National Emergency Management Agency
Te Rākau Whakamarumaru

22 May 2024

[redacted]

Reference: OIA-2023/24-0794

Dear [redacted]

Official Information Act request relating to the Common Operating Picture Business Case

Thank you for your Official Information Act 1982 (the Act) request received on 23 April 2024. You requested:

> *"The 2017 TAC report said 'Further we recommend investigating existing technologies available internationally to support a common operating picture'*
>
> *The 2024 storms report just out said 'The then Government agreed to invest in the technology to ensure a*
> *fit-for-purpose common operating picture, however, the Inquiry understands that a business case developed in 2019 was not progressed.'*
>
> *RNZ requests release in fully searchable format of*
>
> *• The business case referred to here*
> *• With all appendices and attachments*
> *• With copies of the main subsequent records of what decision was made about this technology, and why.*
> *• Pls provide the very latest info available on any further consideration of this tech or tech that can provide what was talked about in the 2017 report, in such a way RNZ is able to report on the current status of tech that would provide this function*
>
> *Pls redact juniors names, but retain decisionmakers names."*

I have decided to release the document listed below.

Item	Date	Document Description/Subject
1.	16 October 2019	Common Operating Picture Programme – Stage 2: Business Case version 1.2 Status: Final ("the Business Case")

Please note that the watermark states "DRAFT," and that this is the copy NEMA have on record. This draft version was not finalised.

The Business Case was not implemented. NEMA does not hold a subsequent record setting out why it was not adopted and so this aspect of your request is refused under s18(e) – the information does not exist.

In respect of your request on information on further consideration of technology that could meet the expectations of the TAG report, the Business Case, while not implemented, was

developed based on a snapshot of a set of requirements and technological solutions from 2019. It is also important to note this Business Case was about the establishment of a team to support data and information management rather than the direct implementation of specific technologies.

Since the business case was developed the technologies available and likely to be needed for a future Common Operating Picture have moved on. While we have not been actively working on this project, a future model would likely include considering some of the following technologies:

- Cloud Geospatial Information Systems (GIS)
- Low Earth Orbit (LEO) satellite data
- Contemporary system security applications, including security assessment of cloud GIS systems
- Analytical applications to support decision making
- Task, action, request management, and logistics toolsets to support emergency response
- User information display technologies
- Interoperability and sharing protocols
- The appropriate application of artificial intelligence

You have the right to ask the Ombudsman to investigate and review my decision under section 28(3) of the Act.

This response will be published on the Department of the Prime Minister and Cabinet's website during our regular publication cycle. Typically, information is released monthly, or as otherwise determined. Your personal information including name and contact details will be removed for publication.

Yours sincerely

Anthony Richards
Chief Advisor to the Deputy Chief Executive, Emergency Management

Common Operating Picture Programme - Stage 2

Business Case

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Document Control

Document Information

	Detail
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Version	Issue Date	Changes
0.1	9 August 2019	First draft
0.2	15 August 2019	Initial project team feedback
0.3	21 August 2019	Further stakeholder comments
0.4	23 August 2019	Steering Committee feedback
0.5	30 August 2019	MCDEM Operations feedback
1.0	10 September 2019	MCDEM Executive Director feedback
1.1	1 October 2019	Emergency Management System Reforms Board feedback
1.2	16 October 2019	Additional reference to achievement of NEMA objectives

Document Sign-off

Role	Name	Sign-off Date
Programme Sponsor	Sarah Stuart-Black	16 October 2019
Programme Owner	David Coetzee	16 October 2019

Contents

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Glossary of terms

4Rs	The four parts of emergency management, being reduction, readiness, response and recovery (defined in the National CDEM Plan Order 2015 clause 2)
CDEM	Civil Defence Emergency Management – entities and activities covered by the Civil Defence Emergency Management Act 2002.
CDEM Groups	A group established under section 12 of the Civil Defence Emergency Management Act 2002. All local authorities must be members of a CDEM Group, and all local authorities and emergency services must have representatives on a Co-ordinating Executive Group of the CDEM Group (the CDEM Group may co-opt other people as required). CDEM Groups respond to and manage the adverse effects of emergencies in their area (from an Emergency Coordination Centre) and plan for and carry out recovery activities.
Common Operating Picture	A Common Operating Picture (COP) is a representation of relevant incident information that can be shared across relevant functions and agencies during a response. A COP is achieved through a system of protocols, procedures and tools that facilitate shared awareness and understanding of the situation and enable consolidated planning.
Emergency	A situation that poses an immediate risk to life, health, property or environment that requires a coordinated response. The Civil Defence Emergency Management Act 2002 provides the statutory definition.
MCDEM	Ministry of Civil Defence and Emergency Management (MCDEM) is the lead national agency responsible for co-ordinating the management of emergencies resulting from various hazards.
NEMA	National Emergency Management Agency – a new agency to replace the Ministry of Civil Defence and Emergency Management

1 Executive summary

This Business Case presents options for further investment in a sector-wide Common Operating Picture (COP) which will build on the progress and lessons of the COP Programme Stage 1 initiative to improve data availability, geospatial and information management systems for the emergency management sector. The Stage 2 investment is intended to develop an enduring capability to continually enhance shared situational awareness and informed decision making by the emergency management sector and the public.

Programme background and existing arrangements

In 2017, the Minister of Civil Defence initiated a Ministerial Review, appointing a Technical Advisory Group (TAG) to consider New Zealand's system for responding to natural disasters and other emergencies. The TAG Report featured 42 recommendations on improving New Zealand's emergency response system, including decision making processes, capability and training, information available to decision makers, consistency of emergency management approaches and community engagement. Of particular relevance to this business case, the TAG identified shortcomings in the existing system of joined-up intelligence that supports decision-making. It noted that information needs to be available from multiple sources and rapidly collated to provide a detailed, accurate and comprehensive view (single source of truth) of the unfolding situation that includes management of the hazard and dealing with consequences.

The TAG recommended that agencies investigate a fit-for-purpose COP. The Government's response to the TAG Report acknowledged the "need to improve how we synthesise vital information into a common picture for decision makers". In the short term, the Government committed to progress initial elements of a sector-wide COP, pull together existing work on data requirements, and to develop a business case for an enduring COP.

The Government also highlighted the need to put the safety and wellbeing of people at the heart of the emergency response system and that effective communication with the public is essential in a response - "We want to ensure better communication with the public during emergency responses so that people know what is going on, what to expect, and what to do."[1]

Stage 1 of the COP Programme has progressed preliminary foundation work and investigation relating to key datasets, a geospatial proof of concept for MCDEM, a system for capturing welfare registration and needs assessment, and the replacement of the current CDEM Emergency Management Information System (EMIS). This business case is the final work stream within Stage 1 and incorporates the lessons of the work to date. It recommends a way forward to implement the Government's intentions in relation to a COP.

In developing the scope and requirements for Stage 2, the COP Programme team and key stakeholders summarised the following shortcomings with the existing arrangements.

Key issues	Consequences
Lack of shared situation awareness, and timely, complete and consistent	— Decision makers have incomplete or inconsistent information about the emergency event. This may lead

[1] Government response to the Technical Advisory Group's recommendations (August 2018).

Key issues	Consequences
information for decision makers and the public	to poor coordination and/or decision-making and result in increased losses and risk to public safety. — Information collection and verification is resource intensive and marked by duplication of effort. It is therefore slow and ties up resources that can be utilised more effectively towards the management of the response. — The public do not know where to get authoritative information, which impedes their ability to prepare and respond to an emergency. Public trust and confidence in emergency management agencies is jeopardised, and in the extreme, public safety could be at risk.
Inconsistent information management practices and capabilities across the sector.	— Coordination and accessing up-to-date information takes longer. — Multiple groups are developing and maintaining their own applications (geospatial and information management) which is inefficient use of specialist resources and results in a lack of consistency. — Collaboration and information sharing between agencies is complicated as they are not familiar with each other's systems and practices. — The way that information is gathered and disseminated is inefficient, which may lead to delayed and inconsistent response across agencies.
Limited information and resource sharing, and duplication of effort across the sector	— Multiple interest groups seek access to the same data and endeavour to negotiate licenses or data sharing arrangements with data owners. — While agencies act with goodwill in lending staff during emergencies, there are no formal arrangements to share and backfill specialist resources. This often results in resource shortages and impede the response.
There is currently no government organisation that has the responsibility, capability and capacity to provide professional leadership to the sector to help achieve best practice and consistency.	— Agencies do the best they can with the resources they have available.

Benefits sought and investment objectives

Further development of a sector-wide COP will support the provision of timely, accurate and relevant information to emergency managers, decision makers, and the public during emergencies. This will enhance public safety, and enable more effective emergency response. The achievement of the key programme outcomes will be progressive and evolve as we further define information needs, improve our understanding of data availability, enable access to vital information and develop efficiencies across the sector.

Achievement of the programme outcomes will significantly lift the capability of the emergency management sector and therefore supports the leadership role that the government expects of the newly forming National Emergency Management Agency (NEMA), in particular with regards to:

- building the capability and capacity of the emergency management system to plan for, withstand, respond to, and recover from emergencies; and
- leading or supporting responses to, and recovery from, emergencies (irrespective of cause).

In particular, the Government have prioritised work towards the consolidation and presentation of emergency information.

The key outcomes following implementation of the Programme are:

— Decision makers will have access to a broad and consistent set of data sources that is relevant to their needs.

— Essential emergency impact and response information will be quickly available to relevant stakeholders, supporting effective emergency management decisions and consolidated planning.

— Emergency management professionals across the sector understand how to utilise the tools and information that is available to them.

— The ownership of 'single source of truth' data will be clear, including clear responsibilities for provision and maintenance of data.

— Information will be presented in intuitive and impactful ways so users can quickly gain an overview of the situation.

— The public will have an authoritative starting point to obtain information on current emergencies.

— Agencies can more effectively leverage each other's data, know-how and specialist resources for information management.

The Programme Team summarised the key business needs to develop and maintain a common operating picture and agreed three investment objectives over five years:

1. *Improve the availability of information and key datasets for decision makers.*

2. *Enhance decision makers' ability to view and use consistent information through more effective use of relevant tools*

3. *Improve the availability of timely and consistent information for the public about emerging and current emergencies.*

Options evaluation

— The options developed take into account the expected limitations in available resources and funds, and agencies' preferences to use existing systems where available. The options therefore focus on ensuring that steps are taken to improve the consistency of practices across the sector, and improve the information available to the public.

— It should be noted that the proposed Stage 2 investment is not an IT-led transformation of the current sector operating model. Workshops with stakeholders on the case for change highlighted that significant foundational work would be required in the short to medium term to progress towards a COP, and must be supported by greater national leadership and resourcing. This does not preclude a move to a more centralised IT-led solution at a later stage (after Stage 2 of the programme).

The approach of continuous and progressive improvements aligns with the Government's Digital strategy to evolve capability in an agile way, rather than implement entire new IT systems.

The identified options relate to the capability development, service delivery model, implementation and phasing, and resourcing approach. The options were assessed against the investment objectives and a set of Critical Success Factors.

Based on this assessment, the **preferred way forward**, subject to agreement to progress Stage 2 with the resourcing, is to:

Establish a team within NEMA to provide professional leadership in the planning, coordination and maintenance of the COP across the emergency management sector. The team will provide leadership across the sector to understand the information needs of the sector, facilitate access to authoritative data sources, and to provide templates, advice and training to help maximise effectiveness. This aligns to the expectation of NEMA to be a system leader by making sure the sector has the tools and information it needs to operate effectively.

The team will:

a) Build on COP Stage 1 by continuing to facilitate agreement across the sector on the essential information requirements, identify the owners of required data, and work with them to make the data available to the sector in a useable format. This includes:

- Establish data sharing and service level agreements between data owners and users to define expectations on data availability and standards for emergency management.
- Enable and maintain the central hosting and/or aggregation of high priority data sets if the data owner is unable, or unwilling, to do so.
- Maintain copies of critical national-level baseline information.

b) Provide proactive leadership, templates and guidance to agencies to assist them to make the best use of their information management / geospatial systems.

c) Establish 24/7 support agreements for CDEM Groups' and NEMA's critical geospatial systems.

d) Assist agencies to embed use of the EMIS Replacement system and the Welfare Registration and Needs Assessment system, and lead enhancements as required.

e) Establish an online public viewer hosted by NEMA to show pertinent information to the public about current emergencies in an easy to understand format.

Implementation approach

Programme management: The COP Programme Stage 2 will be factored into the design of the newly formed NEMA so that the programme will be set up and implemented within the broader portfolio of initiatives managed by NEMA. A multi-agency Steering Committee will ensure the programme reaches its target outcomes for the emergency management sector.

Resourcing: The resource requirements for Stage 2 were estimated based on the work streams and timings shown in the Implementation Plan (section 6), with consideration of the level of resources that were required for Stage 1. There are opportunities to leverage existing resources.

To establish an enduring capability, Stage 2 will require 5 new FTEs, including an implementation lead, three additional staff with information/data management/ technical geospatial skills and one staff with public communications skills. Three MCDEM FTEs already funded from MCDEM's baseline are also assumed to work on Stage 2, bringing the total staff complement to 8 FTEs.

The three FTEs already funded from baseline includes one existing FTE that has been contributing to the COP Programme and two new FTEs being hired in FY19/20 to manage new systems that contribute to the COP, i.e. the new EMIS Replacement system and the Welfare Registration and Needs Assessment system.

The programme may also use external specialists to assist with technology development.

Risks and Constraints

Inter-agency information sharing initiatives are characterised by common risks and constraints. These risks and constraints relate to the availability of specialist resources, mandates, stakeholder support, system development, and data management risks.

Strengthening the CDEM Act with regards to mandating the sharing, of data for emergency management in a standard format across the 4Rs is particularly vital for the COP. CDEM Act amendment work is a parallel initiative to the proposed stage 2 of the COP Programme.

Funding requirement

The proposal is to invest new funding of up to $7.120m over five years in Stage 2 of the COP Programme from 2020/21, with subsequent ongoing operating funding to maintain an enduring capability.

The majority of the required funding is for direct operating expenditure ($5.216m including contingency) which covers staff and external support for improving data and information management, geospatial capability and the public viewer.

Indirect operating costs ($1.334m) include business overheads, depreciation and capital charge. Capital expenditure ($0.570m including contingency) relates to the design and implementation of the public viewer and purchase of geospatial applications.

$000s	**FY20/21**	**FY21/22**	**FY22/23**	**FY23/2**	**FY24/25**	**Total**
Capex	$63	$244	$38	$15	$77	**$438**
Contingency (capex)	$19	$73	$12	$5	$23	**$131**
Total capex	$82	$318	$50	$20	$100	**$570**
Direct operating costs	$745	$908	$888	$895	$911	**$4,347**
Indirect operating costs	$170	$221	$304	$317	$322	**$1,334**
Contingency (direct opex)	$149	$182	$177	$179	$182	**$869**
Total opex	$1,064	$1,311	$1,369	$1,391	$1,415	**$6,550**
Total investment (capex and opex)	**$1,146**	**$1,629**	**$1,419**	**$1,411**	**$1,515**	**$7,120**

2 Introduction

The main objective of the COP Programme is to provide more consistent, reliable and timely information for the emergency management sector and the public during emergencies. This will enable better decisions to improve the safety and wellbeing of New Zealanders impacted by emergency events.

The programme aims to significantly lift the capability of the emergency management sector and therefore supports the achievement of the leadership role that the government expects the newly forming National Emergency Management Agency (NEMA) to achieve, in particular with regards to:

- building the capability and capacity of the emergency management system to plan for, withstand, respond to, and recover from emergencies;
- leading or supporting responses to, and recovery from, emergencies (irrespective of cause);

In particular, the Government have prioritised work towards the consolidation and presentation of emergency information.

This business case seeks new investment of up to $7.120m over five years commencing from the financial year beginning July 2020 in a COP Programme, including capital investment and ongoing operating funding to maintain and further develop the capability.

The purpose of this business case is to:

— set out the case for change; including the context, rationale and objectives of the proposed investment,

— present a short list of options that fulfil the business needs required to meet the investment objectives, and

— seek approval to develop the preferred way forward for the future COP architecture and operating model

— set out the Implementation approach, including the programme management, governance and high level plans for implementation

— set out the Financial plan including the required resources and financial profile of the investment.

3 Case for change

This section introduces the strategic context, current situation and benefits sought, scope and requirements, and the investment objectives.

3.1 Strategic context

Emergency management in New Zealand

New Zealand's people, economy and infrastructure are exposed to a range of hazards that can give rise to emergencies. This includes natural hazards such as flooding, earthquakes, and tsunami; as well as biosecurity, technology and other 'human-made' hazards such as industrial accidents, infrastructure failure, major transport incidents, terrorism and crime.

The majority of emergencies are managed at local and regional levels with local authorities and Civil Defence Emergency Management (CDEM) Groups working with emergency services and other agencies across reduction, readiness, response and recovery.

The Ministry of Civil Defence & Emergency Management (MCDEM) provides leadership in reducing risk, improving readiness, and providing effective response to and recovery from emergencies. MCDEM is the lead agency in national states of emergency and supports locally led emergency responses or emergencies led by other lead agencies. Government's approach to hazard risk management is based on the 4Rs of risk reduction, readiness, response, and recovery.

Ministerial Review: Better Responses to Natural Disasters and Other Emergencies (the TAG Report)

In 2017, the Minister of Civil Defence initiated a Ministerial Review, appointing a Technical Advisory Group (TAG) to consider New Zealand's system for responding to natural disasters and other emergencies. The TAG drew on extensive sector feedback, international best practice, and reviews of the response to recent New Zealand emergencies[2].

The resulting TAG Report, released in January 2018, identified issues that need to be addressed to ensure confidence in the effectiveness of New Zealand's national emergency management system. These improvement areas broadly related to decision making processes, capability and training, information available to decision makers, consistency of emergency management approaches and community engagement.[3]

The TAG Report featured 42 recommendations on improving New Zealand's emergency response system, targeted at addressing the above themes. In its analysis the TAG Report identified shortcomings of the system of joined-up intelligence that support decision-making. It noted that systems for situational awareness and intelligence sharing and dissemination need to be better coordinated and more agile. It highlighted the importance of public information and

[2] Including the 2016 Kaikoura earthquake and tsunami, and the 2017 Port Hills fires.

[3] Proactive Release of Government Response to Ministerial Review: Better Responses to Natural Disasters and Other Emergencies in New Zealand August 2018 – Department of the Prime Minister and Cabinet

effective communication to maintain public trust and confidence, and help people prepare and know what to do in an emergency.

Consequently the TAG recommended:

7.2. Invest in the technology to ensure a fit-for-purpose Common Operating Picture

7.2.1. Investigate technology needed for a Common Operating Picture based on international best practice models as a strong contender for New Zealand's common operating model.

7.2.2. Expect all entities with emergency operations functions to collectively solve the challenge of cross agency systems to share intelligence, and situational assessment.

The Government's response to the TAG Report, published in August 2018, acknowledged the "need to improve how we synthesise vital information into a common picture for decision makers". In the short term, the response committed to progress elements of a sector-wide Common Operating Picture, including pulling together existing work on data needs, and to develop a business case for a Common Operating Picture.

The Government also highlighted the need to put the safety and wellbeing of people at the heart of the emergency response system and that effective communication with the public is essential in a response. "We want to ensure better communication with the public during emergency responses so that people know what is going on, what to expect, and what to do."

The TAG also recommended that MCDEM is replaced by a new organisation, the National Emergency Management Agency (NEMA), to strengthen New Zealand's emergency management system. In Budget 2019, the Government allocated funding for the establishment of a NEMA, and to improve the resilience of the National Crisis Management Centre. The new agency is expected to be established before the end of 2019. This business case assumes that NEMA will take over responsibility for progressing the COP from MCDEM once the new agency is established.

Progress to date

In early 2019, MCDEM with support from other agencies established the COP Programme to progress preliminary work (Stage 1) towards a COP, including:

Availability of key data sets: Work is underway to identify the datasets required by emergency managers and decision makers. A survey of stakeholders, and analysis and prioritisation of available and required data sets has been completed (an extract is provided in Appendix B). Work has been progressed to identify the organisations that own the highest priority data and discussions have been held to gain access to the data. This work has informed this business case as well as the high importance of statutory amendments to ensure organisations have greater incentive to share data in a way that is usable by the sector.

Geospatial Proof of Concept: A trial was conducted to develop a proof-of-concept geospatial analysis and display capability for MCDEM-led emergency responses. The proof-of-concept has been completed and this work has also informed this business case.

Emergency Management Information System (EMIS) replacement: Implementation of a Microsoft Office 365 Teams solution to replace the legacy collaboration and information

sharing functionality (EMIS) system which is nearing end-of-life. This has been advanced to testing stage, and is funded from existing budget. It is included in the business case for visibility and interdependencies as it is a critical component of the COP.

Welfare Registration and Needs Assessment system: A fit-for-purpose solution for capturing and storing welfare registration and needs assessment information has been identified, and the solution build is underway.

This business case: This business case for Stage 2 investment in an enduring COP solution was developed with contribution from working groups representing user agencies from May to August 2019.

The COP Programme is being progressed in parallel with complementary activities already underway in central and local government and private organisations (for example the LINZ Resilience programme). The COP Programme is coordinating with these activities to ensure alignment and visibility of work underway and planned.

3.2 Current situation and key outcomes sought

The development of a sector-wide COP aims to address shortcomings in the current system capability. The TAG noted that New Zealand's intelligence infrastructure has been inadequate to deliver an accurate and comprehensive common operating picture in recent emergencies.

The agencies with situation awareness systems (Fire, Police, Health, Defence, for example) have invested considerable resources in their own systems. However none of these systems appear to support a multi-agency solution as they have been built organically based on individual needs with agency-specific resources.

From an Emergency Manager's point of view, a common operating picture is of critical importance as the following example illustrates:

When an event occurs, a key challenge is to establish exactly what happened and what the resulting impact is. Parts of the picture are assembled over time as new information comes to hand. The Emergency Manager makes their way to the relevant coordination centre, making calls on the way, aiming to establish contact with key stakeholders. Assuming the agency has 24/7 response capability, some information about the emergency may already be available at the centre, or remotely with dispersed staff. Otherwise the centre must be activated and staff then gather information.

However, in many cases, in the early stage of the response, information flows sporadically and is initially unlikely to be captured in electronic format. Later the information starts flowing more regularly, through a variety of media (calls, emails, spreadsheets). Information updates are in the form of periodic situation reports from people on the ground, cascading to local, regional and national emergency managers. The cascade is manual, can be overlooked, and creates delays and potential inconsistencies in information.

At each level the emergency management team aims to fill data gaps by identifying data owners and contacts (e.g. at councils, utilities, emergency services). Over time, the team is able to assemble regular reports for decision makers. For example, during the 2019 Tasman fires the local CDEM Group used a one page infographic (shown in Appendix A) to update strategic decision makers about the situation on the ground.

As the response progresses, the number of interested parties increases, and the challenge moves from ensuring the completeness of information to the consistency of the data and the visibility of decisions and actions by various parties. For example, large scale events, like the 2016 Kaikoura earthquake and tsunami, span the jurisdictions of multiple councils, and maintaining a consistent picture of the situation, related actions and their consequences becomes significant. During the Port Hills fires early in 2017, the fire spanned districts and rural and urban areas and there was little visibility of the overall picture by agencies involved, causing a lack of coordination and political concern.

Currently, decision makers at different agencies need to meet in person or talk on the phone to exchange relevant information. At the same time, mainstream media and social media begin covering the event and decision makers need to provide an authoritative view of information that is relevant to the public.

Key issues

The COP Programme team led a workshop with key stakeholders in May 2019 and identified the following the key issues with the existing arrangements.

Lack of shared situation awareness, and timely, complete and consistent data for decision makers and the public.

— During an emergency, decision makers may have incomplete or inconsistent information about the event because:

- it is not known that the data exists.
- the data is not in a usable format.
- organisations use different sources as the authoritative data source is uncertain.
- the data is out of date or incomplete.

— Confidentiality, commercial sensitivity and privacy considerations of data are cited as reasons that restrict sharing.

— Data owners also advise that they are unable to make vital data available to the emergency management sector without IT investment. A broader mandate is required through the CDEM Act to ensure data owners are compelled to provide data in electronic formats that can be used by the sector.

— The public do not have a consistent go-to point to get authoritative information. A range of communication channels are available from agencies with different type of content and 'look and feel'.

Inconsistent information management practices and capabilities across the sector.

— There is currently no government organisation that has the responsibility, capability and capacity to provide professional leadership to the sector to help achieve best practice and consistency. Therefore agencies do the best they can with the resources they have available.

— A range of data tools and templates are used by agencies (e.g. ArcGIS, D4H, Sharepoint, Office 365) or similar tools are set up differently. External staff joining responses may be unfamiliar with new settings.

— The ability to access, discover and use information is variable due to differences in data availability, formats and the questions the data aims to address.

— For instances where data is available, there is typically no formal service level agreements (SLAs) to set consistent expectations between data users and suppliers (e.g. established data feeds can be taken down without notice). Data provision arrangements tend to operate on a 'best efforts' basis.

— Smaller agencies and local/territorial authorities tend to have fewer specialist resources for data analysis and information management, and insufficient capacity to maintain relationships, capability, data and systems in 'downtimes' between events.

Limited information and resource sharing, and duplication of effort across the sector.

— Multiple interest groups seek access to the same data and endeavour to negotiate licenses or data sharing arrangements with data owners. For some data, it may be unclear who 'owns' the source of truth (e.g. Police, Health, CDEM).

— While agencies act with goodwill in lending staff, there are no formal arrangements to share and backfill specialist resources during emergencies. This often results in resource shortages and impede the response.

— Insufficient resources are allocated to national coordination, and development and maintenance of a sector-wide COP.

The consequence of the above shortcomings include that emergency response is less timely and inefficient; in that setting up the response and accessing up-to-date information takes longer. Scarce resources are used for information gathering and verification rather than looking after the safety and wellbeing of the people impacted. It is harder to on-board experienced staff across agencies as they are not familiar with each other's systems and practices.

Finally the public do not know where to get authoritative information, which impedes their ability to prepare and respond to an emergency. Ultimately, public trust and confidence in emergency management agencies are jeopardised.

Key outcomes and benefits from the COP

The COP programme will enhance timely, accurate and relevant information to emergency managers, decision makers, and the public during emergencies. This will in turn enhance public safety, and enable more effective response and recovery by agencies. The achievement of the key programme outcomes will be progressive and evolve as we further define information needs, improve our understanding of data availability, enable access to vital information and develop efficiencies across the sector.

The key outcomes are that, following implementation:

— Decision makers will have access to a broad and consistent set of data sources that is relevant to their needs.

— Essential emergency impact and operational information will be quickly available to relevant stakeholders, supporting effective emergency management decisions and consolidated planning.

— Emergency management professionals across the sector understand how to utilise the tools and information that is available to them.

— The ownership of 'single source of truth' data will be clear, including clear responsibilities for provision and maintenance of data.

— Information will be presented in intuitive and impactful ways so users can quickly gain an overview of the situation.

— The public will have an authoritative starting point to obtain information on current emergencies.

— Agencies can more effectively leverage each other's data, know-how and specialist resources for information management.

The main benefits of the investment will be in three areas:

A. Improved information and data management: measured by the number of information requirements met, quality and completeness of data, discoverability of available data and formal data sharing arrangements in place.

B. Enhanced decision support: measured by the availability of high quality geospatial applications, tools, guidance and templates available across the sector, access to trained geospatial specialists and decision-makers knowledge on how to effectively utilise these tools, information and specialists.

C. Better public information: measured by the availability of accessible information about current national and local emergencies that meets the needs of the public.

The achievement of the key benefits set out below is not completely within the control of the COP Programme. For example, the availability of key datasets requires the cooperation and agreement of data owners and suppliers. While it is therefore difficult to predict the exact number of available datasets at any point in time, the Programme will measure progress over time and mitigate barriers where possible. Similarly, the accuracy of information provided through the public viewer will be contingent on the quality of the data available.

3.3 Investment objectives

The proposed investment will establish an enduring capability to deliver the above outcomes and benefits.

The overarching purpose of this investment is to:

Improve shared situational awareness across the emergency management sector to enable informed decision-making and consolidated planning over the next five years.

The investment objectives related to the above purpose are to:

1. *Improve the availability of information and key datasets for decision makers.*

2. *Enhance decision makers' ability to view and analyse consistent information through more effective use of relevant tools*

3. *Improve the availability of timely and consistent information for the public about emerging and current emergencies.*

3.4 Scope

The conceptual framework for the COP is illustrated in Figure 1 (below). Key components include:

Users and views: Agencies and organisations involved in emergency management and the public have access to information that is relevant to their needs

Baseline data: Common pre-emergency information to measure impact against e.g. terrain of the land, census, and lifelines information).

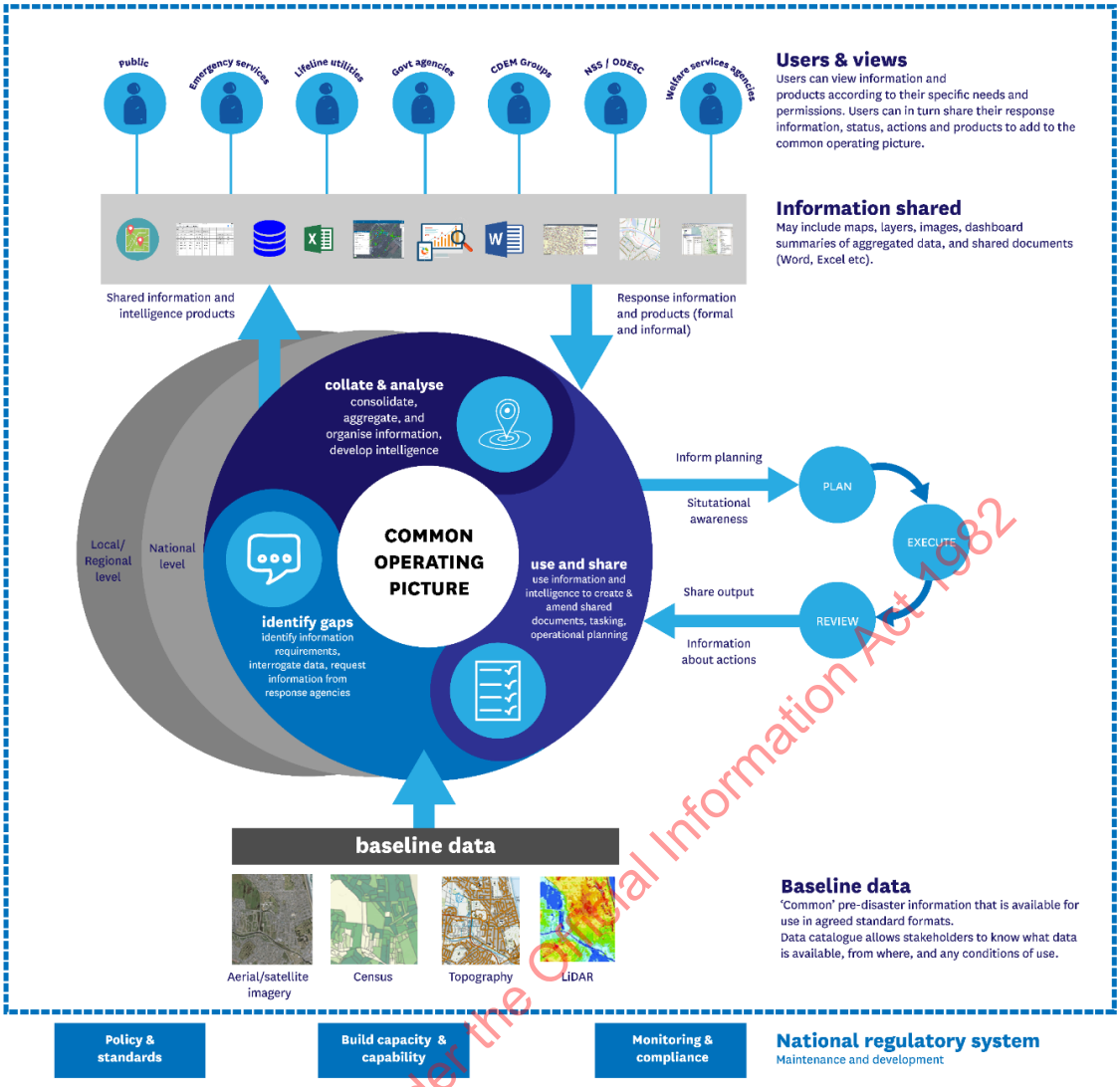
Event data: Information captured during an emergency that provides a view of the impact and extent of the emergency

Geospatial capability: Geospatial systems to capture, analyse and display location specific information such that decision makers can quickly get up-to-speed on a situation. Agencies can choose what geospatial viewer(s) to use as long as they can draw from authoritative data sources and share data in agreed formats.

Other information needs: Sector-wide solutions for collaboration and sharing of documents, event logs, tasks and requests, and for welfare registration and needs assessment.

Mandate: Legislation, agreements and standards required to ensure information/data owners make data accessible and information is shared appropriately.

Figure 1: Conceptual framework



Within the above framework, the potential Programme scope and key service requirements were defined by the programme team during June-July 2019.

The boundaries of this investment proposal are as follows:

Table 1: Scope

Service requirements	In Scope	Out of Scope
Improve and maintain the discoverability of existing data	✓	
Improve and maintain the availability of data required for emergency management	✓	
Improve and maintain the availability of data on current emergencies for the public	✓	
Maintain existing data at source level		✓ (done by data owners)
Advocating for the creation of critical new data for emergency management	✓	

Service requirements	In Scope	Out of Scope
Produce new data for emergency management		✓ (done by data owners)
Facilitate the development of consistent decision support systems and practices for emergency management	✓	
Embed the use of geospatial systems and shared data into the Coordinated Incident Management System (CIMS) framework	✓	
Implement and continually enhance a sector-wide solution for collaboration and sharing of documents, event logs, tasks and requests, as well as a Welfare Registration and Needs Assessment (WRNA) solution	✓ (continuation of the COP Stage 1 EMIS Replacement and WRNA projects)	
Reinforce the regulatory and legislative framework that supports information sharing in emergencies		✓ (part of the CDEM Act review)
Provide agency-specific systems and associated workforce to CDEM and other agencies		✓ (done by individual agencies)

3.5 Key risks and dependencies

Inter-agency information sharing initiatives are characterised by common risks and constraints. These risks and constraints relate to the availability of specialist resources, mandates, stakeholder support, system development, and data management risks.

Importantly, the proposed investment is not envisaged to be an IT-led transformation of the current sector operating model. Agencies will continue to utilise the geospatial and information management tools of their choice. Critical to the COP is that agency systems are drawing from available authoritative data sources and that systems or organisations are able to share relevant data and information with other agencies, thereby achieving an interconnected system. The focus of the programme is to provide leadership across the sector, to understand the information needs of the sector, to facilitate access to authoritative data sources, and to provide templates, advice and training to help maximise effectiveness.

The approach of continuous and progressive improvements aligns with the Government's Digital strategy to evolve capability in an agile way, rather than implement entire new IT systems.

A risk register has been developed and will be progressively updated as more detailed analysis is undertaken (refer Appendix C).

Security testing and reviews will be conducted for new or enhanced technology solutions as per DPMC and CASS standards. Funding for these activities has been included in the cost estimates.

The outcome of the proposal will depend on related initiatives, including:

— The replacement of EMIS with Microsoft Office 365 Teams, will be completed and embedded in MCDEM and CDEM Groups by the end of 2020. This will improve sector collaboration and sharing of key documents e.g. Situation Reports, and support the identification of further enhancements if required.

— The review of the CDEM Act, which aims to reinforce the mandate to share, and improve the standard of data available for emergency management across the 4Rs. If these changes are not made to the CDEM Act then the emergency management sector will continue to struggle to gain access to critical data. Some data owners need a directive to invest in making data available and/or mitigating confidentiality and commercial sensitivity concerns.

Dependencies will be carefully managed during the programme through joint strategic governance, and working group level cooperation where relevant.

While not dependencies, the COP Programme will continue to coordinate with developments in the following initiatives:

COP for Fire and Emergency New Zealand

Fire and Emergency New Zealand (FENZ) conducted a pilot and technical review of the EM-COP system (an existing platform used by Victoria Emergency Management in Australia). FENZ concluded that the functionality provided by the system was very beneficial, however the implementation of this particular system presented issues that would require significant development and costs. FENZ has decided to go to market for the supply of a common operating picture system for their use. The process will involve an RFP via a GETS tender process. FENZ will be seeking:

— Web (cloud) based geospatial collaboration tool for building and maintaining a common operating picture for FENZ's internal emergency management requirements

— A solution to provide tasking and co-ordination functionality

FENZ will ensure that the system selected for their agency will be complementary to the all of government COP.

Resilience and Climate Change work programme - Land Information New Zealand

In support of its high-level outcome to ensure that "Geographic and property information are used effectively to deliver value for New Zealand", Land Information New Zealand (LINZ) identified 'Resilience and Climate Change' as one of three long-term challenges for New Zealand. In 2017 LINZ established a Resilience and Climate Change work programme which has three current focus areas:

— Formalising LINZ's role in support of emergency management,

— Improving key datasets for resilience and climate change, and

— Providing cross-sector cooperation and support.

LINZ has been working with the MCDEM-led COP Programme to ensure the work programmes are complementary.

4 Options analysis

The programme team has identified and evaluated a range of options to achieve the investment objectives within the scope of this proposal. A short list was assessed further to select the preferred option that optimises value for money.

4.1 Options identification

Options were identified across four dimensions. The table below summarise the assessment of a long-list of options in each dimension, with their main advantages and disadvantages. The long-list was evaluated against the investment objectives and critical success factors (shown in Appendix C). Options evaluated as 'Short-listed' are taken forward and form part of the short-listed options.

Options development approach

The development of options recognised the expected limitations in available resources and funds, and agencies' preference to use existing systems where available. The options therefore focus on ensuring that steps are taken to continue developing a COP, improve the consistency of practices across the sector, and improve the information available to the public.

The business case team considered more ambitious initiatives that would shift the sector away from the existing federated model, but have not progressed them at this stage due to high implementation risks and affordability challenges. For example, these include:

— Implementation of a single sector-wide incident management software solution and realignment of the sector operating model accordingly.

— Development of a public information viewer consolidating all national and local emergency viewers in a single system and realignment of the sector operating model accordingly.

— The provision of additional information management / permanent geospatial workforce for CDEM Groups and/or the consolidation of existing agency resources into NEMA.

Importantly, the foundational investment sought in this business case is required to achieve a common operating picture regardless of whether the opportunities for more transformative initiatives are pursued in the future. The proposed Stage 2 programme includes further evaluation of these options in Year 3.

Long-list option dimensions

Table 2: Long-list options

Dimension	Options	Assessment
1. Extent of capability development	(a) Enduring capability for sector coordination to incrementally develop the COP	**Short-listed.** Offers more gradual improvement in information management and decision support capability (without a national public viewer).

Dimension	Options	Assessment
	(b) As above + material improvement in all three benefit areas	**Short-listed**. Provides a wider scope of information availability, additional tools for decision support and a national public viewer.
2. Service delivery model	(a) Move to a more centralised model	**Not preferred**. Entities would not be able to use their 'BAU' tools and resources during emergencies. Agency IT tools provide more detailed operational data relevant to the specific agency needs during a response.
	(b) Improve the existing federated model	**Short-listed**. This builds on the existing 'system of systems' approach and leverages existing investment and familiar tools to user agencies, but would be enhanced by investment in a central capability to drive activities to gain access to essential information and develop templates etc to increase the effectiveness of the sector and more efficient use of resources
3. Implementation	(a) Roll out by user group or geography	**Not preferred.** Harder to promote sector-wide consistency, breaking down silos and building an common interconnected operating model
	(b) Roll out progressively adding new capability	**Short-listed**. More suited to the nature of a programme where data, templates, apps, standards etc will be progressively made available. Enables benefits to be achieved over time with limited resources
4. Resourcing	(a) Mainly internally configured, maintained and operated systems	**Short-listed**. Provides enduring capability within MCDEM/NEMA, lower supplier dependence for niche/specialised skills.
	(b) Mainly outsourced built systems, internally maintained and operated	**Not preferred.** High interface risk between implementation and operation. Development of data sharing agreements, templates etc (eg geospatial templates, data schemas) are tightly coupled with their ongoing implementation and adoption.
	(c) Mainly outsourced	**Not preferred**. Although it shifts some delivery risk from MCDEM/NEMA; it is likely to involve higher cost due to high availability/performance requirement and dependency on few mature suppliers with a New Zealand presence and require niche skills. Ultimately MCDEM/NEMA will still be seen responsible for performance

Long list options evaluation

The following critical success factors are considered essential for the successful implementation of the programme and realisation of benefits.

Table 3: Critical Success Factors

Critical Success Factors	Description
Strategic fit and business needs	How well the option meets the agreed investment objectives, related business needs and service requirements, and integrates with other strategies, programmes and projects.
Potential value for money	How well the option optimises value for money (i.e., the optimal mix of potential benefits, costs and risks).
Supplier capacity and capability	How well the option matches the ability of potential suppliers to deliver the required services, and is likely to result in a sustainable arrangement that optimises value for money.
Potential affordability	How well the option can be met from likely available funding, and matches other funding constraints.
Potential achievability	How well the option is likely to be delivered given the organisations ability to respond to the changes required, and matches the level of available skills required for successful delivery. How well the option is likely to be delivered given the stakeholders' capability to respond to the changes required.

Together with the investment objectives identified in the case for change, the CSFs are the basis for the long-list options evaluation. Under the evaluation, an option within a domain must meet all the CSFs in order to be considered as part of a short-list option.

The long-list options evaluation is presented on the following page.

Figure 2: Long-list options evaluation

OPTION LONG LIST (*)		LONG LIST EVALUATION								SHORT LIST	
		Investment Objectives			Critical Success Factors					Options	
		Key datasets	Decision making	Public information	Strategic fit	Value for money	Commercial viability	Affordability	Feasibility	Minimum Viable	Preferred
In-scope capability development											
1	Minimum viable	Y	Y	Y	Y	Y	Y	Y	Y	✓	
2	Preferred	Y	Y	Y	Y	Y	Y	Y	Y		✓
Service delivery model											
3	Move to more centralised model	Y	Y	Y	N	Y	Y	Y	N		
4	Improve the existing federated model	Y	Y	Y	Y	Y	Y	Y	Y	✓	✓
Implementation											
5	Roll out by user group or geography	Y	Y	Y	N	N	Y	Y	N		
6	Roll out progressively adding new capability	Y	Y	Y	Y	Y	Y	Y	Y	✓	✓
Resourcing											
7	Mainly internally configured, maintained and operated	Y	Y	Y	Y	Y	Y	Y	Y	✓	✓
8	Mainly outsourced built/configured system, internally maintained and operated	Y	Y	Y	Y	Y	Y	Y	N		
9	Mainly outsourced	Y	Y	Y	N	Y	Y	Y	N		

Short list

Two short-listed options were developed by the Programme team, which combine the long-list components that were selected for further evaluation (marked as 'Short-listed' above).

Each short-listed option is based on the existing federated model of information management. For example, agencies can choose what geospatial viewer(s) to use as long as they can draw from authoritative data sources and share data in agreed formats.

Under each option, new capability is rolled out progressively over time and evolves as efficiencies are identified, information needs change and more data becomes available. The data and decision support tools that enable the COP are mainly internally configured, maintained and operated (by emergency management agencies).

The key differentiator between the short-listed options is the extent of capability development. The short listed scope options are defined by work streams delivered in the three benefit areas: improving information and data management, enhanced decision support and public information.

The options are:

(a) **Minimum viable**: establish enduring capability for sector coordination to incrementally develop and maintain the COP

(b) **Preferred**: as above, plus further investment in improvements to data availability, geospatial capability across the sector, and the discoverability of information for the public, including a public viewer

Table 4: Work streams

	Options	
Work streams by benefit area	**Minimum viable**	**Preferred**
A) Improved information and data management		
1 Identify and maintain information requirements, datasets, and sources	✓	✓
2 Establish and maintain data sharing agreements with data owners for highest priority data sources	✓	✓
3 Enable and maintain central hosting and/or aggregation of a prioritised list of datasets where required	✓	✓
4 Establish and maintain data sharing agreements for lower priority data sources		✓
5 Design and maintain copies of critical data		✓
6 Maintain data catalogues and guidance for the wider emergency management sector	✓	✓
B) Enhanced decision support		

Work streams by benefit area	Options	
	Minimum viable	Preferred
7 Support, maintain, and enhance the EMIS replacement and Welfare Registration and Needs Assessment systems	✓	✓
8 Design, develop and potentially license innovative apps/tools on behalf of local agencies, e.g. for field information capture		✓
9 Identify, host or develop, and share resources to support consistent practice (e.g. templates, guidance, SOPs)	✓	✓
10 Enhance and maintain the National MCDEM/NEMA geospatial viewer and share with relevant agencies	✓	✓
11 Support CDEM Groups (e.g. design template agreements) to formalise geospatial resource sharing relationships at a local or regional level	✓	✓
12 Develop and share training guidance for emergency management geospatial professionals		✓
13 Establish a 'best practice' geospatial resource (e.g. Director's Guidelines) to support CDEM Groups and other agencies, including access to SME consultation	✓	✓
14 Develop a centralised database of specialist emergency management workforce (e.g. geospatial skills, resources and availability)		✓
15 Establish a 24/7 support agreement for CDEM Groups and NEMA's critical geospatial systems	✓	✓
C) Public information		
16 Develop guidance and example templates for agencies to achieve a more consistent approach in locally operated public information websites and geospatial viewers in emergencies	✓	✓
17 Develop and maintain a public viewer that provides a national view of emergencies (including CAP feeds of Emergency Mobile Alerts etc), with links to agency/CDEM Group websites for more detailed information		✓

4.2 Evaluation

The evaluation of the short-listed options considers the relative benefits, costs and risks of each option. The preferred option optimises the mix of these considerations and produces the highest potential value for money.

Benefits

The monetary benefits have not been estimated at this stage as the COP is not a single capability, and there is insufficient baseline performance information and limited evidence to credibly quantify and assign benefits. The anticipated benefits in year 5 after the start of the programme have been assessed based on scores out of 10 (10=leading practice[4]).

Table 5: Comparison of the benefits of short-listed options (1-10)

Benefits	**1. Minimum viable** sector coordination for incremental development	**2. Preferred** material improvement across all three benefit areas
A) Improved information and data management	6	8
B) Enhanced decision support	6	8
C) Public information	2	6
Average score (equal weighting)	**4.7**	**7.3**

Costs

The cost estimates and assumptions are described in the Financial Plan section. The table below provides the Net Present Value (NPV) of costs over five years.

Table 6: Comparison of the costs of short-listed options

Costs ($m, NPV)	**1.Minimum viable** sector coordination for incremental development	**2. Preferred** material improvement across all three benefit areas
Capex	$0.1m	$0.4m
Opex (direct & indirect)	$3.8m	$4.6m
5-year NPV	**$3.9m**	**$5.0m**

Risks

The key risks to the achievement of the investment objectives are outlined in Appendix C. They can be summarised in three areas:

1. **Implementation risks**: which may lead to delays, cost overruns and inadequate functionality.

[4] From New Zealand events in the last five years and international practice based on the experience of the COP Programme team.

2. **Operational risks**: which would prevent the COP components working as intended.

3. **Adoption and other risks**: which impact the adoption and ongoing application and use of the COP components.

The following table provides an overall post-mitigation risk assessment of the short-listed options. The key factors that increases risks between the options is:

— The breadth of data sharing agreements to be established with data owners and suppliers.

— The ambition for the public viewer, requiring greater coordination and integration with a wider range of data sources and owners, as well as clear messaging to the public.

Table 7: Comparison of the risks of revised short-listed options

Risk levels	**1.Minimum viable** sector coordination for incremental development	**2. Preferred** material improvement across all three benefit areas
Implementation risk (30% weight)	M	M
Operational risk (40%)	L/M	M
Adoption and other risk (30%)	L	L/M
Weighted total risk score	**L/M**	**M**

Relative value for money

The following table summarises the NPV of costs, the benefit scores, and the overall risk assessment of the short listed options, to demonstrate their relative value for money.

Table 8: Value for money

	1.Minimum viable sector coordination for incremental development	**2. Preferred** material improvement across all three benefit areas
Benefit score	4.7	7.3
Cost ($m, NPV)	**$3.9m**	**$5.0m**
Benefit/cost	**1.21**	**1.47**
Overall risk	**L/M**	**M**

Option 2 has the highest benefit to cost ratio at a manageable overall risk level. This option should be pursued at present. The potential to expand the scope into more transformative technology development will be considered in the future (provisionally, in Year 3), subject to successful progress towards the investment objectives.

The recommended way forward is described further in the following section.

5 Recommended way forward

On the basis of the above options assessment, the preferred way forward is to:

Establish a team within NEMA to provide professional leadership in the planning, coordination and maintenance of the COP across the emergency management sector. The team will:

a) Facilitate agreement across the sector on the essential information requirements, identify the owners and suppliers of required data, and work with them to make the data available to the sector in a useable format. This includes:

- Establish data sharing and service level agreements between data owners and users to define expectations on data availability and standards for emergency management.
- Enable and maintain the central hosting and/or aggregation of high priority data sets if the data owner is unable, or unwilling, to do so.
- Maintain copies of critical national-level baseline information.

b) Provide proactive leadership, templates and guidance to agencies to assist them to make the best use of their information management / geospatial systems

c) Establish 24/7 support agreements for CDEM Groups' and NEMA's critical geospatial systems.

d) Assist agencies to embed use of the EMIS Replacement system and the Welfare Registration and Needs Assessment system, and lead enhancements as required.

e) Establish an online public viewer hosted by NEMA to show pertinent information to the public about current emergencies in an easy to understand format.

5.1 Illustrative deliverables

Stage 2 of the COP Programme will be organised around three key benefit areas (described further in the Implementation Plan section). The deliverables over the first three years of operation will include the following:

Key datasets

Requirements for essential emergency management information will be documented and the owners of the data will be identified. An increasing amount of data will be available to the emergency management sector as data owners make it accessible or provide it to NEMA to host. Information about the datasets will be published on data.govt.nz to ensure agencies know what information is available and what it can be used for.

Access to data will be supported by data sharing agreements where required. The data sharing agreements are expected to be memorandums of understanding that cover the data requirements and formats, the protocols of data access, updates and maintenance procedures.

Decision support capability

The deliverables in this area will include:

— An enhanced MCDEM/NEMA geospatial information viewer,

— Roll-out, support and ongoing enhancement of the EMIS replacement system and the Welfare Registration and Needs Assessment system

— Ability to meet information requirements by providing geospatial analysis and information products,

— A toolkit of standards, templates, apps and best practice guidelines to assist agencies to improve their capability and help to achieve consistency, where this is needed,

— Tools to improve access to geospatial skills, e.g. consolidated database of specialists, templates for resource sharing arrangements, training guidance and library of open source training materials.

Public viewer

The public information viewer will be available through the MCDEM/NEMA website. It will provide an accessible central location for the public to view up-to-date information on emergency situations. While further detailed design work will be undertaken subsequent to this business case, the key proposed features of the public viewer include:

— A national map view of information regarding the location, nature and status of current emergencies.

— Complementary information, such as hazard descriptions and safety guidance, current advisories and information on where to get help.

— Links to local CDEM Group and other relevant agency websites that provide more detailed local information and advice.

Figure 3: Public information website (mock-up)

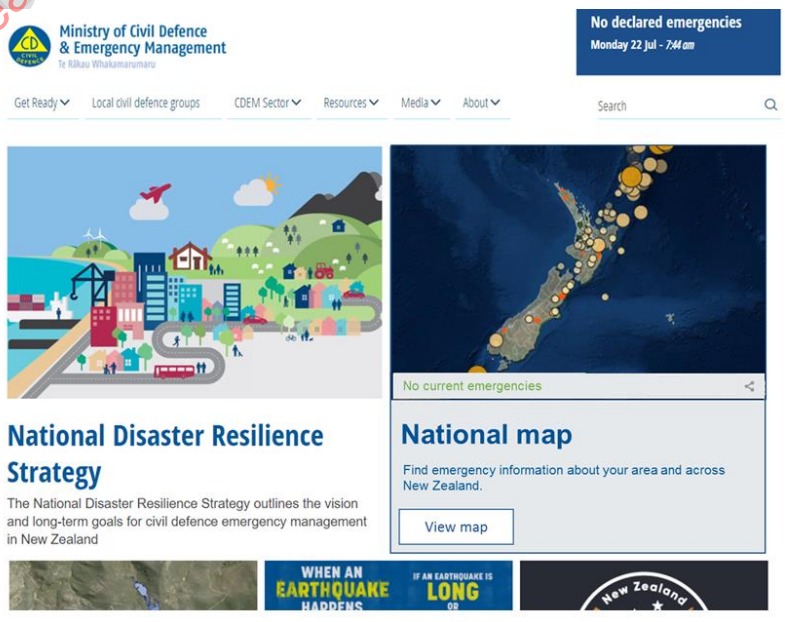
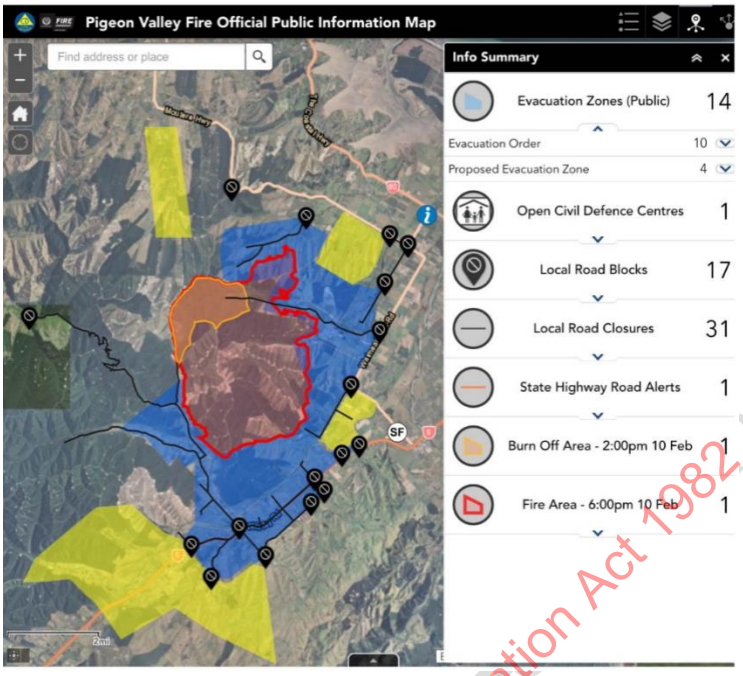


Figure 4: Public viewer map example



5.2 Operating model

The operating model that underpins the COP components will be based on a federated system approach. User agencies can choose what systems and tools they use as long as they draw from authoritative data sources and share data in agreed formats. The presentation of information will be based on the same look and feel (eg using agreed symbology) to support collaboration across agencies. Agencies will remain responsible for maintaining a workforce to support and maintain their systems. Agencies will be encouraged to share and adopt national best practice in information management, geospatial analysis and presentation, which will enable greater cooperation during emergencies.

A central function, with a small, dedicated team will be created within NEMA to provide professional leadership and cross-agency coordination for the development and maintenance of the COP components. In particular, the team will be responsible for facilitating the availability of fit-for-purpose data, promoting the development of consistent decision support tools and practices, and developing the national public viewer.

The development of the public viewer will be an internally-led project. This map-based public viewer will be integrated into the existing Civil Defence website, operated by the MCDEM/NEMA IT function which already offers 24/7 website support. The configuration and maintenance of data layers displayed on the viewer will be carried out largely by newly recruited in-house geospatial specialists (with occasional outsourcing of discreet tasks). The MCDEM/NEMA Public Information specialists will continue to work closely with their counterparts in the agencies to ensure that information being provided to the public is consistent and complementary across the sector.

The Stage 1 COP Programme has set up a small temporary team within MCDEM, resourced by secondees and contractors. This part of the Programme will conclude on 20 December 2019. Stage 2 of the Programme (this investment proposal) will establish enduring resource

within NEMA and sufficient capacity to develop and maintain the COP components in line with the investment objectives set out in this business case.

The role of key parties are set out in the table below.

Table 9: Key parties

Agency	Programme establishment	Live operation- Readiness phase	Live operation- During response
MCDEM/ NEMA	Requirement definition and service design Implementation planning Recruitment and training of internal team	Maintain prioritised list of data requirements Lead the roll-out and enhancements of the EMIS replacement and the Welfare Registration and Needs Assessment systems Establish data sharing templates and agreements Negotiate with data owners Host critical datasets if required Publish APIs and data catalogues	Coordinate and activate data agreements Monitor automated data flows Following response, review of sharing arrangements
User agencies	Liaise with NEMA on service requirements and implementation planning, and participate in related working groups	Support NEMA in accessing locally held datasets Develop clear processes and understanding of data access mechanisms	Use the COP Capture event specific data, integrate with baseline data Develop and share event specific information
Data owners and suppliers		Negotiate with NEMA on provision of key datasets Maintain own data in line with the data sharing agreement	Provide data per agreed formats and service levels

6 Implementation plan

The programme team has considered how the programme will be managed, governed and implemented.

6.1 Programme management

The COP Programme Stage 2 capability will be established within the newly forming NEMA. The programme will be set up and implemented within the broader portfolio of initiatives managed by NEMA. NEMA will assign a Senior Responsible Owner and an Implementation Manager.

Programme governance will be aligned through a single Senior Responsible Owner, and implementation will be coordinated through the NEMA annual work plan.

A multi-agency Steering Committee and Work stream Working Groups will be established to ensure the programme achieves the target outcomes for the Emergency Management sector.

Programme structure

The governance, and key roles and responsibilities in relation to the COP Programme Stage 2 are provided below.

Figure 6: Programme organisation

* Governance could be incorporated into another NEMA WorkPlan governance forum if appropriate

Key roles and responsibilities are as follows.

NEMA Leadership

— Provides strategic direction for the programme

— Has ultimate responsibility for the realisation of the expected programme benefits

COP Programme Steering Committee

— Supports the Senior Responsible Owner (SRO) in programme delivery including programme planning, quality and change management

— Ensures the programme's scope, objectives and deliverables meet the investment objectives

— Provides timely and consistent direction and sign offs at stage gates

Senior Responsible Owner (appointed by NEMA)

— Programme owner with visibility and control across the programme work streams

— Ensures that the required resources are available and have full authority within his/her delegation to make decisions

— Exercises overall control of programme

Implementation Manager (appointed by NEMA)

— Deliver the programme to quality, time and cost requirements

— Manage implementation and reporting, including scope, risk, funding and resources

— Develop and manage the quality assurance plan and the benefits realisation plan

— Brief the Senior Responsible Owner and the Steering Committee in advance of any issues or risks

Programme plan and key milestones

The initial programme implementation plan will focus on the establishment of the required capabilities, including hiring appropriately skilled people.

Detailed planning will be progressed once each work stream is established. The SRO and Implementation Manager will ensure the detailed plans align to the high level plan and target outcomes outlined in this Business Case. The detailed plans will be reviewed annually as part of NEMA's annual planning cycle and agreed with the Steering Committee and NEMA Leadership.

It is recommended that in year 3 of the Programme, a review is undertaken of the outcomes achieved by the programme, programme learnings and the evolved requirements of the Emergency Management sector. A further business case will be developed if further initiatives and funding are required.

The implementation will be organised in five phases and work streams as set out below, some of which will operate in parallel:

1 Programme establishment

2 Information and data management work stream

3 Enhanced decision support work stream

4 Public information viewer work stream

5 Review

Table 10: Key programme milestones

Achievement of the timeframes in the below table are subject to the required funding being allocated.

Key activities	Start Estimate	Completion Estimate
Programme Establishment		
Appoint the Senior Responsible Owner	**Jan 20**	**Jan 20**
Recruit and on-board the Implementation Manager	**May 20**	**Jul 20**
Organisation design		
Role definition & recruitment planning	**Mar 20**	**Jun 20**
Recruit and on-board		
Information/data management and geospatial specialists	**Jul 20**	**Sep 20**
Public Information specialist	**May 20**	**Jul 20**
Programme management & governance		
Establish Steering Committee and TOR	**Aug 20**	**Sep 20**
Information and Data Management work stream		
EMIS Replacement and Welfare Registration & Needs Assessment systems go live	**Feb 20**	**Feb 20**
Detailed Planning remaining components (refreshed annually)	**Oct 20**	**Dec 20**
Progress work to make highest priority datasets accessible (as commenced by COP Stage 1)	**Oct 20**	**ongoing**
Create copies of critical national-level data	**Feb 21**	**Jul 21**
Monitor use of EMIS Replacement system and progress enhancements as required	**Feb 20**	**ongoing**
Enhanced Decision Support work stream		
Detailed Planning (refreshed annually)	**Oct 20**	**Dec 20**
Continue to mature the MCDEM/NEMA geospatial viewer	**Jul 20**	**ongoing**
Implement Portal for ArcGIS on Azure platform for NEMA	**Jul 20**	**Dec 20**

Key activities	Start Estimate	Completion Estimate
Develop a 'good practice' guide to establishing and maturing a geospatial, information management and decision support capability	**Feb 21**	**Jul 21**
Create a centralised database of people with geospatial skills	**FY 21**	**FY 21**
Develop apps/tools on behalf of other agencies	**Nov 20**	**ongoing**
Public Information work stream		
Develop guidelines and templates for agencies to achieve a more consistent 'look and feel' in their public information websites	**Oct 20**	**Feb 21**
Develop an AoG public viewer that consolidates emergency management information from across the EM sector	**FY 21**	**FY 21**
Review		
Review outcomes, learnings and evolved needs of the Emergency Management sector	**Aug 22**	**Feb 23**
Develop business case for further work (if required)	**Feb 23**	**Jun 23**

6.2 Resources required

The programme will require additional resource in NEMA directed at varying tasks as it progresses through the above milestones.

The Stage 2 resource requirement was estimated based on:

— A bottom up estimate of the additional capacity required to deliver the work streams of the preferred option: 5 FTEs shown below.

— The level of Stage 1 resourcing (for comparison): 7 temporary FTEs (contractors and secondees) who have already completed or are completing their term in December 2019.

— Existing/approved MCDEM capacity: three FTEs already funded from baseline, including one existing FTE that has been contributing to the COP Programme and two new FTEs being hired in FY19/20 to manage new systems that contribute to the COP. i.e. the new EMIS Replacement system and the Welfare Registration and Needs Assessment system.

Note: NEMA design work is still to be undertaken.

Table 11: Additional resources required for COP Programme Stage 2

Resource	Key skills	Programme Requirement
Implementation Manager to manage all aspects of the programme until go-live, including timeline, deliverables, budget, quality and risks.	— Project management (Prince2 or equivalent) and team management. Information management skils preferable	1 FTE from July 2020 onwards
Information/data management and geospatial specialists to make essential datasets accessible, develop templates, apps and standards for agencies	— Information management and analysis, and geospatial application development	3 FTE from Sept 2020 onwards
Communications specialist to support the national public viewer and work with public information specialists across the sector to ensure advise provided to the public is consistent	— Public relations. Communication and stakeholder engagement	1 FTE from July 2020 onwards
IT resource to implement the national public viewer.	— Various	Resource will be sought from the Central Agencies Shared Services (CASS) IT team within The Treasury that provides IT services to MCDEM. Vendor resource will also be secured via CASS.

6.3 High-level procurement approach

The COP Programme to date has leveraged existing MCDEM capability, contractors and secondees from other agencies on a temporary basis. The development of the EMIS replacement system was outsourced to a vendor specialising in Microsoft products.

Requirements

The preferred way forward identified the need for additional staff to provide ongoing capability to implement the work streams, as well as an investment in supporting technology.

Table 12: Requirements: Additional staff and supporting technology

Dimension	Description
Internal capability	
Staff and people resources	As set out above, the preferred way forward requires an additional 5 FTEs.
Technology	
Tools and apps for local agencies	The procurement of new tools and apps on behalf of local agencies (e.g. apps to capture field information)
Public viewer	The development of ArcGIS map integration into the Civil Defence website will require web development, performance impact testing and security reviews.

Procurement strategy

Internal capability

The preferred way forward is to establish an enduring capability to implement and maintain the work streams required for an ongoing COP.

The recruitment of internal staff capability will be completed under standard staff policies for MCDEM/NEMA.

Technology

The procurement of technology components will be undertaken with NEMA's standard procurement processes. The programme will adhere to the Five Principles of Government Procurement set out in the Government Rules of Sourcing.

An open procurement approach will be followed; MCDEM has existing relationships with vendors that are likely to be interested in the provision of the technology components of the COP.

The existing MCDEM website is supported by an existing vendor, which MCDEM would work with to implement ArcGIS map integration as part of the public viewer, as well as testing on site performance and a full security review including penetration testing.

Where procurement is required, vendors will be required to provide:

— software solutions as required. The evaluation of bids in any competitive procurement process will consider the functionality and benefits offered.

— ongoing support: including technical helpdesk, ongoing maintenance and upgrades

— user training: for users as required

Contractual and other issues

The delivery of technology components will be subject to standard contract management processes. The contract manager will be responsible for:

— regular supplier reviews as milestones are reached

— coordinating user group feedback

— monitoring contract compliance

6.4 Programme control, risk and change management

Programme control

A Programme Management Plan (PMP) will be developed in the early stage of the programme. This will include documentation of objectives, key activities, milestones and programme controls. The PMP will be endorsed by the Programme Steering Committee. Any changes to the PMP will be managed by Change Requests that also require endorsement from the Steering Committee.

The PMP will include a Quality Assurance Plan which sets out how the achievement of objectives will be monitored, and risks and quality managed.

The programme will be managed within NEMA's delegations of authority for opex and capex, and in line with the Quality Assurance Plan.

Benefits, and associated measures, targets and responsibilities, will be formalised as part of the Quality Assurance Plan. The achievement of benefits will be tracked initially through programme governance arrangements.

Risk management

The key risks are outlined in Appendix C. A risk mitigation plan focusing on timeline, quality, costs, stakeholders, resources and scope will be developed. This plan will be embedded in the programme operation and will be updated as required.

The plan will outline the causes, consequences, probabilities and mitigation for identified risks to the success of the programme. Its purpose is to support better decision making through understanding the risks inherent in the programme and their likely impact.

The programme's risk register will list all the identified risks and the results of their analysis and evaluation. Information on the status of the risk will also be included. The risk register will be continuously updated and reviewed throughout the programme.

Change management

The programme team has been working with internal and external stakeholders since the start of this business case process. This involved consultation from determining business needs to defining the service requirements and key milestones for the preferred solution.

During the course of implementation, the programme will continue to engage with the stakeholders impacted by the COP Programme. The Implementation Manager will be responsible with developing a change management plan which will be signed off as part of the broader implementation plan. This plan will identify the key areas of change, those that are

impacted, and the approach to managing the change, such as providing information, training, documentation, exercises, or seeking deeper cooperation of impacted parties.

An initial assessment of key areas and approach for managing change is as follows.

Table 13: Areas of change and impacted parties

Area of change	Impacted parties	Approach (provisional)
Implementation of EMIS Replacement and Welfare Registration & Needs Assessment systems	**User agencies** — MCDEM/NEMA — CDEM Groups — Other agencies	— Develop and deliver user manuals/guidance and training — Provide system support — Collaboration through inter-agency user groups — Incremental (agreed) enhancements within budget
Inter-agency data sharing	**Data owners / suppliers** — Government agencies — Commercial entities **Data consumers** — MCDEM/NEMA — CDEM groups — National Agencies involved in emergency management — Lifelines organisations	— Engagement with data consumers to identify high priority data and information requirements — Collaborative approach with data owners focused, in the first instance, on cooperation, rather than legal mandate — Clear communication strategy with data owners setting out NEMA's broader objectives and intention to engage on establishing sharing agreements — Engagement with data consumers on preferred formats and mechanisms for sharing
Public information viewer	**NEMA Communications team** **CDEM groups** **National Agencies involved in emergency management** **General Public** **Media**	— Management and maintenance of the national public viewer — Robust stakeholder engagement with agencies to ensure alignment between the national public viewer and agency websites/viewers — Clear public communication strategy
COP governance and planning	**NEMA Leadership team** **Multi-agency programme steering committee**	— Establishment of a programme steering committee once the core team is on-board. — Inclusion of COP planning into NEMA's annual work planning cycle

7 Financial plan

This section sets out the financial profile of the short-listed options and the funding requirement of the preferred option.

7.1 Financial profile

Cost estimates were developed by the COP Programme team for each shortlisted option based on resources required for each work stream (per the implementation plan). Cost projections are modelled in nominal terms with an inflation adjustment for direct operating costs. Contingencies are included at 30% for capital expenditure, and 20% for direct operating expenditure.

Capital costs relate to the establishment of the public viewer ($348k), Portal for ArcGiS on Azure ($62k) and geospatial tools ($160k) including design, development and testing. Direct operating costs include new staff costs (at $85k-$150k per FTE, with 4 additional FTEs under the minimum viable, and 5 additional FTEs under the preferred option). Direct costs also include various support costs, such as 24/7 geospatial vendor support and system enhancements. Indirect costs include business overheads (at $40k per FTE), depreciation and capital charge (at 6% real, pre-tax cost of capital).

The proposal is to invest new funding of up to $7.120m over five years in Stage 2 of the COP Programme from July 2020, with subsequent ongoing operating funding to maintain an enduring capability.

The tables below show the incremental annual financial impact of each shortlisted option over the first five years of the programme.

Table 14: Summary costs: Minimum viable

$000s	**FY20/21**	**FY21/22**	**FY22/23**	**FY23/24**	**FY24/25**	**Total**
Capex	$48	-	-	-	-	**$48**
Contingency (capex)	$14	-	-	-	-	**$14**
Total capex	$62	-	-	-	-	**$62**
Direct operating costs	$676	$750	$742	$762	$775	**$3,706**
Indirect operating costs	$140	$176	$176	$176	$176	**$844**
Contingency (direct opex)	$135	$150	$148	$152	$155	**$741**
Total opex	$952	$1,076	$1,067	$1,091	$1,106	**$5,292**

$000s	**FY20/21**	**FY21/22**	**FY22/23**	**FY23/24**	**FY24/25**	**Total**
Total investment (capex and opex)	**$1,014**	**$1,076**	**$1,067**	**$1,091**	**$1,106**	**$5,354**

Table 15: Summary costs: Preferred option

$000s	**FY20/21**	**FY21/22**	**FY22/23**	**FY23/2**	**FY24/25**	**Total**
Capex	$63	$244	$38	$15	$77	**$438**
Contingency (capex)	$19	$73	$12	$5	$23	**$131**
Total capex	$82	$318	$50	$20	$100	**$570**
Direct operating costs	$745	$908	$888	$895	$911	**$4,347**
Indirect operating costs	$170	$221	$304	$317	$322	**$1,334**
Contingency (direct opex)	$149	$182	$177	$179	$182	**$869**
Total opex	$1,064	$1,311	$1,369	$1,391	$1,415	**$6,550**
Total investment (capex and opex)	**$1,146**	**$1,629**	**$1,419**	**$1,411**	**$1,515**	**$7,120**

7.2 Funding requirement

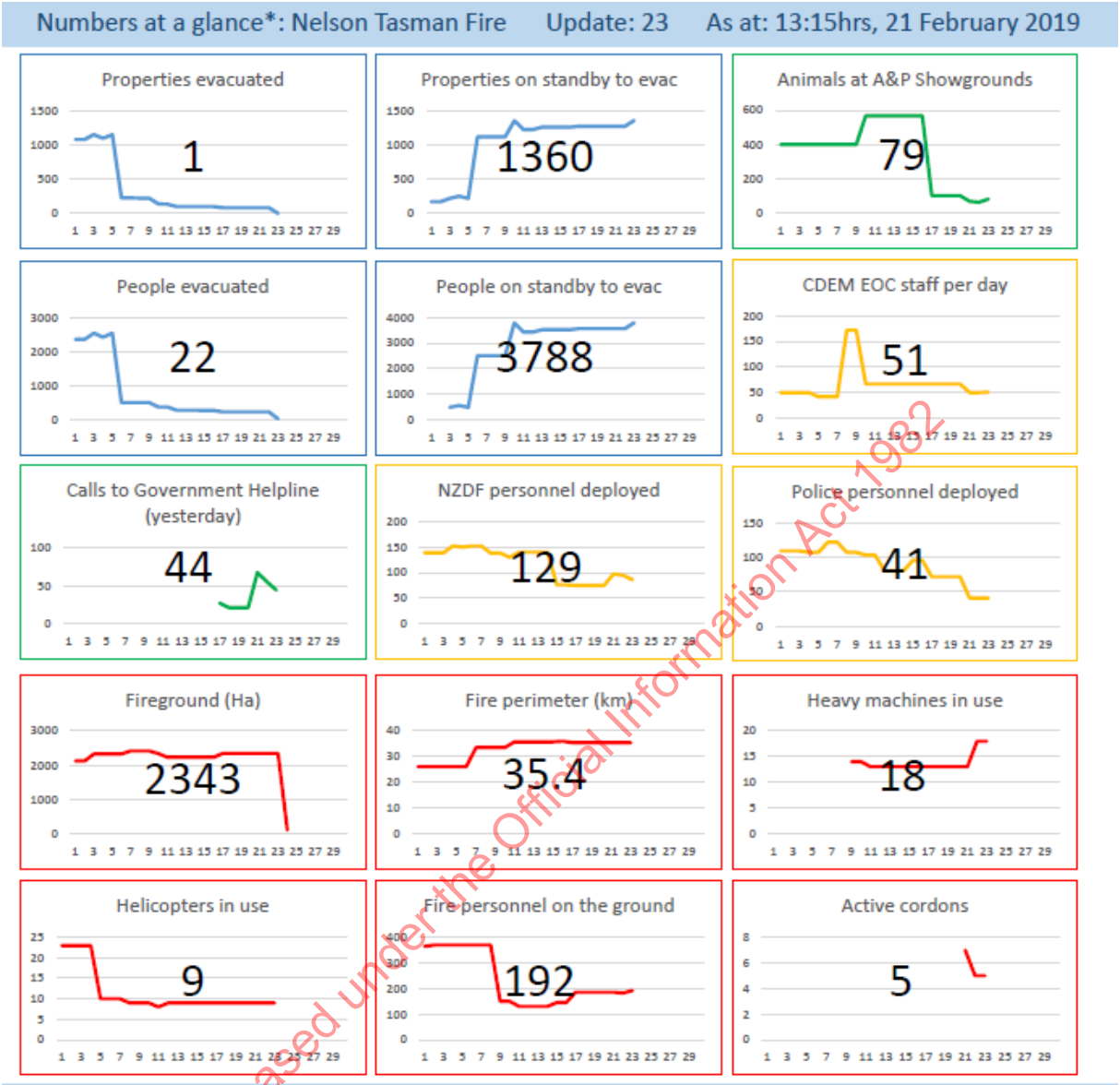
The table above sets out the additional funding required for the preferred option after taking account of existing resources that can be redeployed to the programme. The current Stage 1 programme will cease at the end of 2019.

Accordingly, the total new funding requirement, including capex, direct opex and indirect opex (overheads, depreciation and capital charge), is $7.120m over five years. Ongoing funding will be required beyond FY25, at an inflation adjusted level, to maintain the COP.

7.3 Next steps

To be considered by the Emergency Management System Reform Board.

Appendix A: Current tools used for COP



- Conditional re-entry has now been provided to residents in areas affected by the fires. This is access is for residents only and residents must be prepared to evacuate at short notice should conditions change. Non-residents requiring access can apply for a permit through the CDEM Group.
- The fire response continues to focus on dampening down hot spots, improving firebreaks and extinguishing flare-ups as they occur. Plans are in place for a forecast front that may result in bad weather.
- Last night's public meeting was well supported by agencies and attended by approximately 90 people. Residents of each valley (Teapot, Eves and Redwood) were also given the opportunity to address their particular concerns.
- The CDEM Group continues to focus on the needs of families and individuals as response activities continue and recovery activities increase. Work on land remediation will be addressed as the fire ground is made safe.

Other activities

- Auckland CDEM Group continues to support the MPI response to fruit fly in Auckland. A second Queensland fruit fly has been located, this time in Northcote.

Appendix B: Emergency Management Information Framework Survey Results

As part of the existing Availability of key data sets' work stream, a survey of stakeholders and prioritisation of available and required datasets has been completed. The survey set out the list of Essential Elements of Information (EEI) from the Emergency Management Information Framework. The results ranked 109 EEIs in order of priority based on the response to the stakeholder survey.

The top 30 ranked EEIs based on votes is presented in the table below:

Table 15: Survey results

EM Information Survey: results (top 30 EEIs)			
1	Status of local emergency declarations	**16**	Water contamination
2	Status of agency NCCs / EOCs	**17**	# / % Households/ people without potable water
3	Population of impacted areas	**18**	# / % of housing units in impacted areas
4	Demographic breakdown of population,	**19**	Infrastructural demands for business continuity
5	Status of NCMC / ECCs / EOCs	**20**	# of households displaced
6	Locations of vulnerable people / groups	**21**	Status of schools
7	# / % / location of people impacted (evacuated, injured, casualties, missing / unaccounted for)	**22**	Status of welfare needs and actions taken or planned
8	Resource / capability shortfalls	**23**	# of households in temporary accommodation
9	Status (level of service) of major/primary roads - availability, restrictions, outage, estimated repair time.	**24**	Infrastructural demands for business continuity - Telecommunications
10	Status (level of service) of critical bridges - availability, restrictions, outage, estimated repair time.	**25**	Accessibility to most severely impacted areas (by level of service – restriction)
11	# / location of non-residential foreign nationals requiring support	**26**	Status (level of service) of ports
12	Isolated households	**27**	Status (level of service) of airports/heliports
13	Animal welfare impacts - Rural	**28**	Status of local transition periods given or planned
14	Weather – current / forecast	**29**	Status of telecommunication services
15	Impacted central / local government capabilities	**30**	Status (level of service) of railways

Appendix C: Main risks

The proposed investment involves data management, technology enhancements and the cooperation of data owners and data users. Key risks are in three categories: implementation, operational and adoption/other risks.

Table 17: Initial risk analysis

Main Risks	Impact (H/M/L)	Likelihood (H/M/L)	Comments and Risk Management Strategies	Residual Risk
Implementation risk				
Data owners of high priority datasets are reluctant to co-operate and unwilling to share data	(H) Some high priority data is not included in the COP, full benefits cannot be realised,	M/H	Minimise requirements for data to make it easier for data owners Ongoing work with data owners to reinforce the mandate for the COP under the CDEM legislation, setting / formalising expectations on the type data required and standard of data provision Demonstrate effectiveness of security and confidentiality of systems and processes Be flexible about the sequencing and timing for bringing on board particular types of data Work closely with relevant data owners from outset Build on existing relationships established to date Demonstrate collaborative working and responsiveness to feedback	M/H
Privacy or commercial confidentiality concerns prevent data sharing and cooperation	(M/H) Some high priority data is not included in the COP, full benefits cannot be realised,	M	Ongoing work with data owners to reinforce the mandate for the COP under the CDEM legislation, setting / formalising expectations on the type data required and standard of data provision Demonstrate effectiveness of security and confidentiality of systems and processes Be flexible about the sequencing and timing for bringing on board particular types of data	M

Main Risks	Impact (H/M/L)	Likelihood (H/M/L)	Comments and Risk Management Strategies	Residual Risk
Availability of specialist geospatial resources for recruitment	(M) Delayed start and completion, increased cost	H	Sufficient time and budget allowed for recruitment	M
Handover of Stage 1 COP work (finishing Dec 2019 while Stage 2 starting July 2020)	(M/L) IP and relationships lost, slower start to Stage 2	M	Documentation of Stage 1 deliverables, handover to permanent MCDEM/NEMA staff before the end of Stage 1	L
Programme does not deliver to time, cost or quality	(M) Benefits not achieved as expected	M	Programme plan staggered delivery to maximise early benefits Regular progress monitoring and review Programme stage gating and assurance plan	M/L
IT, legal, operational requirements overlooked	(M) Higher than planned cost to remediate	L	Early involvement of required stakeholders in planning Programme stage gating and assurance plan	L
Operational risks				
System security compromised (e.g. due to cyber-attack)	(M) Information unavailable to users, reputational damage and low future usage	M/L	Security testing/reviews System design for resilience Business continuity planning	L
Incomplete or incorrect information is posted on the public viewer	(H) Public safety at risk (at an extreme), or the public loses confidence in the public viewer and stops relying on it	M/L	Use Standard Operating Procedures and public information specialist teams already in place to manage information flow to the public Training, testing and exercises to ensure that emergency managers are understand the role and capabilities of the public viewer and the relevant specialists can use it as intended	M
Data provided by external sources is not managed in accordance with the data providers' requirements for data privacy, commercial sensitivity, and other security needs	(H) Breach of privacy and/or exposure of commercially sensitive data leading to downstream effects.	M/L	Ensure usage of data rules are agreed with data providers and that people able to access the data understand these rules. Data sharing agreements are in place where required. Ongoing training and exercises	M

Main Risks	Impact (H/M/L)	Likelihood (H/M/L)	Comments and Risk Management Strategies	Residual Risk
	Loss of data provider confidence in the COP.			
Adoption and other risks				
The programme does not meet stakeholder agency expectations, or requirements are not fully defined / understood	(M) Benefits not achieved as expected	M	Effective stakeholder communication and engagement strategy Programme stage gating and assurance plan	L/M
The public is not aware of the existence of the public viewer or does not find it useful for their needs	(M) Benefits are not achieved as expected; the public will need to be kept informed through other channels	M	Public viewer design incorporates good practice from NZ and international examples of similar viewers Use of Public Information Specialist on the team to develop and refine the public viewer Continuous improvement based on public feedback The availability of the public viewer is communicated through existing MCDEM/NEMA channels	L/M
Reputational risk if the programme does not deliver to government and public expectations	(H) Reduced trust and support by the public, Ministers	L	Effective stakeholder communication and engagement strategy Programme stage gating and assurance plan	L

Appendix D: Case study – Tsunami Evacuation Zones data

As part of the Stage 1 COP Programme, work was undertaken to improve the availability of authoritative Tsunami Evacuation Zone spatial data. This case study demonstrates the benefits to the CDEM sector of a centralised resource to coordinate the consolidation of dispersed data.

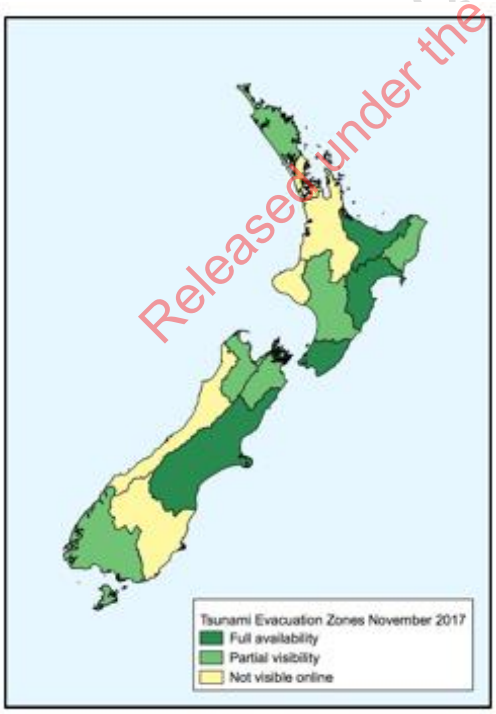
The issues with the availability of Tsunami Evacuation Zone data were typical of many data sources used by the emergency management sector, including:

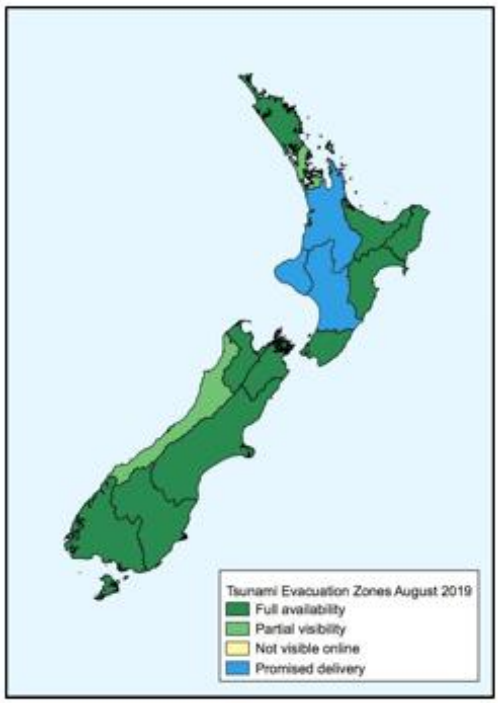
— Data was dispersed across multiple agencies as 16 CDEM Groups develop Tsunami Evacuation Zone data under national guidance. Those requiring a view across multiple regions or interested in access to data nationally had to access information from each group.

— No single source for all Tsunami Evacuation Zones and no consistent description of the datasets to make them discoverable.

The project sought to improve nationwide availability of Tsunami Evacuation Zone data by ensuring datasets are discoverable on a single catalogue, data.govt.nz[5] and meet minimum criteria relating to governance, metadata, licensing and interoperability. In most cases, the data for each region is available in a variety of formats, including Rest services, GeoJSON, CSV and other common formats.

As shown in the diagrams below, the project has achieved significant improvement in the availability of Tsunami Evacuation Zone spatial data.





[5] https://catalogue.data.govt.nz/dataset?q=tsunami+evacuation+zones&groups=tsunami

The project followed a simple and efficient process to achieve near nationwide availability, including:

— Coordinated communication to data owners (in this case, CDEM Groups) on the scope of the project and potential benefits.

— Working closely with the designated GIS resource within each CDEM Group to ensure understanding of the specifications and requirements.

— Coordination with LINZ to add data to the Hazards/Tsunami group on data.govt.nz once prepared by the CDEM Group.