomplete or not scientifically robust. The NPS does not refer to processes or tools under other legislation, such as the Building Act, so it is my view that it is requiring an approach which is reliant on a RMA focussed response. This response would require TDC to initiate a First Schedule process that would likely involve adding the most up-to-date fault data into the Plan along with an relevant policy framework.

Whether the NPS would effectively direct the progression of Option 2 would be based on whether TDC had any plans to revise the existing data based on further analysis of wider LIDAR data. If TDC is considering revising the data (such an undertaking is normally predicated in an annual or LTP process) in the short to medium term, it is likely that TDC would defer any plan changes until the GNS Data is revised.

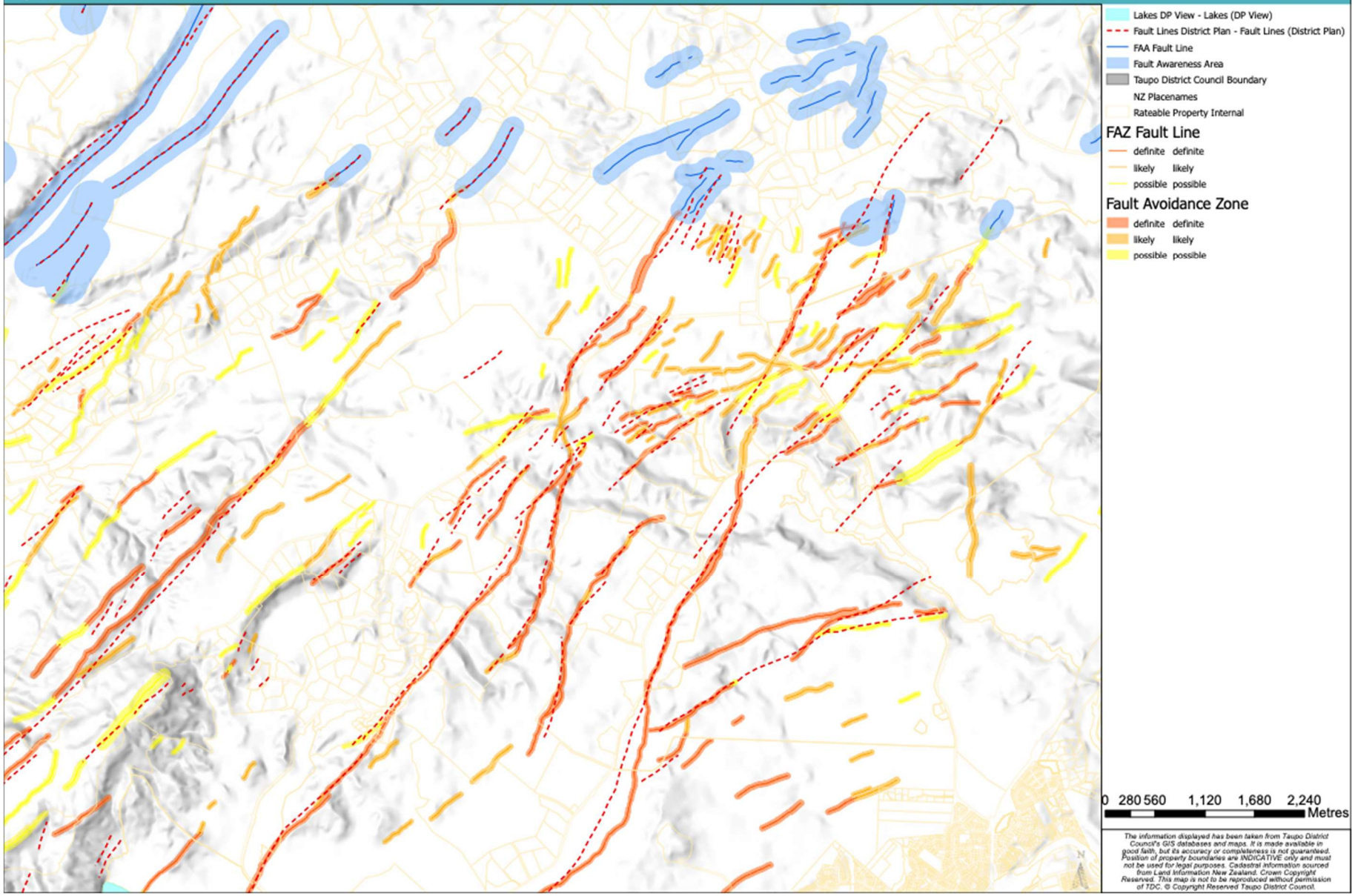
Further to my response to Q10b, the presence of the GNS Data enables the management of the risk within the medium term until TDC initiates a first schedule process as directed by the NPS or if the GNS Data is revised on the basis if the new LIDAR areas.

Maps Showing Operative and GNS Fault Information.

Current District Plan Faultlines vs New Mapped Faults - Northern End of Lake

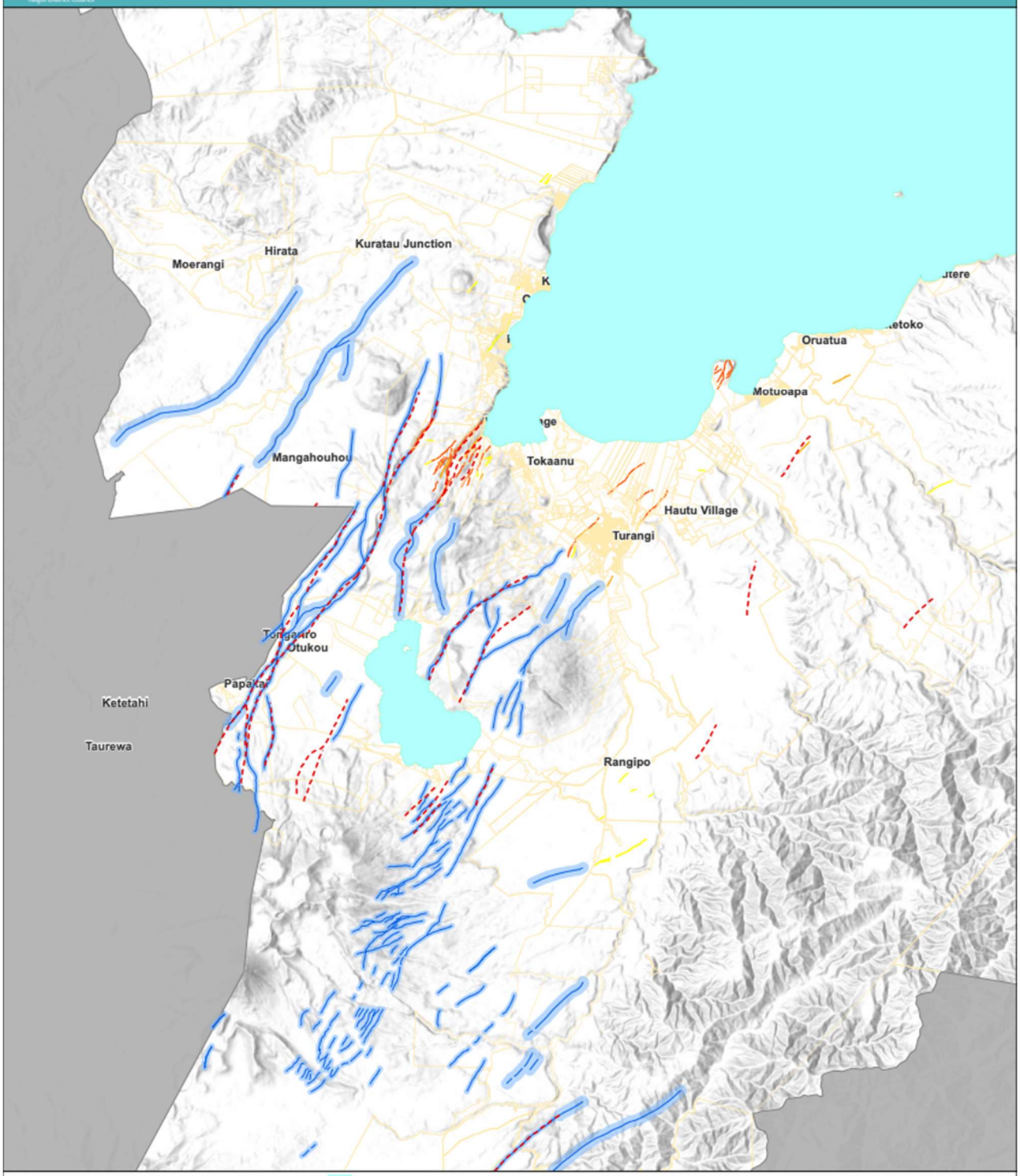


Current District Plan Faultlines vs New Mapped Faults - Zoomed example



Current District Plan Faultlines vs New Mapped Faults -

GREAT LAKE TAUPŌ
Taupō District Council



Lakes DP View - Lakes (DP View)
Fault Lines District Plan - Fault Lines (District Plan)
FAA Fault Line
Fault Awareness Area
Taupo District Council Boundary
NZ Placenames
Rateable Property Internal

FAZ Fault Line
definite definite
likely likely
possible possible

Fault Avoidance Zone
definite definite
likely likely
possible possible

0 1,250 2,500 5,000 7,500 10,000
Metres

N