National Emergency Management Agency
**Te Rākau Whakamarumaru**

CDEM Resilience Fund project application form

This form provides the minimum of information for the application; a detailed project plan should be developed to inform this application and may be attached.

Project title	Active Fault Delineation for Gisborne/Tairawhiti
Date of application	14th June 2021
Details on application	
Applicant *(Note: CDEM Group must endorse/sponsor all applications)*	Gisborne District Council/GNS
Sponsoring CDEM Group	Gisborne CDEM Group
Other local authorities, Groups or organisations supporting this proposal	
Project description	

Executive summary *[200 words maximum description]*

Gisborne District, along with adjacent regions, have a poor understanding of the distribution of active faults that pose a risk to communities and infrastructure. This results from the absence of mapping since the publication of the Raukumara geological map in 2000. Secondly, it is a consequence of the soft-rock geology which masks the fault traces that would be evident in hard rock environments such as in the main ranges. As the GNS active fault database map shows; where active mapping is undertaken such as in northern Wairarapa, a significant density of faults will be identified.
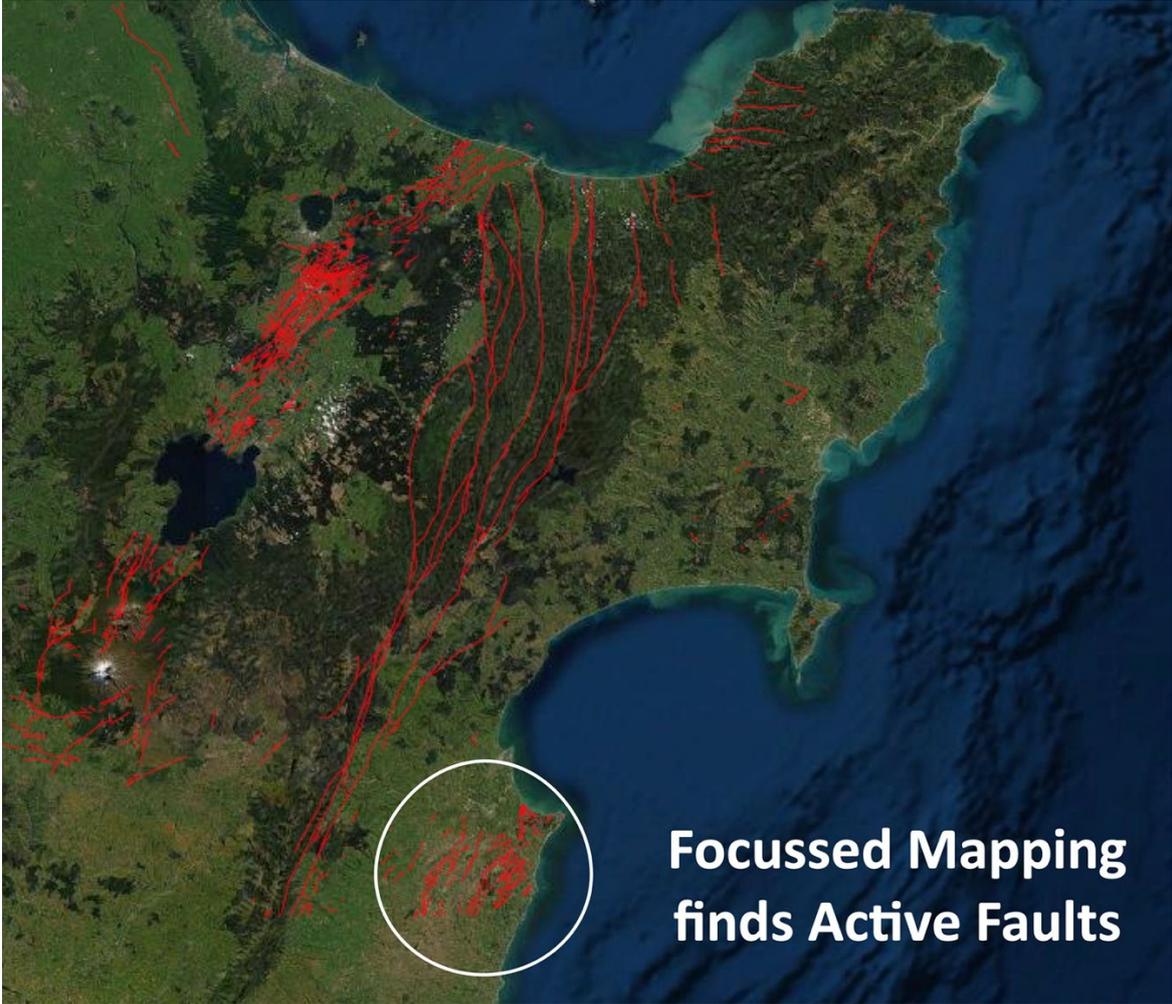
Focussed Mapping finds Active Faults

The region has experienced a significant number of M5 to M6+ earthquakes since 1940 and 7 infrastructure damaging earthquakes since 1960, culminating in the 2007 M6.7 Gisborne quake which caused significant damage. The 2007 event was offshore but there were also others close to or under Gisborne city. Most of these events cannot be assigned to a known fault.

This project aims to identify active faults for the Ruatoria and Tolaga areas, the Poverty Bay Flats and Gisborne City environs, as well as the water supply network. This will allow the risks to critical infrastructure such as the water supply dams and pipeline, the water treatment plant, roads, and bridges to be better assessed to inform long term mitigations to enhance community resilience.
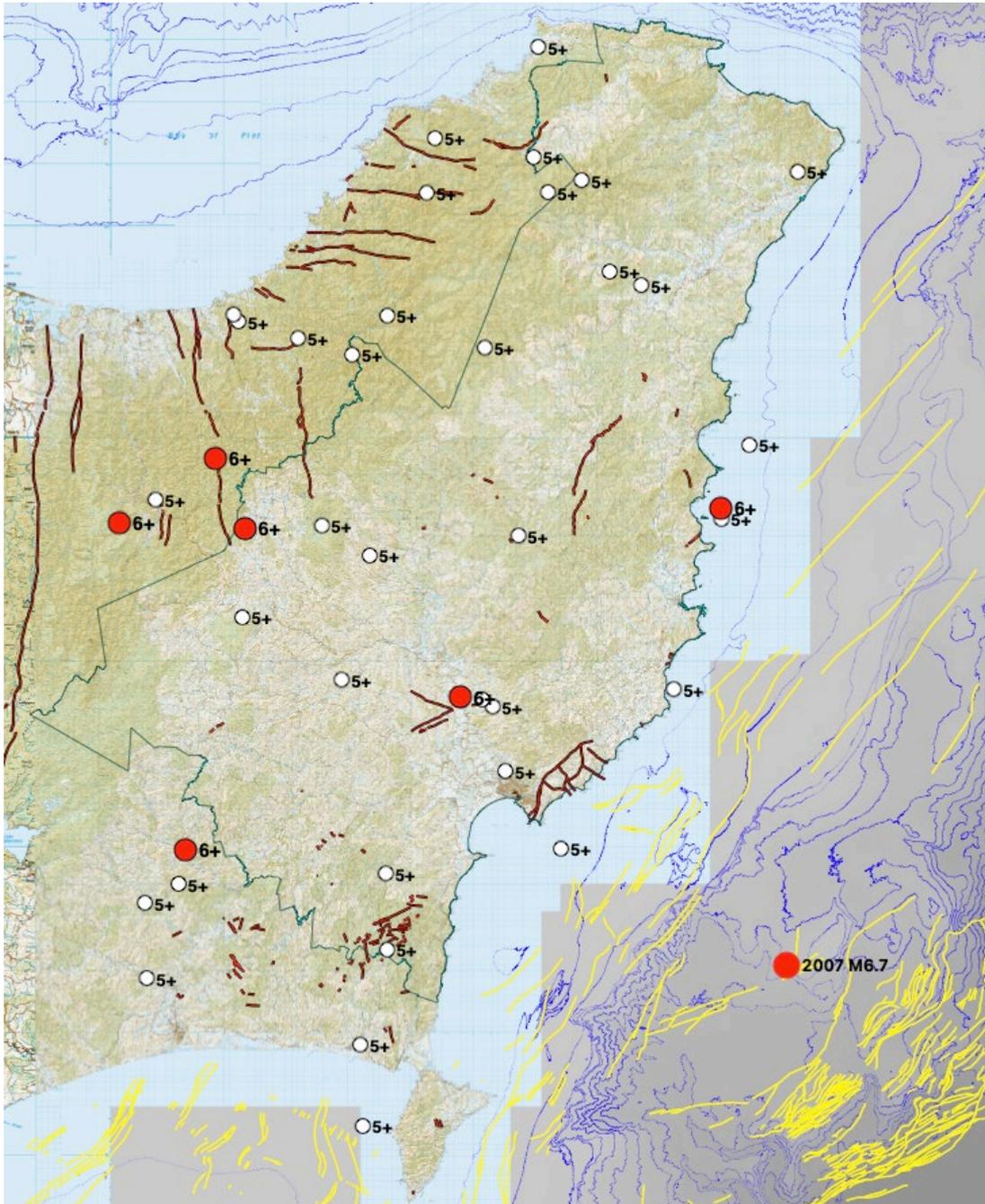
Challenge/opportunity *[200 words maximum description]*
Decision-making for resilience and recovery requires good information. Gisborne City has been struck by earthquakes previously as in 2007, and will likely be struck by damaging earthquakes in the future. The earthquake risk to the broader infrastructure that the city relies on, particularly the main bridges and the water supply reservoirs and pipeline is, however, poorly known. Likewise the assessment of risk of earthquake rupture for the rural townships is limited by the lack of active fault mapping. The Christchurch Earthquakes in 2010-11 demonstrated the risk associated with blind/hidden faults, while the Kaikoura Earthquake highlighted for the first time in New Zealand the risk posed by sequential multiple fault

rupture. As Tairawhiti is in the same tectonic region, it faces similar risks but the locations are presently unknown.

Gisborne District Council has acquired 8,500km^2 of LiDAR at a resolution of 4 pulses per m^2. This is a valuable high resolution dataset and one of the key opportunities supporting that investment was to identify otherwise obscured active faults in the region.

The project has a broader opportunity in that as many regions with a similar potential for hidden or blind active faults are still in the process of acquiring regional LiDAR and this project will provide a template and risk assessment process to follow using New Zealand leading earthquake and fault risk provider, GNS.

Alignment with priorities and objectives of the National Disaster Resilience Strategy (NDRS) *[200 words maximum description]*

Managing risks: This project is all about managing risks. Risk minimisation requires that the areas most at risk of damaging earthquake rupture are identified and mitigation strategies put in place. GDC is reviewing the Tairawhiti Regional Management Plan. Natural hazard management is a core element of the plan review and knowledge of the areas most at risk of earthquake rupture will allow for policies and rules to be put in place to manage earthquake risk. Identification of the potential earthquake risks associated with core infrastructure such as water supply will allow the LTP process to identify vulnerabilities and lead to effective resilience measures (e.g. alternatives or increased redundancy).

Effective response and recovery: Knowledge about active faults and thus rupture risk is so minimal that an effective response and recovery strategy cannot be developed. The assumption is that we must anticipate that the risk is everywhere. This is inefficient and results in ad hoc decision-making. The research will add significant granularity to the earthquake rupture risk profile for the region and allow for locally focussed rupture response plans.

Supporting community resilience: The research will allow for informed decisions about the investments people and communities make; what those investments are and where are they best located to mitigate risk.

Alignment with Principles and Allocation Preferences *[200 words maximum description]*

The project aligns with the NDRS.

51.6% of Tairawhiti identify as Maori, and Tolaga and Ruatoria are predominantly Maori. Moreover, the socio-economic wellbeing of Maori communities is below that of other communities. Consequentially, their capacity to absorb and mitigate risk is lower. Thus, an assessment of the active faults in the vicinity of Tolaga and Ruatoria is a key objective of this project.

A key project outcome is that it will allow for the areas most at risk of earthquake rupture to be identified and mitigation strategies put in place. Such strategies may include identifying areas where the medium to long-term risk of rupture is greatest and then establishing policies in the TRMP ranging from discouraging new dwellings in high risk areas to potentially managed retreat in areas where the risk is too high. It is anticipated that insurance risk may drive a realignment of occupation of such areas in the long term but for this to happen, those risks need to be identified (otherwise the cost is borne by all irrespective of risk).

As one of the first vulnerable regions to acquire LiDAR coverage, the lessons learnt and the AI tools developed can be applied in other regions once national LiDAR coverage is rolled out.

Once the project is complete, it is anticipated that other areas can be addressed using the tools developed in this project.

This project is one of a suite of projects that have and are being undertaken to assess alignment with the NDRS.

Application of outcomes/benefits to sector *[200 words maximum description]*

Community awareness of the outcomes will be addressed through a significant suite of regional hui using the recent set of 15 hui following the March 15th 2021 earthquake and tsunami as a template.

It is seen as critical that at the culmination of the project, a peer reviewed project report with plain English summaries and audio-visual/social media collateral are developed and socialised.

It is seen as key that the tools developed are shared with adjacent regions. This could be via the East Coast Labs model but since that does not include Bay of Plenty, Eastern Waikato, Marlborough and Northland, it is proposed that the project results and outcomes are socialised via a series of regional workshops. These could be facilitated through the Regional Councils Natural Hazards Risk Management SIG and it is proposed that the second meeting of the SIG is held in Gisborne in the second half of 2022 (2 SIG meetings are held annually with the second typically held in a region)

Ongoing costs (post project) and how it will be funded *[Please provide a summary of ongoing costs (if any) and how it will be funded/managed - 200 words maximum]*
These have not yet been quantified. The Tairawhiti CDEM group will need to integrate the outcomes into the risk-hazard matrix for the region while gaps will be addressed utilising existing strategic alliances with key Universities to address these gaps using post graduate studies. Maintenance of the existing close working relationship between the Council's CDEM and Principal science functions is key to ensuring post project success.

Project design

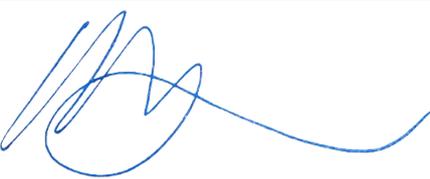|	
Project manager	Dr Murry Cave, Principal Scientist Gisborne District Council
Other project members	Gisborne District CDEM staff, GDC GIS staff, Matt Cook (Auckland University EQC funding landslide risk assessment for Gisborne City). A governance oversight committee is established comprising CDEM Community Link members from Ruatora to Muriwai, and Te Karaka, and hapu leaders from within the study area as well CDEM or Natural Hazard Policy staff from adjacent regions are appointed as representatives.
External providers/contractors	Institute of Geological and Nuclear Sciences who will be the primary entity undertaking much of the work.
NEMA Resource (if required)	

Deliverables *[Note: payments will be made after successful completion of milestones identified]*

Key Milestones	Date for completion	Cost (Invoice Amount)[1]
Detailed scoping workshop between GDC and GNS to establish final design and data requirements for project. Report to Governance committee	Within 2 months of project approval	$10,000 ($5000)
Compilation for all data required for project. Report to Governance committee	Within 3 months of project approval	$10,000 ($5000)
Model build, validation and testing, mid project workshop with GDC/Gisborne CDEM and stakeholders to ensure project work plan is aligned with project objectives and gaps and opportunities for improvement identified. Report to Governance committee	Within 7 months of project approval	$ $55,000 ($10,000)
Testing and validation of AI tool. Report to Governance committee	Within 10 months of project approval	$20,000 ($5000)
Preparation of and submission of final products and project report. Final report to Governance committee	Within 12 Months of project approval	$25,000 ($10,000)

Identified risks

Risks	Suggested mitigation / management
Staff changes at Council	Build in redundancy with more than one staff member with a good understanding of the project and outcomes.

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[1] Council costs in (Red Brackets)

Staff changes at GNS	Build in redundancy with more than one staff member with a good understanding of the project and outcomes.
Delay in project completion due to events outside of Council or GNS control cf a Covid 19 outbreak	Liaise with NEMA regarding amended milestone timeframes.
AI tool does not perform	Review underlying causes and if unable to proceed, examine alternatives Discuss with NEMA and include these in final project report.
Project not complete within 12 months of project approval	GNS to advise GDC and NEMA as soon as the time overrun becomes apparent so that milestones can be amended.

Funding request and use	
CDEM Resilience Fund contribution	$120,000
Local authority/organisation contribution	$35,000 (in kind, primarily staff time)
Other sources of funding or support	
Budget *[Please supply spreadsheet]*	$155,000
Applies if application exceeds $100,000 over the life of the project	Are you prepared to attend an interview in support of this application (if needed)? Yes ☒ No ☐

Application confirmation
Is this application from an individual or other organisation (not CDEM Group)? Yes ☐   No ☒
Does the CDEM Group support this application?   Yes ☒   No ☐ *(Sign-off below confirms support)*

Approval of Chief Executive *(Chief Executive or Head of the organisation receiving the funding)*	
Approval of CEG Chair	

All communications regarding the application, including approval decisions will be addressed to the Chief Executive and CEG Chair

CDEM Group comment

Note: Only complete forms will be considered for assessment. All completed forms and supporting documents must be emailed to NEMA on Resilience.Fund@nema.govt.nz

NEMA Assessment *(Internal Use Only)*		
Principles	**Yes**	**No**
Local/Regional Focus	☐	☐
Valuing the role of Maori in Emergency Management System	☐	☐
NEMA involvement required	☐	☐
Allocation Preferences		
Alignment with NDRS	☐	☐
Achieving equity of outcomes for Māori communities, marae, hapū, iwi, and Māori organisations.	☐	☐

Outcome focused	☐	☐
Applicable in other regions/CDEM Groups	☐	☐
Enables national consistency	☐	☐
Wider funding/resource commitment (i.e. co-funding, on-going funding, resource time committed)	☐	☐
Builds on existing work	☐	☐
Operational expenditure (Opex)	☐	☐
Capital expenditure (Capex)	☐	☐
Other		
Application from individuals or other organisations endorsed/sponsored by CDEM Group	☐	☐

NEMA Subject Matter Expert Comment　　　　Supported ☐ Not supported ☐

NEMA Regional Emergency management Advisor Comment　　　Supported ☐ Not supported ☐

NEMA Review Panel Comment　　　　Supported ☐ Not supported ☐

NEMA Director Decision Sign-off　　　　Approved ☐ Declined ☐

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Director of Civil Defence Emergency Management