



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		Taranaki Geospatial Information Systems Investigation
Date of application		28 September 2018
Details on application		
Applicant		Taranaki CDEM Group
CDEM Group/s affected		Taranaki
Other local authorities, Groups or organisations supporting this proposal		Taranaki Regional Council New Plymouth District Council South Taranaki District Council Stratford District Council
Project description		
Executive summary <i>[200 words maximum description.]</i>		
<p>This application is for a detailed scoping investigation into building Geospatial Information Systems (GIS) capability for the Taranaki region. This investigation is specific to the requirements for a shared service across the CDEM Group members, including functionality, technical structure, software and licensing, user requirements, sharing agreements, staging, detailed budget, human resource requirements. These learnings will be applicable to other Groups with shared user requirements. The outcomes of this investigation will provide a solid foundation for the Group to decide on committing budget and resource to the implementation and maintenance of GIS capability.</p>		
Challenge/opportunity <i>[200 words maximum description.]</i>		
<p>GIS are powerful tools for decision makers across the full range of CDEM functions. GIS can support risk reduction activities (such as lifeline vulnerability studies), contribute to a common operating picture during events (response), prioritise recovery efforts post-emergency, and to support science communication with the public (readiness).</p> <p>A recent Lifeline Vulnerability Study has included the development of an initial GIS capability hosted by new Plymouth District Council (NPDC) on their GIS enterprise platform. The layers include available hazard information and as-built layers for lifeline utilities such as power, telecommunications, roads, three waters, and gas lines. The functionality of this platform is to conduct risk analysis on lifeline assets. These as-built layers will progressively become out of date as the information has been collected at a single point of time for a single purpose. This system is only available to the Group office and NPDC.</p> <p>The Taranaki Group Office provides policy and coordination for the region and is supported by the three territorial authorities who assume local CDEM delivery. Hence, consistent, integrated systems and processes are required region-wide. Each have existing, and not necessarily complimentary, IT systems.</p>		

Alignment with identified goals and objectives identified in the CDEM sector [200 words maximum description.]

This application supports the Sendai Framework priority of Understanding Disaster Risk: 24-c “To develop, periodically update and disseminate, as appropriate, location-based disaster risk information, including risk maps, to decision makers, the general public and communities at risk of exposure to disaster in an appropriate format by using, as applicable, geospatial information technology”.

The Government’s delivering better responses to natural disasters and other emergencies (August 2018) identifies a key area of improving the information and intelligence system that supports decision making in emergencies. This includes putting structures in place to build the capability of those working in the intelligence function in responses; and progress elements of the common operating picture. GIS capability will contribute to these action areas.

A Regional GIS is listed in the Taranaki CDEM Group Plan as a strategic objective to be completed in the next five years to improve the understanding of risk exposure and to enable better situational awareness during a response and recovery.

Dissemination of benefits to sector [200 words maximum description.]

This investigation will provide a strong basis for the Group to decide on committing budget and resource to the implementation and maintenance of GIS capability.

These learnings will be applicable to other Groups with shared user requirements.

Although the implementation of the GIS system is not included in this application, the benefits of the implementation stage is the driver of this initial investigation and will provide significant benefits to the CDEM sector in Taranaki through improvements in risk awareness and reduction; developing a common operating picture across the region, and to prioritise recovery efforts.

Project design

Project manager	Craig Campbell-Smart, CDEM Regional Manager
Other project members	Teresa Gordon, CDEM Analyst New Plymouth District Council GIS team lead
External providers/contractors	To be determined

Deliverables

Milestones	Date for completion	Cost
1. Engage a contractor for the study	31 July 2019	Milestone payments as per attached budget
2. Identification of user requirements	August to October 2019	
3. Technical assessment	November 2019 to February 2020	
4. Development plan and resource costings	March 2020	
5. Final Report	April 2020	

Identified risks

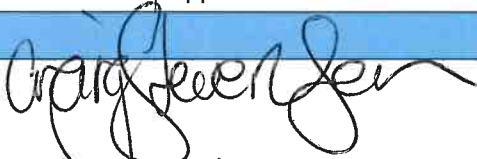
Risks	Suggested management
Taranaki CDEM Group Joint Committee does not fund \$25,000 contribution	Application to be withdrawn.

Plan does not meet expectations.	Develop terms of reference for the GIS project (attached).
Cost overruns occur.	Taranaki CDEM to meet cost overruns.
CDEM Group member Councils do not engage in the process.	Begin the process by initiating relationships with key IT/GIS members and executives.
CDEM stakeholders do not engage with the process.	Address through CEG or other committee (e.g. Lifelines and Readiness and Response) membership.
National developments for Common Operating Picture (COP) GIS developments not considered	Involvement of Ministry staff in project.

Funding request and use

CDEM resilience fund contribution	\$25,000				
Local authority/organisation contribution	Taranaki Emergency Management Office to provide project management.				
Other sources of funding or support	\$25,000				
Budget <i>[Please supply spreadsheet]</i>	Please see attached.				
Applies if application exceeds \$100,000 over the life of the project	Do you wish to attend a hearing in support of this application? <table style="display: inline-table; vertical-align: middle;"> <tr> <td>Yes</td> <td>No</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Yes	No	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Yes	No				
<input type="checkbox"/>	<input checked="" type="checkbox"/>				

Application confirmation

Approval of Chief Executive	 Craig Stevenson CEG Chair.
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CDEM Group comment

This is a CDEM Group led project.

GIS Project Budget

2019/20

Income

MCDEM Resilience Funds	\$	25,000
Taranaki CDEM Group Office (TEMO) - to be confirmed	\$	25,000
	\$	<u>50,000</u>

Contractor	\$	40,000
Project expenses	\$	10,000
	\$	<u>50,000</u>

Contractor

\$ 40,000

Activity	Installments (%)	Installments (\$)
Milestone 1 - Contractor Engagement	20%	\$ 8,000
Milestone 2 – Identification of user requirements	20%	\$ 8,000
Milestone 3 – Technical assessment	20%	\$ 8,000
Milestone 4 – Development plan and resource costings	20%	\$ 8,000
Milestone 5 – Report and presentation to Taranaki CDEM and CEG	20%	\$ 8,000
		<u>\$ 40,000</u>

Project expenses

\$ 10,000

Travel, accommodation	\$	2,500
Workshop expenses	\$	1,500
GIS development	\$	6,000
	\$	<u>10,000</u>

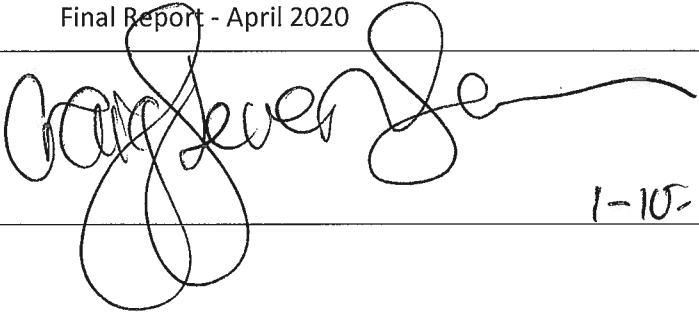
TERMS OF REFERENCE: TARANAKI GIS INVESTIGATION

CDEM Resilience Fund project application

DATE OF APPLICATION	1 October 2018
APPLICANT	Taranaki Emergency Management Office
CDEM GROUP AFFECTED	Taranaki
BACKGROUND	<p>This investigation will give effect to scoping user requirements and development planning for a Common Operating Picture (COP) in line with the <i>Ministerial Review: Better Responses to Natural Disasters and Other Emergencies in New Zealand</i> (Invest in the technology to ensure a fit-for-purpose Common Operating Picture).</p> <p>The investigation seeks to specify the most appropriate and cost effective solution for development of geospatial COP capability for the Taranaki CDEM Group, alongside any national development of systems.</p> <p>The history of need for GIS development for the Taranaki CDEM Group is well documented and the development of a Regional GIS for emergency management is reinforced through Objective DRR5 in the Civil Defence Emergency Group Plan 2018-2023.</p> <p>An initial Lifelines GIS viewer was developed during the 2018/19 financial year, and forms the initial GIS capability specific to CDEM requirements for the Taranaki CDEM Group.</p> <p>Funding for the establishment of a GIS capability is not yet budgeted for within the Taranaki CDEM Group, and this project will contribute to the detailed discovery, user requirements and scoping project. This project would ascertain the dedicated budget required to build GIS capability for the Taranaki CDEM Group and outline a roadmap for the development of GIS. A project budget of \$50,000 is recommended for the initial discovery and scoping for the 2019/20 financial year.</p>
OBJECTIVE	To undertake detailed discovery, user requirements and scoping to ascertain the dedicated budget and development roadmap required to build GIS capability.
DELIVERABLES	<p>A Taranaki GIS Investigation will cover:</p> <ol style="list-style-type: none">1. Discovery and user requirements/priorities2. Scoping3. Platform4. Staffing capability and capacity5. Funding

	<p>Discovery and user requirements/priorities will determine software requirements and prioritisation to clearly define key functional uses. Decisions on which set of requirements need to be implemented first and which ones can be delayed until a later release are required.</p> <p>The project scoping with project partners will determine:</p> <ul style="list-style-type: none"> • Minimum Essential Datasets (MEDs) and Essential Elements of Information (EEl)s that need to go into a GIS for Emergency Management (EM) • Setting up a project development timeframe with associated stages of data development • Determining the software and licensing requirements and prices for a regional GIS, within existing GIS platform • Determining human resource requirements for both setting up a regional GIS for EM and ongoing development and maintenance of the system • Provisional budget for elements defined above
<p>INTENDED AUDIENCE</p>	<p>The intended audience is the:</p> <ul style="list-style-type: none"> • Taranaki CDEM Group (<i>ECC and EOC staff, particularly Controller, Intelligence Managers and Lifeline Utility Coordinators</i>) • Taranaki Authorities (<i>New Plymouth, South Taranaki and Stratford District Councils, and Taranaki Regional Council</i>) • Provider of CDEM Shared Services (<i>GIS and IS teams</i>) • CDEM-critical stakeholders (<i>Lifeline Utilities</i>)
<p>APPROACH / METHODOLOGY</p>	<p>A GIS Specialist will be appointed under contract to deliver the project in accordance with these terms of reference.</p> <p>The GIS Specialist will:</p> <ul style="list-style-type: none"> • Report to the project manager or their appointed representative on a regular basis including when project milestones are due • Work actively with intended audience to define requirements and scope solutions (templates and workshops envisaged) • Prepare documentation on project deliverables (user requirements, scoping, platform, staff capacity and capability and funding requirements), as outlined above.
<p>STAKEHOLDERS TO BE CONSULTED</p>	<ul style="list-style-type: none"> • CDEM stakeholders • Emergency Services

	<ul style="list-style-type: none"> • Taranaki Intelligence Managers and Lifeline Utility Coordinators • Ministry staff
OVERSIGHT	<p>The project will be managed by the CDEM Regional Manager, and their appointed Project Manager.</p> <p>Project oversight will be provided by the Chair of Coordinating Executive Group, and milestone progress reported on a quarterly basis.</p>
RESOURCES	<p>Cost: \$50,000+GST</p> <p>Funding:</p> <ul style="list-style-type: none"> • MCDEM Resilience Fund (half share) • Taranaki CDEM Group Contribution (half share)

TIMING	Milestones <ol style="list-style-type: none">1. Engage a contractor for the study - 31 July 20192. Identification of user requirements - August to October 20193. Technical assessment - November 2019 to February 20204. Development plan and resource costings - March 20205. Final Report - April 2020
APPROVAL OF CEG CHAIR	 1-10-2018

GIS Functional requirements

Functional qualitative specifications for GIS are listed as:

Qualitative Specifications	Benefits / Features
Common View	<ul style="list-style-type: none"> • Common Operational Picture • Information Visualization • Common Symbology and Taxonomy
Digital Mapping Service (Foundational Data)	<ul style="list-style-type: none"> • Web-based digital map services • Discover through search services, specific geospatial data, information, knowledge, and services • Visualise geospatial data and products • Access the most up-to-date data directly from the authoritative source responsible for ensuring its currency and accuracy • Obtain immediate access to geospatial data without having delays associated with factors, such as processing orders, and converting data to a specific GIS format
Spatial Data Service (Geospatial Data for Essential Information)	<ul style="list-style-type: none"> • Geo-tagged assets, including built infrastructure, transportation networks, economic activities, land-use, and resources • Data from multiple source (i.e. Lifeline Utilities) • Partnerships in spatial data production and sharing

A range of non-functional requirements also exist (such as an information management plan, standardisation, data sharing protocols, access authorisation and information release, application schemas, metadata, semantic interoperability), but are excluded from this discussion.

Common View

Effective management of multi-incident responses requires the development of a “Common View” of the on-going incidents and response efforts - often referred to as a “Common Operational Picture”. This common picture fosters an understanding of the challenges among the individuals who have responsibilities to grasp the magnitude (i.e. the big picture), and also reduces the information and intelligence inconsistencies among participating entities.

Information visualisation is important for organising and displaying the huge amounts of complex information being generated pre- and post-emergency impact. Geographic displays and maps quickly become key assessment, planning, and response tools. The geographic map is the common interface. Symbology on the map allows the rapid attainment of situational awareness through enabling quick distillation of essential information, and, because of its graphical nature. When combined with a common taxonomy, symbology provides a common operational ‘language’ that greatly facilitates information exchange (in raw and assessed form) and interoperability, increasing the ability to generate shared situational awareness and understanding.

Common symbology and taxonomy standards are therefore critical to enabling shared situational awareness across a federated system structure. The need for these standards are more readily apparent when considering the multiple levels of interaction between local, central and non-government entities in response to natural and manmade disasters and threats. They are both essential for improving information sharing amongst all users.

Digital Mapping Service

This is the most important functionality of any GIS. It offers the foundational mapping presentation layer that can be used within all aspects of the emergency management lifecycle. Web-based digital map services are becoming more frequently used due to the costly update of spatial data only needing to occur once for all data to be available to all possible users and applications. Based on modern web technology, GIS information can be published to anyone anywhere through the World Wide Web.

Spatial Data Services

In addition to the digital mapping functionality layer discussed above, there is concurrent need for a spatial data service. The challenges New Zealand faces are multifaceted and complicated; they require diverse information, innovative analysis, and collaboration to solve. These challenges also have two other common characteristics – they occur in places and impact communities. Therefore, all human traces, including but not limited to built infrastructure, transportation networks, economic activities, land-use, and resources need to be geo-tagged.

The data within the spatial data service(s) should be updated more frequently than the foundation data that constitutes the backbone of the digital mapping service. The data that constitutes this service is from multiple sources, ranging from administrative entities that are responsible for specific fields (e.g. energy transmission infrastructure managed by nationalised and commercial entities), to localised voluntary initiatives, to crowdsourcing for example.

Organisations are logically the producers and updaters of data during both everyday business activities and an emergency. If the results of such data production and updating efforts are physically recorded in appropriate databases, the required data / information for disaster response will be available for exchange. To ensure effective exchange, appropriate data standards and interoperability models need to be implemented so that information can be utilised within multiple systems. This brings the concept of partnerships in spatial data production and sharing to the fore as a vital component of a federated or enterprise solution for all users to be able to leverage.

Minimum Essential Datasets

A Minimum Essential Dataset (MED), is any key piece of information officials need to have in order to make a decision, that is, a decision maker cannot achieve full situational awareness without them. MEDs can be defined as information requirements before a decision is made.

The effective use of information within emergency management can be impeded by difficulties in locating and accessing important information. This is often due to:

- lack of awareness that the information exists
- not knowing who controls the information
- inability to access the information or having access but in a format that is not understandable or intuitive.

An approach that is becoming more common to resolve some of these challenges is aligning information into standardised datasets. These are variously referred to as Fundamental Operational Datasets (FODs), Minimum Essential Datasets (MEDs). Standardised datasets can improve interoperability and real-time data exchange, and help avoid repeated collection of the same data. They are often thematically characterised (i.e. data about specific things rather than general backdrop mapping) as a base logical model.

To enhance the interoperability of data collected before, during and after an emergency, basic geospatial dataset framework for emergency management in New Zealand should be collected. The geospatial dataset framework is relatively 'high-level'; it is not exhaustive of the data that could be of relevance to emergency management at the different levels of response management – from incident to national, but identifies the range and scope of work required to establish, maintain and refresh this minimum information.

Essential Elements of Information (EIs)

Effective decision-making is contingent upon communities of interest collectively defining and codifying their operational information requirements for various situations. These collections of pre-defined operational information requirements are known as essential elements of information (EIs). Because EIs are essential – that is, a decision maker cannot achieve full situational awareness without them – you typically can identify what they will be before they are needed. This means EIs can be defined as information requirements before a decision is made.

EIs represent the evolution of the localised data sharing components from the custodial owners of data into a hierarchical system that allows for specific information requirements to be shared and understood at a regional or national view. Clear definition of EIs will help foster the ability of communities to mobilise operators, planners, and technical personnel to work together to refine and share information products that help responders achieve their respective objectives.

When community members and stakeholders come together and determine what information they will need to make good decisions in an emergency, the resulting list of information needs are known as EIs. A common example is road status. Anyone from a first responder, to a utility company, to an evacuation planner needs to know whether or not roads are passable. Attributes (details you need to know about an EI, like name, location, and condition) can be chosen, and individuals know what they need to share and what information will be available to them.

By agreeing on what information is needed and how it will be shared, community members become better prepared to make decisions. When groups of stakeholders come together and agree on specific information requirements they need to access, they are taking the first step towards effectively using EIs.

Geospatial Framework (Minimum Essential Datasets)

	Hazard Themes	Response Themes	Population Themes	Building Themes	Transportation Themes	Infrastructure and Essential Facility Themes	Economic Themes	Natural Environment Themes
Standing Information Needs	<p>What is the extent of the situation? What areas are affected? What areas could be affected next?</p>	<p>What is the operational response structure? What is the status of response agencies? How is the situation changing around response entities?</p>	<p>Who is in the affected area? How have they been impacted?</p>	<p>What is in the affected area? What has been affected and how?</p>	<p>What areas are difficult to access or are isolated? Which areas are the most important to regain access to?</p>	<p>What is in the affected area? What has been affected and how?</p>	<p>What are the micro / macroeconomic impacts?</p>	<p>What are the consequential impacts on ecosystems, biodiversity, natural and cultural landscapes?</p>
	<p>Hazard boundary/ies (actual and potential)</p>	<p>Status of operational responses</p>	<p>Scale / scope of population affected / exposed</p> <ul style="list-style-type: none"> • Who / how many are affected • What are the social vulnerabilities • What is required to ensure safety and well-being? • What is required to support individuals? 	<p>Scale of residential building exposure / damage</p>	<p>Scale of transportation capacities impacts</p>	<p>Scale of disruption to communities</p> <ul style="list-style-type: none"> • Impact on public buildings / assets • Impact on essential facilities • Impact on lifelines 	<p>Will business productivity be affected? Could businesses close long-term, hurting the vitality of the community?</p>	<p>Scale / scope of change to current and / or proposed land / waterway uses. Scale / scope of impact to ecological sites of importance (social, cultural and natural).</p>