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CONTENTS

EXECUTIVE SUMMARY	VII
KEYWORDS	IX
GLOSSARY AND ACRONYMS	X
1.0 INTRODUCTION	1
1.1 REPORT PURPOSE	1
1.2 REPORT STRUCTURE.....	2
2.0 OVERVIEW OF EARLY WARNING SYSTEMS AND PRINCIPLES OF EFFECTIVE PUBLIC ALERTING	3
2.1 MULTI-HAZARD EFFECTIVENESS	3
2.2 NATURAL, OFFICIAL, AND INFORMAL WARNINGS	4
2.3 MULTIPLE SYSTEMS AND MINIMUM DESIRED REACH.....	4
2.4 MESSAGE CONTENT	4
2.5 EFFECTIVENESS EVALUATION AND THE PUBLIC ALERTING OPTIONS DECISION SUPPORT TOOL	5
2.5.1 Heads up and instruction, and other 'showstoppers'	6
2.5.2 Information required to populate the decision support tool	6
3.0 CONTEXT FOR ALERTING IN THE WAIKATO	9
3.1 OVERVIEW OF WAIKATO CIVIL DEFENCE EMERGENCY MANAGEMENT STRUCTURE.....	9
3.2 WAIKATO HAZARDSCAPE	10
3.2.1 Critical hazards.....	11
4.0 METHODOLOGY	13
4.1 IMPORTANCE OF LOCAL INPUT IN DECISION MAKING	13
4.2 BASELINE DATA.....	13
4.3 TERRITORIAL AUTHORITY WORKSHOPS	14
4.3.1 Alerting options included in tool.....	16
4.4 NATIONAL INITIATIVES.....	17
5.0 RESULTS	19
5.1 REGIONAL.....	19
5.1.1 Key points.....	19
5.1.2 Budget and costs.....	20
5.1.3 Pockets and groups.....	21
5.1.4 Effectiveness scores and multipliers	21
5.1.5 Recommendations for Waikato CDEM Group	22
5.2 HAMILTON CITY.....	24
5.2.1 Key points from workshops	24
5.2.2 Budget	25
5.2.3 Pockets and Groups that need specific alerting.....	25
5.2.4 Effectiveness scores	25

	5.2.5	Recommendations for Hamilton City.....	25
5.3		HAURAKI DISTRICT	28
	5.3.1	Key points from workshops	28
	5.3.2	Budget	29
	5.3.3	Pockets and groups that need specific alerting.....	29
	5.3.4	Effectiveness scores and multipliers	29
	5.3.5	Recommendations for Hauraki District.....	29
5.4		MATAMATA-PIAKO DISTRICT.....	32
	5.4.1	Key points from workshops	32
	5.4.2	Budget	33
	5.4.3	Pockets and groups that need specific alerting.....	33
	5.4.4	Effectiveness scores and multipliers	33
	5.4.5	Recommendations for Matamata-Piako DC.....	33
5.5		OTOROHANGA DISTRICT	36
	5.5.1	Key points from workshops	36
	5.5.2	Budget	36
	5.5.3	Pockets and groups that need specific alerting.....	37
	5.5.4	Effectiveness scores and multipliers	37
	5.5.5	Recommendations for Otorohanga DC.....	37
5.6		SOUTH WAIKATO DISTRICT	40
	5.6.1	Key points from workshops	40
	5.6.2	Budget	41
	5.6.3	Pockets and groups that need specific alerting.....	41
	5.6.4	Effectiveness scores and multipliers	41
	5.6.5	Recommendations for South Waikato DC	41
5.7		TAUPO DISTRICT	44
	5.7.1	Key points from workshops	44
	5.7.2	Budget	45
	5.7.3	Pockets and groups that need specific alerting.....	45
	5.7.4	Effectiveness scores and multipliers	45
	5.7.5	Recommendations for Taupo DC.....	46
5.8		THAMES-COROMANDEL DISTRICT.....	50
	5.8.1	Key points from workshops	50
	5.8.2	Budget	51
	5.8.3	Pockets and groups that need specific alerting.....	51
	5.8.4	Effectiveness scores and multipliers	51
	5.8.5	Recommendations for Thames-Coromandel District.....	54
5.9		WAIKATO DISTRICT.....	56
	5.9.1	Key points from workshops	56
	5.9.2	Budget	57
	5.9.3	Pockets and groups that need specific alerting.....	57
	5.9.4	Effectiveness scores and multipliers	57
	5.9.5	Recommendations for Waikato District	57
5.10		WAIAPA DISTRICT.....	60

5.10.1	Key points from workshops	60
5.10.2	Budget	61
5.10.3	Pockets and groups that need specific alerting.....	61
5.10.4	Effectiveness scores and multipliers	61
5.10.5	Recommendations for Waipa District.....	61
5.11	WAITOMO DISTRICT.....	64
5.11.1	Key points from workshops	64
5.11.2	Budget	65
5.11.3	Pockets and groups that need specific alerting.....	65
5.11.4	Effectiveness scores and multipliers	65
5.11.5	Recommendations for Waitomo District.....	65
5.12	COST AND ABILITY TO PAY	68
6.0	RECOMMENDATIONS.....	69
6.1	NATIONAL OPTIONS	69
6.2	REGIONAL OPTIONS	69
6.3	TA SPECIFIC OR LOCAL OPTIONS	71
6.4	POTENTIAL SUPPLIERS OF SYSTEMS	71
7.0	REFERENCES	73

FIGURES

Figure 1	Components of effective early warning systems (Leonard, 2008).	3
Figure 2	Waikato Civil Defence Emergency Management Group boundaries, district boundaries, regional boundaries and local CDEM areas.	9
Figure 3	Introduction to the facilitated workshop discussion on local inputs to the decision support tool.	14
Figure 4	Input page for the decision support tool.	15
Figure 5	Systems currently used or level of interest in inclusion for options evaluation (all TAs combined).....	16

TABLES

Table 1	Evaluation Criteria for Determining Effectiveness in the Public Alerting Decision Support Tool.	5
Table 2	Hazards applicable to the Waikato CDEM Group and the requirement for rapid warnings for life safety.	11
Table 3	Relative effectiveness scores for selected alerting options, with indicative costs if implemented across the Waikato CDEM Group.	23
Table 4	Relative scores for selected alerting options, with indicative costs for Hamilton City.	27
Table 5	Relative scores for selected alerting options, with indicative costs for Hauraki District.	31
Table 6	Relative scores for selected alerting options, with indicative costs for Matamata-Piako District.	35
Table 7	Relative scores for selected alerting options, with indicative costs for Otorohanga District.....	39

Table 8	Relative scores for selected alerting options, with indicative costs for South Waikato District.	43
Table 9	Relative scores for selected alerting options, with indicative costs for Taupo District usually resident population.	48
Table 10	Relative scores for selected alerting options, with indicative costs for usually resident population and approx. maximum tourists.	49
Table 11	Relative scores for selected alerting options, with indicative costs for Thames-Coromandel usually resident population.	52
Table 12	Relative scores for selected alerting options, with indicative costs for usually resident population and approx. maximum tourists during summer peak season, 140,000 people in high density areas and 10,000 in low density.	53
Table 13	Relative scores for selected alerting options, with indicative costs for Waikato District.	59
Table 14	Relative scores for selected alerting options, with indicative costs for Waipa District.	63
Table 15	Relative scores for selected alerting options, with indicative costs for Waitomo District.	67

APPENDICES

A1.0	DETAIL FROM TA WORKSHOPS	77
A1.1	HAMILTON CITY	77
A1.2	HAURAKI DC	80
A1.3	MATAMATA-PIAKO DISTRICT	83
A1.4	OTOROHANGA DISTRICT	86
A1.5	SOUTH WAIKATO DISTRICT	88
A1.6	TAUPO DC	91
A1.7	THAMES COROMANDEL DC	97
A1.8	WAIKATO DISTRICT	103
A1.9	WAIPA DC	107
A1.10	WAITOMO DC	110
A2.0	BASELINE DATA SOURCES	113
A2.1	STATISTICS NEW ZEALAND 2013 CENSUS DATA DISCUSSED	113
A2.2	OTHER INFORMATION SOUGHT BEFORE THE WORKSHOPS AND DISCUSSED	114
A2.3	OTHER INFORMATION SOUGHT FROM THE WORKSHOPS	114
A3.0	ALERT PROVIDERS	115
A3.1	NATIONAL MOBILE ALERTING	115
A3.1.1	Emergency Response System alerts	115
A3.1.2	Auckland CDEM app	115
A3.1.3	Google Now	115
A3.1.4	Red Cross	115
A3.1.5	Apps by GeoZone (e.g., Campermate)	115
A3.1.6	Rural broadband	116
A3.2	RADIO STATIONS	116
A3.2.1	Switch FM	116
A3.2.2	Contact FM	116

A3.2.3	Free FM	117
A3.2.4	Mediaworks stations	117
A3.2.5	Nga Iwi FM	118
A3.2.6	Tainui FM.....	118
A3.2.7	Newstalk ZB	119
A3.2.8	Raglan Community Radio	119
A3.2.9	Niu FM	120
A3.2.10	The Yak FM.....	120
A3.2.11	AM Christian Radio	120
A3.2.12	Bitter FM.....	121
A3.2.13	Tuwharetoa FM	121
A3.3	VOICE OVER IP (VOIP) PROVIDERS	122
A3.3.1	TNZ Limited.....	122
A3.3.2	GetsReady.....	123
A3.4	SMS TEXT MESSAGE	124
A3.4.1	LERT Info	124
A3.4.2	BULLETiN.....	125
A3.5	MOBILE PA.....	126
A3.6	VHF AND HF RADIO	126

APPENDIX FIGURES

Figure A1.1	Hamilton City Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).....	77
Figure A1.2	Hauraki District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).....	80
Figure A1.3	Matamata-Piako Area Units with 2013 usual resident population count and density shown (green = low density, red = high density)	83
Figure A1.4	Otorohanga and Waitomo Districts Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).	86
Figure A1.5	South Waikato District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).	88
Figure A1.6	Taupo District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).....	91
Figure A1.7	Thames-Coromandel District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).	97
Figure A1.8	Waikato District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).....	103
Figure A1.9	Waipa District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).....	107
Figure A1.10	Waitomo and Otorohanga Districts Area Units with 2013 usual resident population count and density shown (green = low density, red = high density)	110

EXECUTIVE SUMMARY

This report covers the results of a public alerting options assessment project developed under the Waikato CDEM Group Warning Systems Strategy 2014–2020. The project includes an evaluation of current and potential public alerting systems for Waikato CDEM Group, and utilises the recently updated (2014) Public Alerting Options Decision Support Tool. The evaluation includes considerations of relatively new options for public alerting such as mobile device applications, mobile device broadcasting and social media, alongside more established options.

The evidence-based decision support tool was applied in each Territorial Authority (TA) that is a member of the Waikato CDEM Group and at a regional level to determine the most effective options for public alerting. Local information on demographics, hazards, institutions, infrastructure and budget was sought to populate the tool inputs. Cost-benefit tables are presented for public alerting options in each TA and across the Group. Locally implemented (by each TA), regionally coordinated, and potential nationally available options are evaluated.

Baseline data about the above local information was collected on each TA and then ten workshops were held (one at each TA) with local CDEM professionals, emergency services, local government and community representatives to validate and collect necessary information specifically on:

- Existing options in use, their effectiveness and other options of interest
- Limitations or unsuitability of specific alerting options
- Independent self-maintained networks in each TA
- Institutions with people in their care that need alerting
- Geographic pockets and ‘vulnerable’ groups that need specific alerting
- Ranking of hazards that need to be warned for
- Budget available (if any).

For each TA alerting options are grouped and ranked in terms of their effectiveness. The options available for whole TA areas, or for the entire Group, are severely limited by their cost. However, several high scoring options are potentially cost-effective if targeted at location ‘pockets’ and public ‘groups’ that have specific alerting needs. Options that cannot rapidly reach 70% of the population across any one community should be used with caution. Without any effectiveness score multipliers changed, and independent of hazard type or the at-risk community, the more-highly effective options are as follows:

Systems with the highest effectiveness scores (all greater than 80%) for use Group-wide and that are currently available or will be available in the near future include:

- Mobile device applications (apps)
- Tone activated alert radio
- Radio announcements.

Other systems reviewed that were considered to be effective in reaching communities of people in geographic pockets, or with special alerting needs include:

- Mobile PA loud-speakers (assumes no FTE cost)
- Route alert (door-to-door knocking)
- Telephone trees
- Telephone auto-diallers
- Television announcements.

For local source tsunami the only warning method that is timely and reliable is the public understanding and acting appropriately to *natural warnings* such as long or strong earthquake shaking and/or unusual behaviour of the ocean.

Recommendations:

We are strongly recommending a tiered approach.

Most of the populations in all Territorial Authorities (TA) will be able to be reached quickly via one or more of the new public alerting apps, coming online in the next 12 months. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.

TAs will need to identify pockets and groups that are subject to residual risk from hazards and are not covered by the app and need supplementary alerting. We have made a substantial first effort to identify these pockets and groups that are potentially not covered by the mobile app via the workshops and the notes in Appendix A1. This contains a detailed list of geographic pockets, special groups and institutions with people in their care that may need supplementary alerting.

Once the app(s) are up and running (currently estimated to be in 6 to 12 months) and testable by TAs, only then will TAs really be able to ascertain the specific people that need supplementary alerting.

Coastal TAs must focus on public education to trigger spontaneous self-evacuation to earthquakes longer than a minute, OR hard to stand up in, because of the potential for local source tsunami. The public must not wait for any official warning in this circumstance.

For supplementary alerting we recommend:

- Continue to use existing options where they are proven to be effective
- Explore feeding alerts into the listed independent self-maintained networks (both TA specific, and Group-wide)
- Explore feeding alerts into institutions with large amounts of people in their care (both TA-specific, and Group-wide)
- Explore mobile phone and landline Voice Over Internet Protocol (VOIP) auto-dialler options with the CDEM Group IT department (including a database of contact numbers). Two supplier costs are supplied to indicate both the low and high ends of the cost range.

Further supplementary alerting can be achieved via:

- Mobile PA systems – but note that FTE effort is needed to maintain readiness here, and there is direct cost too. It is also limited by the availability of on-demand staff and vehicles.
- VHF or HF radio into pockets, probably to trigger a local response tree (to save on equipment costs) – but note there is a substantial hardware (EOC, repeaters and receivers), training, and upkeep cost to this, particularly if radio is not being used by the EOC.
- SMS-PP may have some additional coverage beyond the mobile app to current non-smartphone users (such as the elderly and farmers), but this is likely to rapidly drop off as smartphone uptake continues to rapidly rise.

Other additional options are listed in Section 6.3.

KEYWORDS

Public alerting, warning systems, Waikato, civil defence emergency management, CDEM, decision support tool

GLOSSARY AND ACRONYMS

Alerting	A 'public alert' is a warning heads-up and/or message delivered to the public. An official public alert may be a noise on a smartphone, the signal a siren makes, etc. A public alert may be a simple text or voice message, or it may be a rich message that includes mixed media such as maps, video, images, etc. An advisory or warning provided by an alerting agency provides instruction information (depending on the system) to the public that a hazard threat is present and what action is, or could be required. A public alert ideally contains both heads-up and instruction information.
CAP	Common Alerting Protocol; a standardised format for public alerts to be input and transmitted across multiple alerting options.
CAU	Census Area Unit; a statistical area used for aggregating census data.
CDEM	Civil Defence Emergency Management.
CEG	Coordinating Executive Group.
Early Warning Systems	This often refers to the hardware, electronics and communications used, together with the planning and processes necessary to generate and notify a hazard warning. Often abbreviated as EWS and in current international usage can include hazard monitoring equipment and/or notification equipment.
GIS	Geographic Information Systems; a layered, geo-referenced mapping tool useful for viewing and analysis of spatial information for people, infrastructure and the environment.
GEMO	The Waikato CDEM Group Emergency Management Office.
Group	<p>A number of people within a community with a shared requirement for special consideration with regards to receiving, understanding and acting on alerts. For example those with English as a second language, sight impairments, hearing impairments, or visitors from NZ or overseas (transients) are considered special interest groups. Groups such as those described are sometimes referred to as "vulnerable populations" in CDEM literature. Groups may be dispersed among a community or within a geographic 'pocket'.</p> <p>Note in this report the term 'Group' (with a capital G) is often used and refers to the Waikato CDEM Group, whilst 'group' (with a lower case g) refers to groups as defined above.</p>
Hazchem	Hazardous chemical substances (often used in industrial processing).

Heads-up	The ability of an alerting method to get the attention of a person regardless of what they are doing, where they are or time of day.
Instruction	That part of a public alert that provides the recipient with information on what the threat is and what response is appropriate.
MCDEM	Ministry of Civil Defence and Emergency Management.
Pockets	Populations that do not necessarily have similar characteristics but are located within a defined geographic area and share a special requirement with regards to alerting. For example a community located in a particular valley with poor radio reception or mobile phone coverage.
Public alerting option	Public alerting options are those methods/systems/mechanisms by which a member of the public is directly alerted. The triggering of these options may utilise a public alerting platform if more than one option needs to be triggered at the same time semi- or fully-autonomously.
Residual Risk	The risk remaining to the population after common risk reduction mitigation methods such as land use planning, physical structures, policies, laws and codes have been applied to reduce hazard risk.
SWOT	‘Strengths, Weaknesses, Opportunities and Threats’; an analysis method for evaluating activities or planning.
VOIP	Voice Over Internet Protocol. The delivery of multi-media services to mobile and/or landline over the public internet rather than Public Switched Telephone Network systems.
Warning	A term often used to describe an alert, but also used to describe monitoring systems of natural events. For clarity, in this report we use the term alert throughout to describe information provided to the public from alerting agencies.

1.0 INTRODUCTION

Local Authorities, (LAs) as part of their Civil Defence Emergency Management (CDEM) functions under the CDEM Act (2002) are responsible for public alerting to at-risk communities prior to and during emergency events. Selection and implementation of public alerting options has occurred in a non-standardised and somewhat ad-hoc manner throughout New Zealand. In the past, this was partially due to a lack of guidance on evidence-based, alerting system effectiveness.

From 2006 onwards considerable research has been conducted in New Zealand to assess existing alerting systems, and evaluate the appropriateness of systems used internationally for implementation in New Zealand. CDEM Groups throughout the country are now seeking and have applied the available research and guidance to improve their alerting capability and capacities through integrated systems and strategic decision making.

Waikato CDEM Group is able to capitalise on the update of the public alerting decision support tool which incorporates this guidance (Leonard et al 2008, Wright et al 2014). The Group has developed a Warning Systems Strategy (Waikato CDEM Group, 2014) which has been approved by the Coordinating Executive Group (CEG). The strategy includes a goal to review and update public alerting mechanisms across the region. The strategy goals are to:

1. evaluate existing warning systems;
2. decide on an optimal suite of public alerting systems;
3. implement agreed public alerting systems;
4. increase public awareness and understanding;
5. build warning system resilience.

1.1 REPORT PURPOSE

This report describes the activities and results of a project to review, assess and recommend public alerting options for the Waikato CDEM Group. The project was designed to:

- support evidence-based decision making for public alerting across the Group;
- incorporate local knowledge and expertise into the assessment, *including local public alerting in use, demographics, local hazards, institutions, infrastructure, budget, and information on at-risk communities*;
- deliver recommendations and options for locally implemented and regionally coordinated alerting options;
- take into consideration national initiatives, standards and guidelines in those recommendations.

The project involved facilitating a series of 11 public alerting workshops; one for coordination then one for each Territorial Authority (TA) in the Waikato CDEM Group. This report delivers recommendations for each TA and also for the CDEM Group as a whole (Group-wide) in terms of regionally coordinated options. Any decision on implementation of systems should be subsequently made by the CDEM Group and respective TAs based on this and any other applicable information (e.g., budgets, existing systems).

The project also included an evaluation and cost estimate for the most suitable suppliers of options against the public alerting tool criteria. This estimate was done for selected options, with high effectiveness scores, that were not currently being used for alerting. Any decision on implementation of suppliers should be subsequently made by the CDEM Group based on this and any other applicable information.

1.2 REPORT STRUCTURE

This report includes the following Sections:

- Section 2: an overview of the principles of public alerting effectiveness and effective early warning systems. This section described the basis upon which individual alerting options may be evaluated and compared.
- Section 3: provides the context for public alerting requirements and options for Waikato CDEM Group; considering the structure of the Group and the hazardscape across the Group.
- Section 4: briefly describes the methodology and activities undertaken to: assess existing alerting systems in use, identify public alerting needs in the various Waikato TAs, evaluate existing and potential alerting options available (nationally, regionally and locally) and produce recommendations that will assist Waikato CDEM agencies with public alerting decision-making and planning.
- Section 5: provides the specific information on each TA that has been input into the decision support tool along with results. The input data is sourced from statistical sources and TA workshops. This information includes demographic data about special groups, access to telecommunications (mobile and landline), transient populations, and the importance of institutions and large industries. Each chapter also includes information on existing alerting systems and alerting options of interest and budget. Results are tabled as information on effectiveness, cost and application of specific alerting applications, sourced from system suppliers.
- Section 6: delivers recommendations for national, regional and local alerting options for Waikato CDEM Group and its member TAs.

2.0 OVERVIEW OF EARLY WARNING SYSTEMS AND PRINCIPLES OF EFFECTIVE PUBLIC ALERTING

For a more detailed explanation of much of the content in this chapter see Wright et al. (2014) and Leonard et al. (2008).

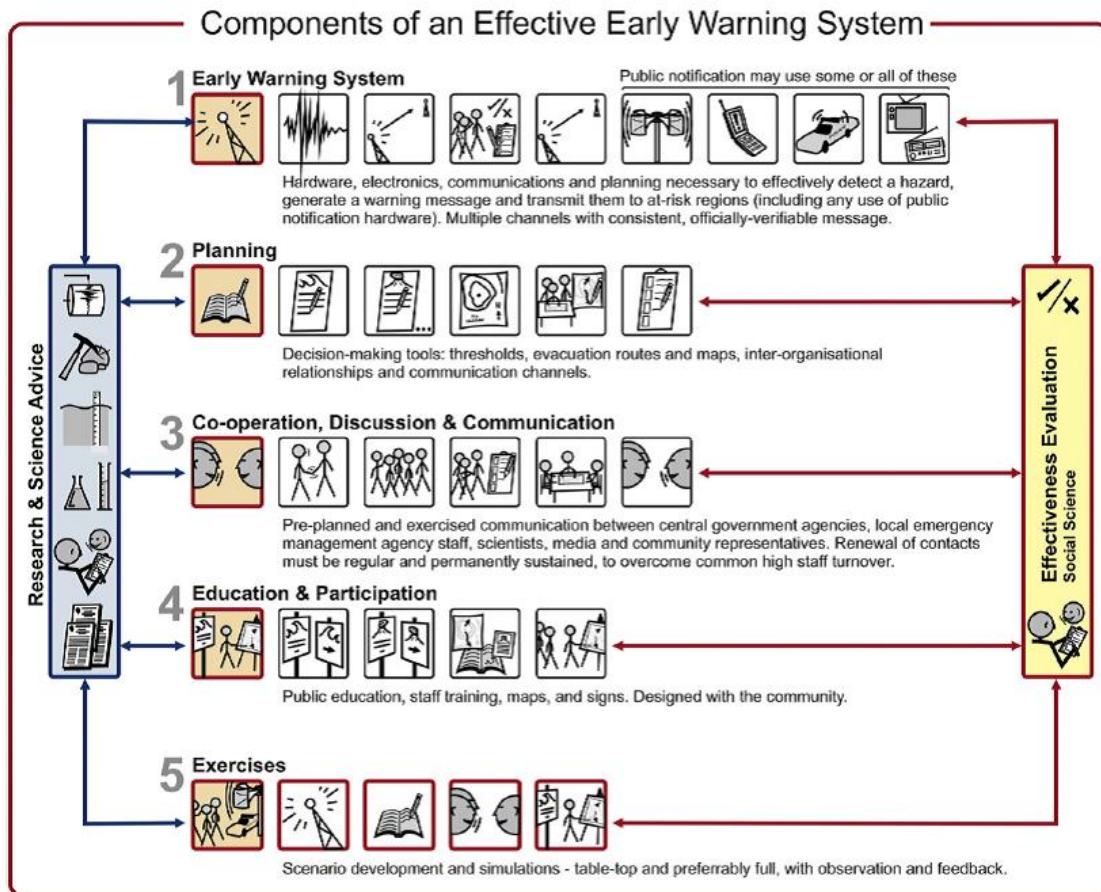


Figure 1 Components of effective early warning systems (Leonard, 2008).

An effective early warning system includes the wider set of actions necessary to ensure that a hazard is not only detected and recognised, but also that the warning message to those at risk is not only delivered, but also acted upon in an appropriate way. Early warning systems encompass a broad range of technologies, behaviours and planning (Figure 1). Public alerting systems are only one component of an effective early warning system (EWS).

2.1 MULTI-HAZARD EFFECTIVENESS

For maximum cost-benefit in a complex hazardscape (as exists in Waikato), public alerting options that are appropriate for use during different types of emergencies are recommended. Many alerting options have the functionality to provide *Instruction* as well as *'Heads-Up'* (see Section 2.5), and this makes them more flexible for use in multi-hazard environments because the response and safety actions for different hazards can differ, so different alerting information needs to be delivered.

2.2 NATURAL, OFFICIAL, AND INFORMAL WARNINGS

There are three main types of warnings: natural, official and informal. Natural warnings are phenomena experienced by people that could indicate that a hazard threat is imminent. Natural warnings can be thought of as triggers that can prompt those at-risk to take the correct actions if adequate understanding of the hazard and appropriate response is already established. Natural warnings are not available for all types of hazards but for some hazards they are the most reliable alerts available (e.g., earthquake shaking for local source tsunami threat). Natural warnings require considerable public education effort to be effective as they are *Heads-Up* only, and the associated threat often has a very rapid onset.

Official warnings are those delivered using public alerting mechanisms by agencies with a legal duty to maintain and use warning systems in emergencies as described in the CDEM Act 2002.

Informal warnings are those received from non-official sources, such as friends, family, overseas media channels, or (non-official) social media. They may be official warnings that are being passed on, or they may be from a less authoritative source. Informal warnings may be valid, and for life safety situations it is recommended that they be acted on if the threat could be immediate and then verified after safety actions have been taken.

2.3 MULTIPLE SYSTEMS AND MINIMUM DESIRED REACH

Research into alerting effectiveness has indicated that if official warnings reach at least two thirds of the population, they have highly effective coverage (Mileti and Sorenson, 1990, Mileti and Kuligowski, 2008). This is because of the power of informal warnings. Informal warnings are passed on by those who receive official warnings. Research into warning delivery and receipt has shown that one out of three people will receive their first warning about an emergency as an informal warning. It is recommended that at least one official public alerting system reach at least two thirds (ideally >70%) of the population.

It is important to understand that the 70% of people reached by the alerts must be distributed throughout the impacted population to allow for the informal warning. We recommend that the same warning message is delivered using as many different systems as are available. This provides redundancy should one system fail or be non-operative. All TAs in Waikato agreed that a minimum of 70% reach for at least one official system was the desired goal for their population, and additional reach and multiple systems were ideal.

2.4 MESSAGE CONTENT

An official public alert should provide clear and concise information on the nature of the hazard threat, and the appropriate response to this threat. The alert should come from a single verified and trusted source and be delivered in a timely manner that allows those at-risk to respond effectively.

2.5 EFFECTIVENESS EVALUATION AND THE PUBLIC ALERTING OPTIONS DECISION SUPPORT TOOL

There is a wealth of information on the effectiveness of public alerting systems based on case studies from a range of hazard types and locations both national and international, as well as theory-based research applying psychology principles. The evidence for what constitutes an effective alerting system has been summarised and used to develop an effectiveness evaluation methodology for alerting systems in New Zealand (Leonard et al., 2005, 2006, 2008; Wright et al., 2014). The effectiveness of each option is determined using a range of criteria, with an evidence-based scoring system. This scoring system forms the basis for a Public Alerting Decision Support Tool. The tool contains base effectiveness scores and these are modified as more detailed information on local hazards and demographics are input to the tool.

The tool also applies an estimated cost for each alerting system, which provides for cost effectiveness comparisons of systems. The range of criteria used to determine effectiveness of each alerting system is shown in Table 1. The 'showstoppers' (most critical considerations for effectiveness) are highlighted in red and explained in Section 2.5.1.

Table 1 Evaluation Criteria for Determining Effectiveness in the Public Alerting Decision Support Tool.

Evaluation Criteria	Explanation, implications
Activation time – Fast or nothing	Alerting and action time available
For fast onset, localised	Hazard, alerting and action time available
For fast onset, widespread	Hazard, alerting and action time, cost
For slow onset, localised	Hazard, alerting and action time available
For slow onset, widespread	Hazard, alerting and action time available, cost
Heads-up	Reach people whatever they are doing
Hearing impaired	Vulnerable groups, receipt of message
High pop density	Cost, economy of scale, reach of system
Immobile	Vulnerable groups, action esp. evacuation
Institutions	Vulnerable groups, dependent
Instruction	Provides appropriate action information
Language	Vulnerable groups, understanding of message
Low pop density	Cost, economy of scale, reach of system
Mental capacity	Vulnerable groups, understanding of message
On-going effect (ability to update message)	Change in at-risk area or required action
Opt-in required	At risk population must subscribe and cannot unsubscribe
Relies on (landline) telephony	Potential point of failure
Relies on electricity	Potential point of failure
Relies on internet connection	Potential point of failure
Robustness/resilience	Maintenance required, hazard resistant
Sight impaired	Vulnerable groups, receipt of message
Terrain	Topographic constraints on alert delivery
Time to reach all	Congestion of networks, delivery time
Transients/Visitors	Unfamiliar with local hazards, alerting systems and required actions

2.5.1 Heads up and instruction, and other ‘showstoppers’

To produce the correct response from at-risk citizens during emergency events, both *Heads-Up* and *Instruction* are important for effective alerting. Heads-up is the ability to inform a person that something unusual is occurring, regardless of where they are and what they are doing. It is something that inescapably grabs the attention.

Instruction is the content of the alert which informs the recipient not only that something is happening (heads-up), but provides detail on what is happening, where and when it is happening and what action is appropriate in response to the threat. For example a hazardous chemical (hazchem) leak may require a different response (e.g., stay indoors and seal doors and windows) than a regional source tsunami (evacuate tsunami hazard zones) therefore *Instruction* is a critical part of the alerting message.

Opt-in highlights the need for the public to subscribe to, or install an alerting system to be able to receive alerts. An example of a subscription-based opt-in is signing up to an email, telephone-tree, telephone auto-dialler, or SMS-text alert distribution list. Opt-in systems that require installation include mobile device applications (apps), power mains messaging systems (ripple control) and tone activated alert radio. If people are required to subscribe to or install an alerting system this creates a potential barrier to uptake, particularly if there is a cost involved or requirement for technological proficiency. If a system is Opt-in then it is also likely to be able to be ‘Opt-out’, meaning at-risk citizens have the capability to modify the heads-up or instruction, or turn it off completely. This presents additional risk.

Timely warnings are essential to maximising appropriate responses. The time to activate a system and create and deliver an alert to all of those at-risk is an important consideration.

2.5.2 Information required to populate the decision support tool

The Public Alerting Decision Support Tool requires information to be input to determine the effectiveness of each system for specific communities, such as towns, cities, districts or regions. Some of the information is available from the NZ Census on the Statistics NZ website. Other information is best sought from local CDEM practitioners or local authority and community representatives. The following information is necessary to apply the tool:

- Population count – low and high density population counts for the area of interest; high density = >200 people/km²)
- Demographics – information about groups of citizens who might have increased barriers to receiving certain types of alerts (e.g., communities with many elderly people, possibly having higher levels of sight or hearing impairment and lower rates of mobile device ownership). The tool asks for information on groups with sight, hearing, mobility or intellectual impairments, and those with English as a second language
- Telephone coverage; mobile and fixed – many alerting systems require telecommunications through either mobile or landline networks
- Transient populations – this includes the number of visitors to the area (tourists and others from outside the location such as seasonal workers) who may be unfamiliar with the local hazards and the local alerting systems
- Those in the care of institutions – this includes the number of citizens who are housed in institutions such as hospitals and prisons; those who are temporarily in care such as pre-school, school and tertiary students; and those working in large campuses or workplaces. These people are likely to require an alert to be delivered to them via the institution in which they are housed

- Hazards of interest – hazards are grouped into four classes based on the lead-in time from hazard trigger to impact and the range or extent of impact. Classes are as follows: short lead-in time localised impact, short lead-in time widespread impact, long lead-in time localised impact and long lead-in time widespread impact.
- Budget – each alerting system requires some budget resource, which could be in the form of staff time for education and exercises, resources for education, financial input for purchase, installation and maintenance of dedicated systems, and/or licenses or charges to use third party systems. Costs are determined on a per-thousand population basis and are separated into start-up (establishment) and on-going.

Nearly forty alerting options are included in the decision support tool, including some options not yet readily available in NZ that are used overseas. These are categorised into third-party systems, dedicated hardware, natural warnings and independent self-maintained networks.

- Third-party systems are owned and operated by non CDEM agencies but can be used for alerting, e.g., TV, radio, mobile phone networks.
- Dedicated hardware is owned and operated by the CDEM agency e.g., PA systems or sirens.
- Natural warnings are those phenomena which are produced by the event that could indicate a hazard threat (e.g., strong or long shaking near the coast could indicate tsunamis; heavy rainfall could indicate landslides or flooding).
- Independent self-maintained networks are non-CDEM agencies in contact with the public that could deliver an alert message to the public if agreements and arrangements are in place (e.g., surf-lifesaving groups, park rangers, neighbourhood watch etc). The decision support tool allows users to select which alerting options to include and exclude in any evaluation.

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3.0 CONTEXT FOR ALERTING IN THE WAIKATO

3.1 OVERVIEW OF WAIKATO CIVIL DEFENCE EMERGENCY MANAGEMENT STRUCTURE

Waikato CDEM Group members comprise ten territorial authorities (TAs) and the Waikato Regional Council. The TAs in alphabetical order, are:

- Hamilton City;
- Hauraki District;
- Matamata-Piako District;
- Otorohanga District;
- South Waikato District;
- Thames-Coromandel District;
- Taupo District;
- Waikato District;
- Waipa District; and
- Waitomo District.

Local operational CDEM areas include two emergency operating areas (EOAs); (Thames Valley and Western Waikato-comprising three TAs and two TAs respectively) and Waikato District, Hamilton City, South Waikato District and Taupo District (Figure 2).

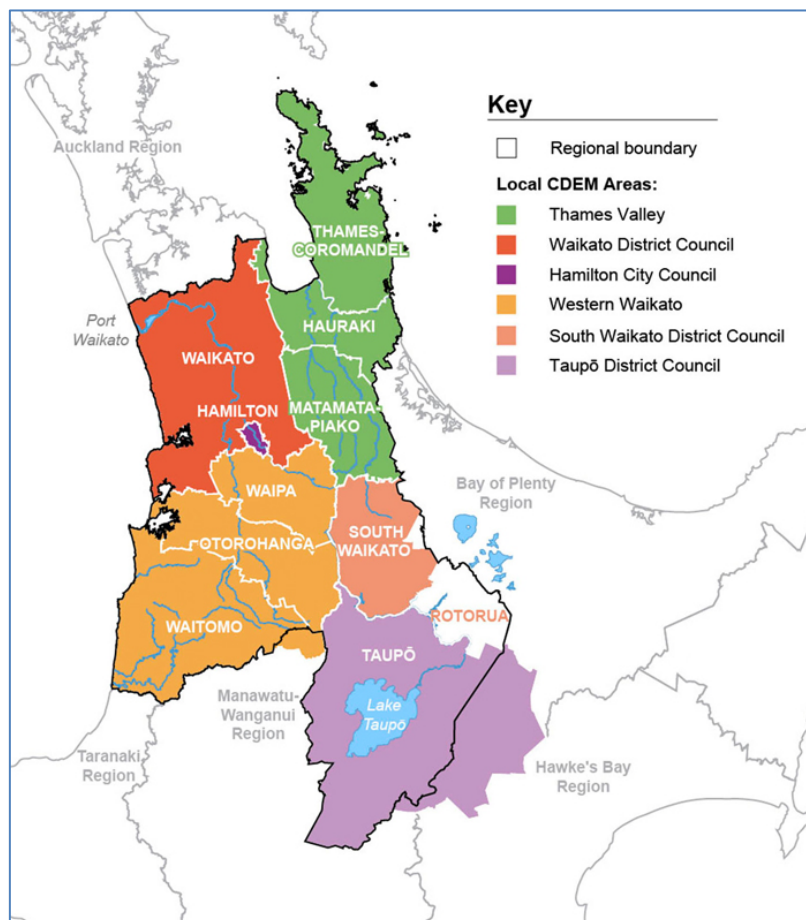


Figure 2 Waikato Civil Defence Emergency Management Group boundaries, district boundaries, regional boundaries and local CDEM areas. Note all of Taupo and Waitomo districts are included in Waikato CDEM Group and all of Rotorua District is excluded (Waikato CDEM Group, 2015).

The Coordinating Executive Group (CEG) provides senior executive direction and resources to develop and implement emergency management policies and plans. The members of Waikato's CEG are the local authorities discussed above, plus the following emergency services:

- New Zealand Police
- New Zealand Fire Service
- Waikato District Health Board
- St John Ambulance

Responsibilities for public alerting fall to members of CDEM Groups under the National CDEM Plan Order 2005. The order states:

"CDEM Groups;

- must maintain arrangements to respond to warnings (s60(5));
- Are responsible for (s62(6)):
 - a. *Disseminating national warnings to local communities; and*
 - b. *Maintaining local warning systems"*

The budgeting and decision making lies at the political level, with advice from CDEM professionals; while the operational implementation of alerting systems occurs at the local or Group-wide level if applicable.

3.2 WAIKATO HAZARDSCAPE

Waikato is a geographically diverse region; the range of natural hazards present include active volcanism in the south and ashfall from remote volcanoes, low lying flood plains, heavy rainfall zones, active faults, geothermal and geophysical processes (landslides, subsidence), coastal hazards (tsunami, storm surge, erosion), windstorms, drought and rural fire. Waikato's agricultural economy and population health is at risk from biological hazards such as animal or human epidemics. The Waikato Region also contains many major industrial sites and lifeline utilities including major state highways, rail corridors, gas lines, power generation sites and power corridors. The threat from hazchem incidents during transportation along arterial routes or at point sites must be considered. Waikato River has several large dams upstream of established communities.

In general three main options are available to local authorities to manage the risks from hazards.

1. Modify the hazard (e.g., river stopbanks – can protect against smaller events but always have design limits which can be exceeded).
2. Modify human behaviour (e.g., land-use planning to avoid hazardous locations).
3. Accept some risks and use warnings to protect life (and to some degree, property).

Hazards that are managed using Options One or Two are still likely to create some residual risk and if there is a life safety threat from extreme events, warnings will be necessary. Therefore the purpose of public alerting as part of effective warnings systems is to complement the other hazard risk management activities used by local authorities.

When considering the CDEM planning, preparedness and response for the wide range of hazards present in Waikato, public alerting options should ideally be capable of delivering warnings for multiple potential hazards, natural and non-natural. Each TA has its own hazardscape and the need for rapid, localised or widespread alerts differs between TAs. This is discussed in more depth in Section 5 of this report.

3.2.1 Critical hazards

With regards to public alerting, life safety is typically the main priority, with protection of moveable property also important (Table 2). Some hazards are therefore more critical in terms of the need for rapid alerting.

Table 2 Hazards applicable to the Waikato CDEM Group and the requirement for rapid warnings for life safety.

Hazards requiring rapid warnings for life safety (short-onset, less than 3 hours)	Hazards NOT requiring rapid warnings for life safety but still appropriate for alerting	Hazards which currently cannot be warned for
Near source* tsunami Regional source tsunami Serious Hazchem incident Flash flooding/debris flow	River flooding Distant source tsunami Storm surge Volcanic eruption Animal or human epidemic Drought Coastal erosion Windstorms Rural fire Large-scale lifelines failure	Earthquakes Extreme geothermal events Landslides Localised subsidence

*Natural warnings are the only possible warnings

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4.0 METHODOLOGY

This project uses the Public Alerting Options Decision Support Tool (see Section 2.5). To successfully use the decision support tool to evaluate alerting options for Waikato communities, a considerable amount of local information is required. The methodology to collect this information and populate and use the tool is described below.

4.1 IMPORTANCE OF LOCAL INPUT IN DECISION MAKING

Following a preparatory meeting with local civil defence emergency management professionals and a review of available information on local hazards, demographics and alerting systems, workshops were held with each TA.

The Group Emergency Management Office (GEMO) recognised that local CDEM stakeholders, community representatives and emergency service staff have invaluable local knowledge and experience of their communities, their hazards and other essential information that could influence alerting effectiveness. It was also noted that workshops would be valuable in educating locals about alerting options and help decision makers to make well informed decisions about warning systems in the future. GEMO developed a process to ensure meaningful input into the evaluation process from the TAs within the Group.

4.2 BASELINE DATA

To prepare for local discussions, baseline data was collated with the expectation that local information provided in workshops would expand and where necessary provide corrections.

The following was collected as baseline data (more information on the source and analysis of this data is available in Appendix 2.0).

- Population data (high and low density).
- Elderly populations (an indicator for hearing, sight and mobility impaired populations).
- Residents who spoke languages other than English (as indicator for potentially those with English as a second language).
- Telephone access: landline and mobile ownership.
- Telephone coverage: reception of mobile phone network.
- Hazards of importance to each TA.

4.3 TERRITORIAL AUTHORITY WORKSHOPS

Nine half-day workshops were held throughout the region; one for each TA except for a combined workshop for Waitomo and Otorohanga District Councils. The purpose of the workshops was twofold:

- to provide background on the evidence basis for evaluation of alerting systems using the public alerting decision support tool; and,
- to enhance the baseline information by capturing local knowledge and experiences.

Representatives of key local organisations were invited to the workshops; the organisations included:

- territorial authority councillors (particularly Mayors and those with a responsibility or interest in CDEM) and community board members;
- council officers (particularly CEG representatives, CDEM professionals and others with a responsibility for, or interest in CDEM); and,
- emergency services (police, fire, health).

MCDEM representatives (regional advisors) also attended some of the workshops, largely in an observer capacity and they provided input on request.

Following presentations from GNS Science and GEMO, a facilitated discussion was conducted using the baseline data as a prompt. These discussions were lively, invaluable and in every instance greatly improved the knowledge of local systems, demographics and benefits and limitations of existing systems. The key discussion topics are shown in Figure 3 as an example.

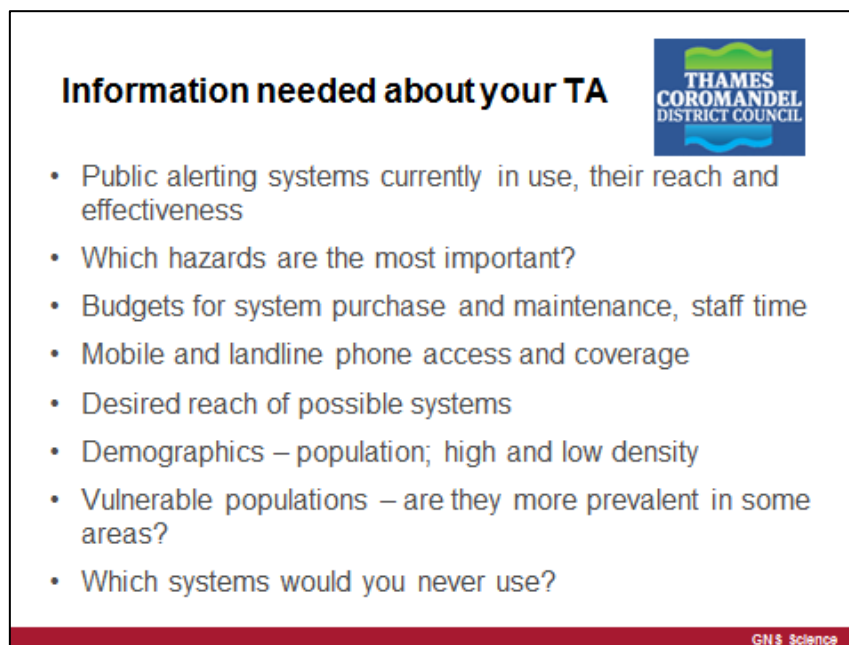


Figure 3 Introduction to the facilitated workshop discussion on local inputs to the decision support tool.

The results of the workshop discussion were used to refine the inputs to the decision support tool for each TA analysis (Figure 4). The tool allows for options to be switched off (removed from consideration) for hazard classes and alerting options that are not of interest. The tool also allows the use of multipliers to enhance the importance of hazard classes and demographic groups requiring special consideration (e.g., transient populations in areas with high tourism numbers). The specific multipliers applied for each TA (if any) are listed in the results section (Section 5).

Budget is essential for determining the cost benefit of any alerting system and budgets for specific systems can vary significantly when calculated for high and low density populations, and when considering establishment and on-going costs. Most TAs had no budget allocated for alerting systems or staff time specifically dedicated to public alerting (see Section 5), therefore an effectiveness evaluation was undertaken of all systems. Recommendations will be based on affordability of local systems to reach groups or pockets and where regional or national systems can be employed as cost-effective measures for local alerting. The Waikato CDEM Group has some budget allocated to alerting and this is taken into consideration for alerting options that are appropriate for Group-wide coordination or management. For TAs with no budget – cost estimates were sought and an indication of cost is given for high benefit options. Free options can be applied with no budget.

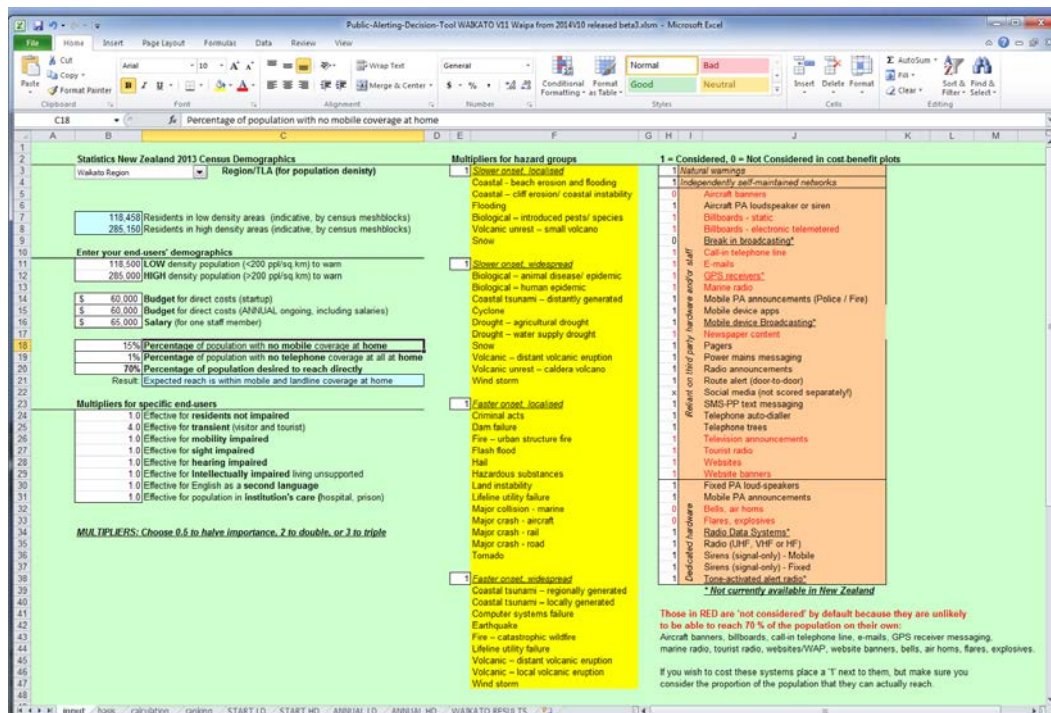


Figure 4 Input page for the decision support tool. Left: information about demographics, budget and multipliers for special groups; Centre: Hazard classes as described in Section 2.5.2; Right: alerting options included for consideration in the tool.

4.3.1 Alerting options included in tool

A summary of the systems most used or most of interest (all TAs combined) is provided in Figure 5.

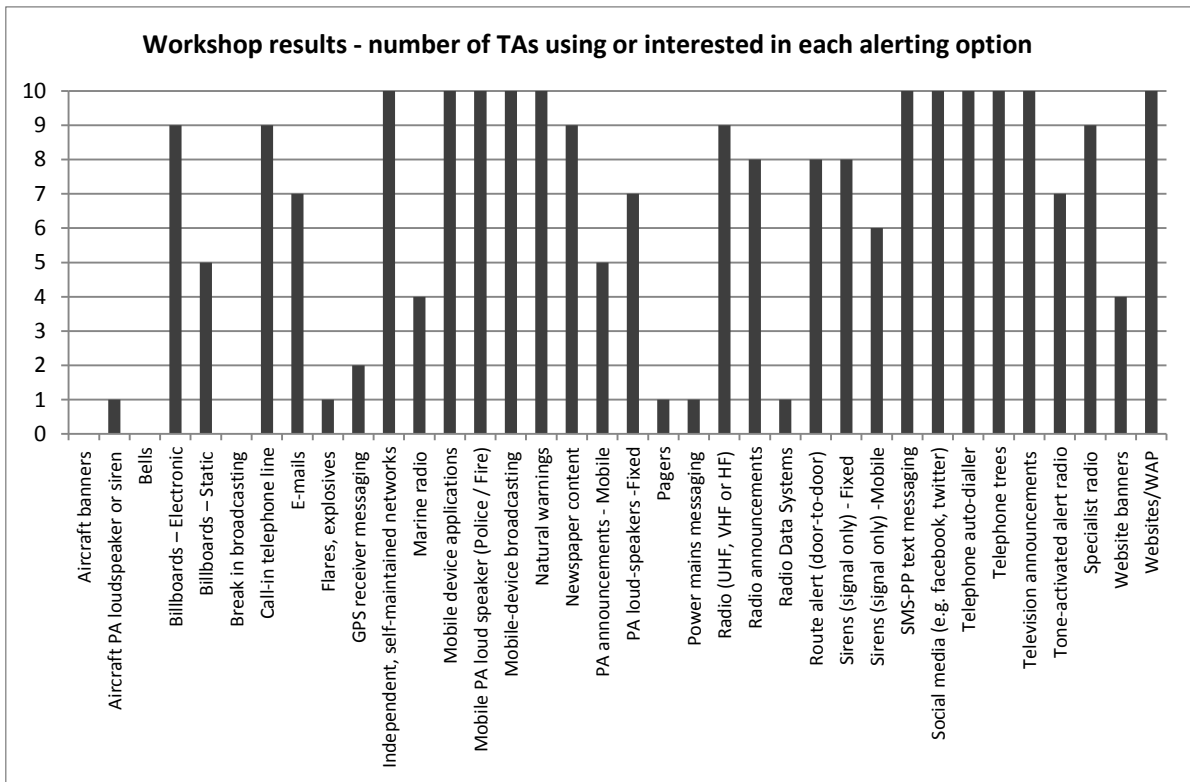


Figure 5 Systems currently used or level of interest in inclusion for options evaluation (all TAs combined).

A regional evaluation (see Section 5.1) was conducted as well as individual TA evaluations (Sections 5.2–5.11). When applying the decision support tool to individual TAs, all systems of interest to the respective TA and/or currently in use locally (e.g., mobile PA systems), regionally (e.g., Regional Council flood warning system) or nationally (e.g., television) were included.

4.4 NATIONAL INITIATIVES

Several national mobile communications-based alerting options have also been considered.

MCDEM is exploring telecommunications-based public alerting options. A business case has been provided to Government. The business case advises on options and investment required for a national (all of government) telecommunications-based emergency alerting capability to facilitate a decision in this regard.

MBIE and Police are leading the emergency response system (ERS) application project – which includes both 111 calling and location-based alerting (service to be established by July 2016).

CloudM and the Auckland CDEM Group have developed a native Apple iOS and Android app called Civil Defence New Zealand Application. In addition, both Google Public Alerts via the Google Now app, and a Red Cross app, have also been mooted by these suppliers for use nationally in New Zealand. Google is working directly with GeoNet, MetService and MCDEM, and Red Cross is piloting its app with Wellington Region Emergency Management Office.

It is envisioned that at least one (and probably all) of these options will be available for the Waikato CDEM Group within the 2015/16 financial year. All four app developers are discussing the implementation of Common Alerting Protocol (CAP) as part of a standard New Zealand implementation for all apps, ideally with a single input platform for emergency managers to enter public alerts securely into, which will then go to all apps.

5.0 RESULTS

The results of each Territorial Authority (TA) workshop and the application of the public alerting decision support tool using this information are presented in Sections 5.2–5.11.

5.1 REGIONAL

This section summarises existing Group-wide public alerting systems and costs, opportunities and issues for implementation of future systems across the Group as a whole.

5.1.1 Key points

The Group is subject to a broad range of natural, technological and biological hazards although some areas are more prone to risk from these hazards than other areas. Population totals some 405,000 individual residents as at 2013, although density varies considerably from high density in some parts of Hamilton City to very sparse in remote rural areas and conservation land. Population in Thames-Coromandel and Taupo Districts can at least double during the peak summer holiday season.

Many independent and self-maintained networks are utilised across the Group and the importance of institutions with individuals in their care varies from district to district although education institutions are prominent in all districts. Unique pockets or groups of populations that may need targeted alerting are detailed for each TA in the applicable sections below. Generally, geographical pockets of poor mobile phone coverage are common in sparsely populated rural, conservation and coastal areas. The elderly and tourists are two groups that may especially need consideration in some districts.

A variety of warning systems are already utilised across the Group, the use of media releases, social media and websites is common. However, some systems are not widely or consistently implemented. Some districts have many systems implemented while others have very few. Most districts have limited or no budget allocated towards warning systems. All districts chose not to consider the following (available) systems:

- Aircraft banners
- Break in broadcasting
- Bells, air horns
- Flares, explosives

Tsunami natural warnings education needs to be targeted towards applicable areas and it is not logical or cost effective for the whole Group in a blanket approach.

Existing Group-wide systems

All available public alerting options have opportunities, advantages and issues associated with them. Please refer to Appendix 1 of The Public Alerting Options Assessment: 2014 update (Wright et al., 2014).

Waikato Regional Council maintains:

- Flood warning SMS and auto-dialler system for applicable landholders and stakeholders
- Websites (Waikato Regional Council and BUSIT!)
- RSS Feed

- Facebook (2056 likes)
- Twitter (1354 followers)
- YouTube (34 subscribers)
- Email subscription service
- TV and Radio – Media releases

Waikato CDEM Group maintains:

- Website (CDEM Group)
- Facebook (2295 likes)
- Twitter (433 followers)
- Email subscription service
- TV and Radio – Media releases

Phone coverage

Phone coverage throughout this report is based on 2013 census household phone access data as a proxy. While network operators' coverage maps have been referred to in Appendix A1.0 this data not been used as input because they are the providers' estimation of coverage and there is no reason to expect these are a more accurate approximation of real coverage than the census access data.

Telephone household (usually occupied private dwellings) access statistics for Waikato Region from 2013 census:

- Percent of households with access to mobile phones: 79%
- Percent of households with access to landline phones: 78%
- Percent of households with no access to telecommunications: 2%
- Percent of households with internet access 69%

The main access problems throughout the Group are:

- Spatial areas (pockets) without coverage: See TA sections for more detail
- Demographic groups without access: Elderly and some – especially to smartphones. See TA-specific groups for more detail.

Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.

5.1.2 Budget and costs

Budget for Waikato CDEM Group

\$40,000 start-up

\$84,000 annual = \$60,000 direct costs (licenses, enhancements, support, maintenance, testing) + 0.3 FTE dedicated to group-wide warning system planning, implementation, testing and coordination.)

System costs

Modifications from the options tool default have been made for all TAs as follows:

Telephone auto-diallers are calculated at a cost of \$200/1000 people, with an additional 0.1 FTE cost per 100,000 people at TA level to populate and maintain a contact database.

For SMS-PP service – \$740 start-up, and then \$540 annual subscription cost for the Group. The SMS-PP cost is \$0.13 cost per SMS message. We have calculated TA and Group costings at one message per year being distributed across the whole population.

5.1.3 Pockets and groups

Pockets and groups are analysed in detail in the TA sections below. Pockets are populations that do not necessarily have similar characteristics but are located within a defined geographic area and share a special requirement with regards to alerting. Groups are a number of people within a community with a shared requirement for special consideration with regards to receiving, understanding and acting on alerts (e.g., hearing impaired people or non-English speakers). Groups such as those described are sometimes referred to as “vulnerable populations” in CDEM literature. Groups may be dispersed among a community or within a geographic ‘pocket’.

Group-wide coordination of TA-implemented options to reach pockets and groups is probably the most effective strategy. It should be noted that new subdivisions don’t necessarily have landline telephone infrastructure as residents opt for mobile phone and/or fibre only internet connections.

People in at-risk areas in transit, particularly on State Highways, were of concern for many TAs. There are several ways they could be targeted for alerts during emergencies. A message can be delivered via a mobile app if mobile phone coverage is available in the transit location and drivers are able to monitor their mobile phones. A regional relationship should be developed and coordinated with NZTA to allow for the ready use of electronic billboards on the State Highway networks. An agreement or MOU should be developed at Group level, acknowledging that requests for use of these electronic billboards could come from TAs or the Group depending on the emergency. These systems are limited in message length but are easily updated. People in transit typically have access to radio networks. If they are actively listening to the radio they will receive any emergency alerts delivered via radio.

5.1.4 Effectiveness scores and multipliers

Table 3 shows the effectiveness scores and estimated costs for all systems, if they were to be applied across the entire Waikato Group population. Important considerations for this table include:

- The results are budget and resource independent; i.e., the results assume no constraint on staff numbers or budget.
- Therefore options that might require very high personnel numbers (e.g., door to door route alert) are not deemed less effective.
- **Blue** text indicates systems where start up and annual costs are within the budget of the applicable area.
- This table provides an indication of which systems are most appropriate to be funded and implemented at the Group level.

No multipliers were changed for the region as a whole. Options that may not be highly effective when implemented at a TA-wide or Group-wide scale may still be highly effective for small pockets. Especially – self-maintaining networks, route alert, mobile-PA, SMS and VOIP auto-diallers. HF Radio is expensive if implemented for each individual or household but may be cost effective to implement for groups who have a single point of HF radio contact that then can trigger a communication process such as a phone tree or route alert.

5.1.5 Recommendations for Waikato CDEM Group

- Engage with the national CAP and mobile alerting app development processes and ensure that Waikato CDEM Group needs are included at the earliest reasonable stage, expected to be within the 2015/16 financial year.
- Liaise with the Waikato Local Authorities to support them to use the national public mobile alerting app(s). Represent the Group's interests as these options evolve and develop over time.
- Investigate options to reach pockets and groups not covered by mobile apps. These will depend on the cost structure between the Group and Local Authorities and the total number of people each Local Authority needs to reach. VOIP-based autodialer systems for landlines should be investigated as the first priority. Then further fall-back systems as needed as persistent gaps in both mobile and land-line coverage are identified (Sections 6.2 and 6.3).
- Liaise with independent self-maintaining networks and large institutions with people in their care that span more than one TA to facilitate alerting agreements into these networks for the region.
- Develop and maintain (or support consistency across TAs at least for) a database structure that Local Authorities can use to store and access auto-dialler, phone tree and self-maintaining network contact lists and details. Ideally the functionality of the database of phone numbers and emails addresses would allow the public to register their details through a web interface and would include a regular (six-monthly or annual) email or SMS-PP text reminder to check and update phone numbers. The database would then be used to generate distribution lists for alerts based on geographic location.

Table 3 Relative effectiveness scores for selected alerting options, with indicative costs if implemented across the Waikato CDEM Group.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		120k		290k		410k		Blue text indicates systems where start up and annual costs are within the budget of the applicable area
When 70% of population targeted:		84k		203k		287k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	85%	16	16	39	39	55	55	
Mobile device broadcasting (1)	84%	10,337	337	10,814	814	21,150	1,150	Cheaper with national implementation
Tone-activated alert radio (1)	82%	6,007	7	14,516	16	20,523	23	Cheaper with national implementation
Fixed PA loud-speakers	68%	10,279	679	6,222	422	16,501	1,101	Maintenance, telemetry and testing
That can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	3	3	8	8	11	11	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	74%	1203	1	298	2	1501	2	# vehicles & staff; time required, GOOD FOR POCKETS ONLY
Route alert (door-to-door)	71%	6,720	6,720	16,240	16,240	22,960	22,960	# staff available and time to walk/drive, Slow to reach 70%
Moderate effectiveness:								
Power mains messaging	66%	2,401	1	5,802	2	8,202	2	Heads up only – slow response
Natural warnings	66%	353	353	853	853	1205	1205	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	270	270	652	652	921	921	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	3,042	42	7,352	102	10,394	144	Reaches only houses/buildings
Telephone auto-dialler	64%	24	24	57	57	80	80	Slow to reach 70% GOOD FOR POCKETS
Helicopter PA loudspeaker	64%	226	673	138	22	364	695	Slow to reach 70% due to # aircraft
SMS-PP text messaging	63%	23	18	48	43	70	60	Slow to reach 70% GOOD FOR POCKETS
Pagers	62%	319	132	771	318	1,090	450	Slow to reach 70%, phasing out
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cheaper than PA, but slow response
Radio Data Systems (1)	52%	3,042	42	7,352	102	10,394	144	No heads up, slow to reach 70%
Call-in telephone line	47%	1,750	1,730	4,202	4,182	5,952	5,912	Very slow to reach 70%
Sirens (signal-only) - Fixed	44%	14,246	706	8,851	487	23,097	1,193	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	3	3	8	8	11	11	GOOD BACKUP
Website banners	66%	603	3	1458	8	2061	11	
Independent self-maint networks	66%	18	18	43	43	60	60	GOOD FOR POCKETS
Mobile PA loud speaker (Police/Fire)	66%	3	3	8	8	11	11	# vehicles & staff; time required GOOD FOR POCKETS
E-mails	59%	33	18	58	43	90	60	
Newspaper content	58%	1	1	2	2	2	2	
GPS receiver messaging (1)	57%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented
Websites	56%	612	12	1478	28	2090	40	
Marine radio	53%	3	3	8	8	11	11	
Tourist/lwi radio	49%	3	3	8	8	11	11	
Billboards - static	47%	375	135	228	83	603	218	
Billboards - electronic telemetered	45%	1	1	2	2	2	2	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.2 HAMILTON CITY

5.2.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.1

Hamilton has had a relatively low frequency and severity of impacts from hazards in the past which may relate to a relatively low profile for CDEM and public alerting. Population is estimated at ~150,000 individual residents as at 2015 with densities in excess of 3,000 people per km² in some areas, although densities can be relatively low in some of the urban fringe. The population turnover is relatively high; as at 2013 43% of residents in Hamilton City had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions.

Significant hazards identified were potential dam failures events on the Waikato River (short-time frame for warnings), human pandemic, and industrial or transported hazchem incidents within or under (rail network) the city. Hamilton has also experienced locally damaging tornadoes and can be affected by extreme weather events. Short time frame localised hazards are important. Longer time frame localised and widespread hazards are also relevant.

Several independent self-maintained networks were noted although the strength of those relationships is uncertain. The following established networks are noted but not currently utilised by Hamilton CDEM:

1. CBD Association
2. Neighbourhood Support
3. Local Welfare Committee
4. Rotary
5. Lions
6. Amateur Radio Emergency Communications (AREC)
7. Māori Wardens

Existing systems primarily focus on using media releases, social media and websites via Hamilton City Council. The low rate of past alerts means that there has been little testing of arrangements. Hamilton City Council currently has no budget allocated towards warning systems.

The following public alerting systems are already in use or available for use In Hamilton City:

- Media releases via radio, and potentially TV
 - Local radio stations are available in Hamilton to use.
- Social media platforms (via HCC and Hamilton NZ Facebook (>20,000 likes combined) and HCC twitter (>2,000 followers) – managed and monitored using HootSuite).
- Over 20 websites, including HCC
 - Ability to activate dedicated CDEM website in place of HCC website.
- The GECC has one mobile PA/siren available, however with very limited reach.
- No rural fire but some volunteer networks.
- Council email subscription service, used for all types of message.
- Consider NZTA fixed digital signs on highways.

There are no significant issues with telecommunications access in Hamilton City.

5.2.2 Budget

Start-up \$0

On-going \$0

5.2.3 Pockets and Groups that need specific alerting

Large employers, tertiary education and large event facilities were identified as institutions with significant populations in their care that needed consideration. Several pockets are detailed in Appendix A1.1 either for their high proportion of elderly, large daily migration, cultural diversity or poorer access to telecommunications. Generally mobile coverage across Hamilton is good. Three groups that were identified for special consideration across the district are non-Europeans (Hamilton is very culturally diverse), transients (tourists and those on the highways) and new residents (high migration). Many pockets and groups could, in theory, be reached via independent self-maintained networks. The highways could be reached via NZTA fixed electronic signs.

5.2.4 Effectiveness scores

No multipliers were changed for Hamilton. Table 4 provides start-up and on-going annual cost indications for the selected alerting options for this TA.

5.2.5 Recommendations for Hamilton City

5.2.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Hamilton CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements could be coordinated through the region or at a TA level. This needs to be discussed between the TAs and Group office.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.2.5.2 Locally implemented systems

- Large employers and public meeting places e.g., shopping malls (institutions) should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts for use in Hamilton City.
- Alerting to people in the care of institutions (e.g., rest homes) should be arranged at a TA level.
- Connections should be made with local self-maintained network groups described above to determine their capacity and willingness to assist with public alerting and whether they are local to Hamilton or part of a wider network.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties (e.g., emergency services) are valuable but these parties may have other priorities in an emergency.
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 4 Relative scores for selected alerting options, with indicative costs for Hamilton City.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		1.6k		140k		141.6k		
70% of population targeted:		1.1k		98k		99.1k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	0	0	18	18	18	18	
Mobile device broadcasting (1)	84%	10,004	4	10,393	393	20,397	397	Cheaper with national implementation
Tone-activated alert radio (1)	82%	120	0	7,006	6	7,127	7	Cheaper with national implementation
Fixed PA loud-speakers	68%	137	9	3,002	202	3,139	211	Maintenance, telemetry and testing
That can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	3	3	3	3	No heads up, slow to reach 70% # vehicles & staff; time required, GOOD FOR POCKETS ONLY
Mobile PA loud-speakers (2)	74%	16	0	143	1	159	1	
Route alert (door-to-door)	71%	73	73	6,370	6,370	6,443	6,443	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	66%	4	4	353	353	357	357	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	3	3	256	256	259	259	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	40	0	3,542	42	3,582	42	Reaches only houses/buildings
Telephone auto-dialler	64%	0	0	26	26	26	26	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	63%	5	0	24	19	29	19	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Call-in telephone line	47%	43	23	2,039	2,019	2,082	2,042	Very slow to reach 70%
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	0	0	3	3	3	3	GOOD BACKUP
Website banners	66%	8	0	703	3	711	3	
Independent self-maint networks	66%	0	0	18	18	18	18	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	0	0	3	3	3	3	# vehicles & staff; time required GOOD FOR POCKETS
E-mails	59%	15	0	32	17	47	17	
Newspaper content	58%	0	0	1	1	1	1	
GPS receiver messaging (1)	57%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented
Websites	56%	8	0	713	13	721	13	
Tourist/lwi radio	49%	0	0	3	3	3	3	
Billboards - electronic telemetered	45%	0	0	1	1	1	1	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.3 HAURAKI DISTRICT

5.3.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.2

Hauraki District has a population of approximately 17,800 residents. There is a history of flooding in Hauraki and stopbank protection is now in place in many previously flooded areas. A failure or overtopping of the stopbanks was considered to be potentially catastrophic. Other hazards of significance in the district include: coastal erosion, storm surge, tsunami, ashfall (distant source), earthquake (Kerepehi Fault), rural fire, geothermal, animal epidemics and lifeline utility failure or hazchem incidents. All traffic to the Coromandel Peninsula passes through the District, as well as all traffic travelling between Auckland and the Northern Bay of Plenty.

Hauraki District Council has a strong ward system providing “grass roots” linkages from the community to the council. Hauraki also maintains a contact database of independent self-maintained networks that could potentially be contacted for alerting support purposes in an CDEM activation. However, no formal arrangements are in place to utilise any of these groups to support alerting. There are too many stakeholders to list but can be grouped as:

- Councillors and Council Staff
- Returned Services Association
- Emergency Services
- Bands
- Schools
- Community Groups
- Services
- Churches
- MP's

Hauraki identified that they currently use or could use the following alerting systems:

- Media Releases (Radio, less likely TV)
 - Iwi radio (Nga Iwi)
- Hauraki DC Website
- Hauraki DC Facebook (470 likes)
- Thames Valley C.D. Twitter (863 followers)
- Fire service Mobile PA (Whiritoa)
- Actively promote natural warnings
- Phone tree in Kaiaua – calls landlines and mobile phones
 - Currently testing as only established one year ago
- Route alert (door knocking) for storm surge events (council staff and rural fire)
- Emergency services PA
- Regional council flood SMS-PP and email system for flood alerts
- Mass text system is used for rural school buses and could potentially be used for alerts with agreements with provider
- E-text full school database (possible)
- Possibly an arrangement could be made with Newmont Gold to utilise tone-alert radio systems in place in Waihi during emergency events

Hauraki generally has good telecommunications access although network coverage is patchy in some areas such as the Karangahake Gorge. It was estimated that approximately 10% of the District's population experienced poor mobile phone coverage.

5.3.2 Budget

Start-up	\$0
On-going	\$ 0

Staff time is provided mainly through the Thames Valley Zone arrangements for CDEM which combines effort for some activities for the following three districts Hauraki, TCDC and Matamata-Piako.

5.3.3 Pockets and groups that need specific alerting

Institutions with people in their care identified in Hauraki include industrial sites, large employers, special schools and retirement homes. Geographic pockets requiring special consideration include coastal tourist areas (e.g., Whiritoa), the higher proportion of elderly residents in Kaioua, large festivals and events, and people travelling in, or visiting, the Karangahake Gorge.

5.3.4 Effectiveness scores and multipliers

Table 5 provides start-up and on-going annual cost indications for the selected alerting options for this TA. No multipliers were changed for Hauraki.

5.3.5 Recommendations for Hauraki District

5.3.5.1 Regionally coordinated systems:

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Hauraki CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.3.5.2 Locally implemented systems

- Natural warnings for tsunami are important and affordable in terms of education for both residents and tourists if targeted at coastal locations and key institutions and tourism providers.
- Alerting to people in the care of institutions should be arranged at a TA level.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 5 Relative scores for selected alerting options, with indicative costs for Hauraki District.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		8.3k		9.5k		17.8k		
70% of population targeted:		5.8k		6.7k		12.5k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	1	1	1	1	2	2	
Mobile device broadcasting (1)	84%	10,023	23	10,027	27	20,050	50	Cheaper with national implementation
Tone-activated alert radio (1)	82%	415	0	475	0	891	1	Cheaper with national implementation
Fixed PA loud-speakers	68%	711	47	204	14	915	61	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	0	0	0	0	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	74%	83	0	10	0	93	0	# vehicles & staff; time required, GOOD FOR POCKETS
Route alert (door-to-door)	71%	378	378	432	432	810	810	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	66%	21	21	24	24	45	45	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	15	15	17	17	33	33	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	210	2	240	3	450	5	Reaches only houses/buildings
Telephone auto-dialler	64%	2	2	2	2	3	3	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	63%	6	1	6	1	12	2	Slow to reach 70% GOOD FOR POCKETS
Pagers (triggering 200 people)	62%	22	9	25	10	47	20	Slow to reach 70%, phasing out
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	0	0	0	0	0	0	Cheaper than PA, but slow response
Call-in telephone line	47%	140	120	157	137	297	257	Very slow to reach 70%
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	<1	<1	<1	<1	<1	<1	GOOD BACKUP
Website banners	66%	42	0	48	0	89	0	
Independent self-maint networks	66%	1	1	1	1	2	2	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	0	0	0	0	0	0	# vehicles & staff; time required
E-mails	59%	16	1	16	1	32	2	
Newspaper content	58%	0	0	0	0	0	0	
GPS receiver messaging (1)	57%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented,
Websites	56%	42	1	48	1	91	2	
Tourist/lwi radio	49%	0	0	0	0	0	0	
Billboards - static	47%	26	9	7	3	33	12	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally one of the options above should also reach at least 70% of people in every location.

5.4 MATAMATA-PIAKO DISTRICT

5.4.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.3

Matamata-Piako District has a population of approximately 31,500 residents. There are a number of hazardous chemical (Hazchem) and large industrial sites to consider alongside the hazards of flooding, strong winds (the 'Kaimai Buster'), ashfall (distant source), geothermal, earthquakes and animal epidemics. State Highways run through the district and people in transit on these routes should be considered.

Some independent self-maintained networks were identified by MPDC as potential opportunities for public alerting including the Lions, Rotary, Te Mana Whenua and the Rural Support Trust. There are many more that MPDC could potentially engage with but these have not been identified to date.

The workshop highlighted that MPDC is interested in nationally consistent alerting. The following options were highlighted in terms of existing public alerting systems in use or available for use:

- Media Releases (Radio, less likely TV)
 - EMO mostly release info to main networks
 - Community radio stations are operating in the area
- MPDC Website
- Thames Valley CD Website
- MPDC Facebook (1,866 likes)
- Thames Valley C.D. Twitter (863 followers)
- Email subscription service "email updates" >1000 people subscribed
- Forwards emails from Metservice to businesses and Emergency Services
- Police email to text service for rural support network
- Text subscription service "Civil Defence Alerts" via MPDC website
- Emergency Services PA (audibility not strong)
- There is a fixed siren that goes at 8, 12, 1 and 5 in Te Aroha. Ex-factory clock, has been misinterpreted as civil defence alarm.
- Regional council flood alerts SMS-PP and email to stakeholders
- Natural warnings, good understanding of flood hazard among locals
- Route alert – council staff
- Use flyers/brochures for emergency info

Telecommunications coverage and access was generally considered to be good across the District; however, Waharoa has very low (56%) telephone landline ownership and coverage is patchy around the Hobbiton tourist attraction.

5.4.2 Budget

Start-up \$0

On-going \$0

Staff time is provided mainly through the Thames Valley Zone arrangements for CDEM which combines effort for some activities for the following three districts: Hauraki, TCDC and Matamata-Piako.

5.4.3 Pockets and groups that need specific alerting

“Institutions with people in their care” was identified as a special alerting requirement in MPDC. This includes being able to reach many workers on industrial sites who may not have access to telecommunications during work hours, and visitors and transients at large events or tourist locations (e.g., Hobbiton). This category also includes those in rest homes and schools. Although there are proportionally higher numbers of elderly than the national average in some locations throughout the District, hearing or mobility impairments were not considered to require special consideration.

5.4.4 Effectiveness scores and multipliers

Table 6 provides start-up and on-going annual cost indications for the selected alerting options for this TA. The MPDC analysis includes effectiveness score multiplier set high (x4) for people in an institution’s care.

Note that the following systems are somewhat better scoring with this multiplier set, but they do not move up whole categories (e.g., from moderate to high effectiveness): Mobile device broadcasting, Tone-activated alert radio, Radio announcements (especially effective if this is on throughout the day in a given institution), Telephone trees, SMS-PP, independent self-maintained networks and websites. These all score better because they are either options people within an institution are likely to be using, or they are a good way of contacting the institution itself (e.g., telephone trees and independent self-maintaining networks contacting a representative at an institution). Note that in specific cases institutions might be best contacted by any one of these mechanisms, depending on the way that institution operates.

5.4.5 Recommendations for Matamata-Piako DC

5.4.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Matamata-Piako CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.

- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.4.5.2 Locally implemented systems

- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Alerting to people in the care of institutions should be arranged at a TA level.
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.
- Large employers and public attractions e.g., Hobbiton (institutions) should be identified (see Appendix 1.3 for more information) and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.

Table 6 Relative scores for selected alerting options, with indicative costs for Matamata-Piako District.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		13.4k		18.1k		31.5k		
70% of population targeted:		9.4k		12.7k		22.1k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	80%	2	2	2	2	4	4	
Mobile device broadcasting (1)	84%	10,038	38	10,051	51	20,088	88	Cheaper with national implementation
Tone-activated alert radio (1)	84%	671	1	906	1	1,576	1	Cheaper with national implementation
Fixed PA loud-speakers	65%	1,148	76	388	26	1,536	102	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	0	0	1	1	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	75%	134	0	19	0	153	0	# vehicles & staff; time required, GOOD FOR POCKETS
Route alert (door-to-door)	75%	610	610	824	824	1,433	1,433	# staff available and time to walk/drive
Moderate effectiveness:								
Power mains messaging	68%	268	0	362	0	630	0	Heads up only – slow response
Natural warnings	63%	34	34	46	46	79	79	Only for a few hazards GOOD FOR COAST
Telephone trees	69%	24	24	33	33	58	58	Slow to reach 70%
Radio (UHF, VHF or HF)	66%	339	4	458	5	797	9	Reaches only houses/buildings
Telephone auto-dialler	66%	2	2	3	3	6	6	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	65%	7	2	7	2	14	4	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	54%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cheaper than PA, but slow response
Radio Data Systems (1)	51%	339	4	458	5	797	9	No heads up, slow to reach 70%
Call-in telephone line	51%	213	193	281	261	494	454	Very slow to reach 70%
Sirens (signal-only) - Fixed	42%	1,588	78	549	29	2,137	108	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	69%	0	0	0	0	1	1	GOOD BACKUP
Website banners	68%	67	0	91	0	158	1	
Independent self-maint networks	70%	2	2	2	2	4	4	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	68%	0	0	0	0	1	1	# vehicles & staff; time required
E-mails	64%	17	2	17	2	34	4	
Newspaper content	58%	0	0	0	0	0	0	
GPS receiver messaging (1)	55%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented,
Websites	58%	68	1	92	2	160	3	
Billboards - electronic telemetered	42%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.5 OTOROHANGA DISTRICT

5.5.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.4

Otorohanga District has a population of just over 9,000 residents. The population turnover is relatively high; as at 2013 over 40% of residents in Otorohanga District had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions.

The district is for the most part land-locked but has a small coastal boundary in the west which could experience tsunami hazard or coastal erosion. Localised flooding is the most prevalent hazard. Most hazard events are relatively slow onset. Following the flooding in 1958 there were new stopbanks built which have greatly reduced the risk in the area. SH3 is a key transport link to New Plymouth (with no alternative route from the north) and to the lower North Island; the Rail network has a similar vulnerability.

No specific independent self-maintained networks were identified. A public education programme was run last year where all urban and rural homes got a get ready get through booklet delivered. All areas in Otorohanga were covered.

The following public alerting options are currently in use or available for use:

- Media Releases (Radio, less likely TV)
- Council Websites
- Otorohanga DC RSS (News) Feed
- Phone trees for most areas are in the development phase.
- Kawhia say they will use the fire service siren for tsunami alerts – all marshals head to police station
- Given this is a regional to distant source tsunami situation only, this may suffice to alert responders but is not consistent with the national siren standard and does not provide instruction to the public
- Radio signal must run out to Rangitoto Range and then on to Kawhia to make sure the signal reaches Kawhia.
- Also in the process of identifying areas where VHF radio connections can be put in, but there is poor radio coverage in some areas so considering HF as a better option.
- The Regional Council flood alerting system (SMS and email) works well for residents in flood prone areas.

Telecommunications coverage and access is reasonable across the district with some isolated areas (e.g., eastern and western hill country) of patchy coverage.

5.5.2 Budget

Start-up \$0

On-going \$0

One CDEM professional FTE is shared across Waipa, Otorohanga and Waitomo districts.

5.5.3 Pockets and groups that need specific alerting

Kawhia/Aotea has a high proportion of elderly, many transients, is culturally diverse, hosts large events, has patchy mobile coverage and is prone to being isolated. There is one high school and several rest homes in the District. Transients on highways and the high proportion of new residents are two groups that may need specific alerting.

5.5.4 Effectiveness scores and multipliers

Table 7 provides start-up and on-going annual cost indications for the selected alerting options for this TA. No multipliers were applied to Otorohanga.

5.5.5 Recommendations for Otorohanga DC

5.5.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Otorohanga CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.
- Existing phone trees could be triggered by a regionally-coordinated auto-dialler.

5.5.5.2 Locally implemented systems

- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Alerting to people in the care of institutions should be arranged at a TA level
- Iwi radio should be considered as an additional method to reach the high Māori population in the west of the district
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.

- Large employers (institutions) should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Existing HF/VHF should be aligned within a new regional VHF framework, as the HF systems is being phased out
- Consistent with the Waikato CDEM Group (2014) Warning Systems Strategy section 1.3.1, all PAs/sirens should comply with the national tsunami siren standard (MCDEM, 2014).
 - Existing sirens should use a consistent tone (i.e., all sirens should sound the same across the district, preferably using the nationally recommended tone for best audibility);
 - Existing tone-only sirens should be promoted as meaning 'seek further information';
 - New sirens, if desired, should be voice capable (i.e., PAs).
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 7 Relative scores for selected alerting options, with indicative costs for Otorohanga District.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		6.3k		2.8k		9.1k		
70% of population targeted:		4.4k		2.0k		6.4k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
SYSTEMS...		\$k	\$k	\$k	\$k	\$k	\$k	
With Rapid Widespread Coverage:								
Mobile device apps	83%	1	1	0	0	1	1	
Mobile device broadcasting (1)	84%	10,018	18	10,008	8	20,026	26	Cheaper with national implementation
Tone-activated alert radio (1)	82%	315	0	140	0	455	0	Cheaper with national implementation
Fixed PA loud-speakers	68%	540	36	60	4	600	40	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	0	0	0	0	No heads up, slow to reach 70%
Route alert (door-to-door)	71%	287	287	127	127	414	414	# staff available and time to walk/drive
Moderate effectiveness:								
<i>Natural warnings</i>	66%	16	16	7	7	23	23	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	12	12	5	5	17	17	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	159	2	71	1	230	3	Reaches only houses/buildings
Telephone auto-dialler	64%	1	1	1	1	2	2	Slow to reach 70% GOOD FOR POCKETS
Helicopter PA loudspeaker	64%	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Slow to reach 70% due to # aircraft
SMS-PP text messaging	63%	6	1	5	0	11	1	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	0	0	0	0	0	0	Cheaper than PA, but slow response
Radio Data Systems (1)	52%	159	2	71	1	230	3	No heads up, slow to reach 70%
Call-in telephone line	47%	111	91	60	40	171	131	Very slow to reach 70%
Sirens (signal-only) - Fixed	44%	747	37	85	5	831	41	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	0	0	0	0	0	0	GOOD BACKUP
Website banners	66%	32	0	14	0	46	0	
Independent self-maint networks	66%	1	1	0	0	1	1	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	0	0	0	0	0	0	# vehicles & staff; time required
Newspaper content	58%	0	0	0	0	0	0	
GPS receiver messaging (1)	57%					0	0	Not internationally implemented,
Websites	56%	32	1	14	0	46	1	
Marine radio	53%	0	0	0	0	0	0	
Tourist/Iwi radio	49%	0	0	0	0	0	0	
Billboards - static	47%	20	7	4	1	24	8	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.6 SOUTH WAIKATO DISTRICT

5.6.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.5

SWDC has a population of just over 22,000 residents. The district is land-locked with no coastal hazards to consider. Hazards of most importance include hazchem incidents, ashfall (distant source), rural fire and biological hazards such as human or animal pandemic. State Highway 1 runs through the district and lifelines failures were also noted as being a potential hazard.

Institutions with people in their care that were noted were:

- Lichfield Dairy Factory
- Kinleith Pulp and Paper Mill
- Forestry Companies
- Waratah NZ
- Schools and some camps along the Waikato River

Community groups (independent self-maintained networks) including neighbourhood watch were identified as potentially being useful to deliver public alerts but no arrangements are currently in place.

The following public alerting systems are in use or potentially available for use:

- Media Releases (Radio, less likely TV)
- Radio Raukawa, Cruise, Classic Hits, Pacific Island Radio could all be used
- South Waikato DC Website
- Facebook
 - South Waikato DC (1,166 likes)
 - Dedicated CDEM (196 likes)
 - Tokoroa News (3,358likes) administered independently of council
- South Waikato DC Twitter (172 followers)
- Sirens
 - Dedicated CDEM Siren (Council Building, Tokoroa)
 - Fire siren could be used in theory but it is confusing
- Three mobile PA systems – Emergency Services or Council?
- Contractors for road blocks/warnings
- Have access to mobile electronic billboards – NZTA or Council?
- Community groups (self-maintained) including neighbourhood watch

Telecommunications access and coverage within the district is reasonable although Tokoroa Central and Stanley Park have relatively low access (excluding mobile phones). Areas with poor mobile coverage are mostly rural farmland, exotic forestry or conservation estate to the east, west and south of the district. Most of these areas have a relatively low density population although the Waikato River Trails are increasing in popularity with transients and has patchy to no coverage in places. There is a low likelihood of flash flooding in some of these areas.

5.6.2 Budget

Start-up \$0

On-going \$0

0.5 FTE is currently assigned for all CDEM topics

5.6.3 Pockets and groups that need specific alerting

Several rest homes are located in the district and some rural and remote locations have limited mobile coverage but these factors were not considered significant for alerting purposes. Also some areas are culturally diverse (Māori/Pacific Peoples).

5.6.4 Effectiveness scores and multipliers

Table 8 provides start-up and on-going annual cost indications for the selected alerting options for this TA.

5.6.5 Recommendations for South Waikato DC

5.6.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by South Waikato CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.6.5.2 Locally implemented systems

- Alerting to people in the care of institutions should be arranged at a TA level.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.

- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.
- Large employers should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Consistent with the Group (2014) Warning Systems Strategy section 1.3.1, all PAs/sirens should comply with the national tsunami siren standard (MCDEM, 2014).
 - Existing sirens should use a consistent tone (i.e., all sirens should sound the same across the district, preferably using the nationally recommended tone for best audibility)
 - Existing tone-only sirens should be promoted as meaning 'seek further information'
 - New sirens, if desired, should be voice capable (i.e., PAs).
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 8 Relative scores for selected alerting options, with indicative costs for South Waikato District.

	Score	For Low Density Areas		For High Density Areas		Total	Limitations and notes	
Total Population:		5.4k		16.7k		22.1k		
70% of population targeted:		3.8k		11.7k		15.5k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	1	1	2	2	3	3	
Mobile device broadcasting (1)	84%	10,015	15	10,047	47	20,062	62	Cheaper with national implementation
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	0	0	1	1	No heads up, slow to reach 70%
Route alert (door-to-door)	71%	246	246	760	760	1,006	1,006	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	66%	14	14	42	42	56	56	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	10	10	31	31	40	40	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	137	2	422	5	559	7	Reaches only houses/buildings
Telephone auto-dialler	64%	1	1	3	3	4	4	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	63%	6	1	7	2	13	3	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	0	0	0	0	0	0	Cheaper than PA, but slow response
Radio Data Systems (1)	52%	137	2	422	5	559	7	No heads up, slow to reach 70%
Call-in telephone line	47%	98	78	261	241	359	319	Very slow to reach 70%
Sirens (signal-only) - Fixed	44%	640	31	506	27	1,146	59	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	0	0	0	0	1	1	GOOD BACKUP
Website banners	66%	27	0	84	0	111	1	
Independent self-maint networks	66%	1	1	2	2	3	3	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	0	0	0	0	1	1	# vehicles & staff; time required
E-mails	59%	16	1	17	2	33	3	
Newspaper content	58%	0	0	0	0	0	0	
Websites	56%	28	1	85	2	113	2	
Tourist/Iwi radio	49%	0	0	0	0	1	1	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS
Billboards - electronic telemetered	45%	0	0	1	1	1	1	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.7 TAUPO DISTRICT

5.7.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.6

The population of Taupo District is approximately 32,400 residents although this number swells by the tens of thousands (mostly New Zealand) transients in the peak tourist season. Forty percent of homes in the district are holiday homes. The population turnover is relatively high; as at 2013 38% of residents in the Taupo District had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions.

The district has no exposure to coastal hazards but it is home to active and potentially reawakening volcanoes and calderas. Other hazards of significance include meteorological events, flooding, geophysical hazards (landslides and subsidence), earthquakes and geothermal activity.

Taupo District attempt to geo-target all alerts to applicable areas. They already utilise a wide variety of systems and have strong relationships with at-risk communities. There are strong networks with stakeholders. Transients (tourists and domestic holiday homes) are very significant in Taupo District. Targeting tourists and domestic holiday homes via radio is most important. There is a huge new electronic billboard at the Great Lake Centre in Taupo CBD that can be utilised for alerting.

Taupo District have identified a range of independent self-maintained networks that could be approached and the potential capacity and willingness for delivering alerts discussed. These include community service groups, transport operators networks, neighbourhood societies, Iwi networks and civil defence emergency management community volunteers.

The following public alerting options are in use or were identified as potentially available for use in Taupo District (note considerable detail on each of these systems is available in Appendix A.1.6):

- Natural warnings – actively promoted
- Websites (Taupo DC, Chamber of Commerce, Enterprise Great Lake Taupo)
- Email distribution lists
- Independent Self Maintained Networks
- Electronic Billboards
- Helicopter PA
- Mobile PAs
- Radio
- Taupo DC Facebook (1453 likes)
- Dedicated CDEM Facebook (682 likes)
- Dedicated CDEM Twitter (574 followers) – Used for alerts only
- Stakeholder text distribution lists
- Phone Trees
- Fax to schools
- Dedicated CDEM Siren (Waihi Village)
- Marine radio
- Direct links to DIA Harbourmaster

Taupo uses a wide range of existing systems and this requires careful coordination and documentation. There is the potential for Taupo DC to mentor other districts with some options or share their success stories.

Telecommunications access and coverage is generally high across most of the district's population. However there are large areas of poor or no mobile network coverage in some rural and forestry areas and conservation estate and along some highways. These areas have been listed in Appendix A1.6.

5.7.2 Budget

Start-up = \$0

On-going = \$0 some, especially FTEs and maintenance

5.7.3 Pockets and groups that need specific alerting

There are several large institutions with people in their care (prisons, large industries, hospital, event facilities and schools). It was not considered that these groups have specific alerting needs different to the general population. Also, a considerable concern is the large numbers of tourists visiting the district, with fewer links to local networks and less familiarity with local hazards. There are many locations popular with tourists and these sometimes coincide with limited mobile phone coverage.

5.7.4 Effectiveness scores and multipliers

Table 9 provides start-up and on-going annual cost indications for the selected alerting options for this TA when considering the usually resident population. Transients are identified as a special group requiring a multiplier for determining costs and effectiveness of systems for Taupo. Because the tourist influx is strongly seasonal Table 10 includes expected maximum tourist numbers.

Both tables include the multiplier set high (x4) for people in an institution's care, primarily due to the significance and size of events held in Taupo and the number of transients under the care of tourist operators. Note that the following systems are somewhat better scoring with this multiplier set, but they do not move up whole categories (e.g., from moderate to high effectiveness): Mobile device broadcasting, tone-activated alert radio, radio announcements (especially effective if this is on throughout the day in a given institution), Telephone trees, SMS-PP, independent self-maintained networks and websites. These all score better because they are either options people within an institution are likely to be using, or they are a good way of contacting the institution itself (e.g., telephone trees and independent self-maintaining networks contacting a rep at an institution). Note that in specific cases institutions might be best contacted by any one of these mechanisms, depending on the way that institution operates.

With maximum tourist numbers included (Table 10) and the multiplier also set high (x4) for transients, the systems that are better scoring change a little to include Mobile device broadcasting, Telephone trees, Helicopter PA loudspeakers, Mobile PA loudspeaker (Police/Fire) Websites and Tourist radio. This is because systems that will reach people irrespective of whether they opt in to a system score better.

5.7.5 Recommendations for Taupo DC

5.7.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Taupo CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.
- Alerting to people in the care of institutions should otherwise be arranged at a TA level.

5.7.5.2 Locally implemented systems

- Natural warnings for ashfall might be worth focussing on.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They have been used and should continue to be used for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Other districts may want to engage with Taupo to learn how they engage with neighbourhood support, Fleetlink (based on Trunked Mobile Radio technology that allows radios to talk to one another anywhere in the country where there is coverage) and NZTA for fixed digital billboards.
- Existing phone trees could be triggered by a Group-coordinated auto-dialler.
- Explore the link to the Harbourmaster, marine radio, and alerting boaties.
- Existing VHF should be aligned within a new Group VHF framework.

- GeoZone Apps that are designed to provide tourism information in up to four foreign languages to international tourists and then track and report on their movements have been trialled during Cyclone Pam. This suite of apps could potentially provide a low cost (but not official) additional method to reach travelling foreign language tourists in districts where tourism is significant such as Taupo.
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: “proving effective” means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 9 Relative scores for selected alerting options, with indicative costs for Taupo District usually resident population.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		8.0k		24.9k		32.9k		
70% of population targeted:		5.6k		17.4k		23.0k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	80%	1	1	3	3	4	4	
Mobile device broadcasting (1)	84%	10,022	22	10,070	70	20,092	92	Cheaper with national implementation
Tone-activated alert radio (1)	84%	400	0	1,246	1	1,647	2	Cheaper with national implementation
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	1	1	1	1	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	75%	80	0	25	0	106	0	# vehicles & staff; time required GOOD FOR POCKETS
Route alert (door-to-door)	75%	364	364	1,133	1,133	1,497	1,497	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	63%	20	20	63	63	83	83	Only for a few hazards GOOD FOR COAST
Telephone trees	69%	15	15	45	45	60	60	Slow to reach 70%
Radio (UHF, VHF or HF)	66%	202	2	630	7	832	10	Reaches only houses/buildings
Telephone auto-dialler	66%	1	1	5	5	6	6	Slow to reach 70% GOOD FOR POCKETS
Helicopter PA loudspeaker	62%	65	45	22	2	87	47	Slow to reach 70% due to # aircraft
SMS-PP text messaging	65%	6	1	8	3	14	4	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Call-in telephone line	51%	135	115	379	359	514	474	Very slow to reach 70%
That cannot reach 70% of the pop.: (3)								
Television announcements	69%	0	0	1	1	1	1	GOOD BACKUP
Independent self-maint networks	70%	1	1	3	3	4	4	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	68%	0	0	1	1	1	1	# vehicles & staff; time required
E-mails	64%	16	1	18	3	34	4	
Newspaper content	58%	0	0	0	0	0	0	
GPS receiver messaging (1)	55%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented,
Websites	58%	41	1	127	2	168	3	
Marine radio	49%	0	0	1	1	1	1	
Tourist/lwi radio	45%	0	0	1	1	1	1	
Billboards - electronic telemetered	42%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

Table 10 Relative scores for selected alerting options, with indicative costs for usually resident population and approx. maximum tourists. This is estimated as an increase of 50,000 in high density areas and 15,000 in low density areas (estimate sourced from Great Lake Taupo).

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		15k		50k		65k		
70% of population targeted:		10.5k		35k		45.5k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	82%	2	2	6	6	8	8	
Mobile device broadcasting (1)	83%	10,042	42	10,140	140	20,182	182	Cheaper with national implementation
Tone-activated alert radio(1)	77%	751	1	2,502	2	3,253	3	Cheaper with national implementation
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	77%	0	0	1	1	1	1	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	75%	150	0	51	0	201	0	# vehicles & staff; time required GOOD FOR POCKETS
Route alert (door-to-door)	75%	683	683	2,275	2,275	2,958	2,958	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	61%	38	38	126	126	164	164	Only for a few hazards GOOD FOR COAST
Telephone trees	64%	27	27	91	91	119	119	Slow to reach 70%
Radio (UHF, VHF or HF)	61%	379	4	1,265	15	1,644	19	Reaches only houses/buildings
Telephone auto-dialler	61%	3	3	9	9	12	12	Slow to reach 70% GOOD FOR POCKETS
Helicopter PA loudspeaker	63%	108	84	24	4	132	88	Slow to reach 70% due to # aircraft
SMS-PP text messaging	63%	7	2	12	7	19	9	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Call-in telephone line	48%	236	216	741	721	977	937	Very slow to reach 70%
That cannot reach 70% of the pop.:(3)								
Television announcements	66%	0	0	1	1	1	1	GOOD BACKUP
Independent self-maint networks	65%	2	2	6	6	8	8	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	69%	0	0	1	1	1	1	# vehicles & staff; time required
E-mails	59%	17	2	21	6	38	8	
Newspaper content	59%	0	0	0	0	0	0	
GPS receiver messaging (1)	51%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented,
Websites	57%	76	1	255	5	331	6	
Marine radio	46%	0	0	1	1	1	1	
Tourist/lwi radio	47%	0	0	1	1	1	1	
Billboards - electronic telemetered	42%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally one of the options above should also reach at least 70% of people in every location.

5.8 THAMES-COROMANDEL DISTRICT

5.8.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.7

Thames Coromandel District has a population of approximately 27,500 residents. It is a popular tourist destination for New Zealanders and overseas visitors with the population swelling by tens of thousands in the summer months. Thames-Coromandel has a complicated hazardscape and distributed population with diverse alerting challenges. Many of the homes on the Coromandel are holiday homes with absentee owners. The population turnover is relatively high; as at 2013 36% of residents in the Thames-Coromandel District had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions. Thames-Coromandel has a higher than average elderly population, particularly in townships.

Hazards that are life threatening, with a short lead-in time such as local and regional source tsunami and flash flooding are high priorities for alerting in Thames-Coromandel. Other significant hazards include severe weather, floods, storm surge and coastal erosion, landslides/debris flows, and earthquakes. With regards to non-natural hazards, lifeline infrastructure failure is a reasonably frequent occurrence, particularly disruption to the electricity supply. Outages in the electricity network can then cascade into problems with radio transmission from repeater stations, or for mobile phone towers. Isolation can be a problem for communities as roads can be cut off by landslides and flooding.

A range of independent, self-maintained networks have been identified as potentially able to be used to deliver alerts to the public. These include coastal organisations such as the Coastguard and surf lifesavers, neighbourhood support groups, service groups, religious organisations, schools networks, emergency response groups (e.g., land search and rescue) and Iwi organisations.

The following public alerting systems are in use or are available for potential use (note see Appendix A1.7 for detail):

- Radio stations (various)
- Websites (TCDC, Thames Valley CD)
- Facebook (TCDC, 2257 likes)
- Twitter (Thames Valley CD 863 followers)
- Email subscription service
- SMS-PP subscription
- Fixed tone only sirens (most owned by NZFS/VRFF, 27 of 30).
- Emergency services PA, only on rural fire trucks
- Regional flood warning system (SMS-PP and email)
- Route Alert (CDEM and council staff undertake limited area door-knocking)
- Natural warnings – public education materials (“Know the signs”)
- Use VHF and UHF – links to DOC
- Mobile PAs
- Rural fire

Thames-Coromandel District Council (TCDC) has access to a substantial range of existing systems, but these need alignment with the national standard, and expectations need to be clarified on how these systems are maintained and used.

Telecommunications access is reasonable across the district, with rates similar to the national average. However, mobile phone coverage is poor in most rural and conservation areas including places along SH25 and 25A, and also in most sparsely populated coastal areas, including some that are popular with transients such as Cathedral Cove.

5.8.2 Budget

Start-up = \$60k per annum for 3 years has been allocated for mobile PA systems

Ongoing = \$0

Staff time is provided mainly through the Thames Valley Zone arrangements for CDEM which covers combines effort for some activities for the following three districts Hauraki, TCDC and Matamata-Piako.

5.8.3 Pockets and groups that need specific alerting

Because of the significant elderly population, sight, hearing and mobility impairment are considered important factors for alerting in Thames-Coromandel. The large number of transients (particularly tourists) is also considered of particular importance for alerting. Many tourists choose to travel as 'Freedom Campers', staying away from official campsites. They are a concern as they are somewhat 'off the radar'.

There are some large employers and learning institutions in Thames-Coromandel but these are not considered to have special alerting needs.

5.8.4 Effectiveness scores and multipliers

Table 11 provides start-up and on-going annual cost indications for the selected alerting options for this TA. Table 12 includes expected maximum tourist numbers. Multipliers for fast onset, local and widespread hazards, and for elderly – mobility/sight/hearing impaired have been increased for both Tables. The multiplier for transients has also been increased in Table 12 to account for the changing costs and effectiveness of systems when tourists are present.

Table 11 Relative scores for selected alerting options, with indicative costs for Thames-Coromandel usually resident population.

	Score	For Low Density Areas		For High Density Areas		Total	Limitations and notes	
Total Population:		9.5k		16.8k		26.3k	Blue text indicates systems where start up and annual costs are within the budget of the applicable area	
70% of population targeted:		6.7k		11.8k		18.5k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	82%	1	1	2	2	3	3	
Mobile device broadcasting (1)	86%	10,027	27	10,047	47	20,074	74	Cheaper with national implementation
Tone-activated alert radio (1)	81%	475	0	841	1	1,316	1	Cheaper with national implementation
Fixed PA loud-speakers	69%	814	54	360	24	1,174	78	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	81%	0	0	0	0	1	1	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	72%	95	0	17	0	112	0	# vehicles & staff; time required GOOD FOR POCKETS
Route alert (door-to-door)	70%	432	432	764	764	1,197	1,197	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	62%	24	24	42	42	66	66	Only for a few hazards GOOD FOR COAST
Telephone trees	66%	17	17	31	31	48	48	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	240	3	425	5	665	8	Reaches only houses/buildings
Telephone auto-dialler	64%	2	2	3	3	5	5	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	61%	6	1	7	2	14	4	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	54%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cheaper than PA, but slow response
Radio Data Systems (1)	47%	240	3	425	5	665	8	No heads up, slow to reach 70%
Call-in telephone line	47%	157	137	262	242	419	379	Very slow to reach 70%
Sirens (signal-only) - Fixed	38%	1,126	55	509	27	1,635	83	Heads up only – slow response
That cannot reach 70% of the pop:(3)								
Television announcements	73%	0	0	0	0	1	1	GOOD BACKUP
Independent self-maint networks	62%	1	1	2	2	3	3	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	64%	0	0	0	0	1	1	# vehicles & staff; time required
E-mails	58%	16	1	17	2	33	3	
Newspaper content	56%	0	0	0	0	0	0	
GPS receiver messaging (1)	58%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Not internationally implemented,
Websites	54%	48	1	86	2	134	2	
Marine radio	49%	0	0	0	0	1	1	
Tourist/Iwi radio	45%	0	0	0	0	1	1	
Billboards - static	43%	30	11	13	5	43	15	
Billboards - electronic telemetered	42%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

Table 12 Relative scores for selected alerting options, with indicative costs for usually resident population and approx. maximum tourists during summer peak season, 140,000 people in high density areas and 10,000 in low density. (Source TCDC).

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population:		19.5k		156.8k		176.3k		Blue text indicates systems where start up and annual costs are within the budget of the applicable area
70% of population targeted:		13.7k		109.8k		121.5k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	2	2	20	20	23	23	
Mobile device broadcasting (1)	85%	10,055	55	10,440	440	20,494	494	Cheaper with national implementation
Tone-activated alert radio (1)	77%	976	1	7,847	7	8,823	8	Cheaper with national implementation
Fixed PA loud-speakers	70%	1,670	110	3,363	227	5,033	337	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	78%	0	0	4	4	4	4	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	72%	195	0	160	1	356	1	# vehicles & staff; time required GOOD FOR POCKETS
Route alert (door-to-door)	71%	887	887	7,134	7,134	8,022	8,022	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	60%	49	49	395	395	444	444	Only for a few hazards GOOD FOR COAST
Telephone trees	63%	36	36	286	286	322	322	Slow to reach 70%
Radio (UHF, VHF or HF)	61%	493	6	3,967	47	4,460	52	Reaches only houses/buildings
Telephone auto-dialler	61%	4	4	29	29	33	33	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	59%	8	3	26	21	34	24	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	52%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cheaper than PA, but slow response
Radio Data Systems (1)	45%	493	6	3,967	47	4,460	52	No heads up, slow to reach 70%
Call-in telephone line	45%	301	281	2,281	2,261	2,582	2,542	Very slow to reach 70%
Sirens (signal-only) - Fixed	37%	2,311	114	4,753	255	7,064	369	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	70%	0	0	4	4	4	4	GOOD BACKUP
Independent self-maint networks	59%	2	2	20	20	22	22	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	65%	0	0	4	4	4	4	# vehicles & staff; time required
E-mails	55%	17	2	34	19	51	21	
Newspaper content	56%	0	0	1	1	1	1	
GPS receiver messaging (1)	55%					0	0	Not internationally implemented,
Websites	53%	99	2	799	15	898	16	
Marine radio	47%	0	0	4	4	4	4	
Tourist/lwi radio	46%	0	0	4	4	4	4	
Billboards - static	42%	61	22	123	45	184	67	
Billboards - electronic telemetered	41%	0	0	1	1	1	1	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location

The following analysis of cost **for usual resident population** is possible for Thames-Coromandel District because they have provided a budget figure.

For rapid widespread coverage:

- Only the mobile device app is affordable to start up.
- All four effective systems are affordable to maintain, but the non-app options would need to be started up with an external (national) budget.

For options that can reach 70% of the population over time:

- Radio announcements are the most effective option that can be started up.
- In terms of moderate effectiveness scores, the following can be started up: Natural warnings, telephone trees, telephone auto-diallers, SMS-PP text messaging.
- Radio UHF/VHF/HF could be maintained, but is too expensive to start up.
- These are all slow to reach 70%, but all could be good for pockets or groups.

This includes multipliers set high (x4) for elderly aspects (hearing, mobility and sight impairment), and fast onset hazards. Note that the following systems are somewhat better scoring with these multipliers applied, but they do not move up whole categories (e.g., from moderate to high effectiveness): GPS receiver messaging, Mobile PA loudspeaker (Police/Fire), telephone auto diallers, radio (UHF/VHF/HF), telephone trees, and mobile device broadcasting. This is because of specific limitations to systems such as long activation or notification time, or systems being opt-in and requiring considerable database maintenance. However, for pockets and groups such systems can be more effective.

When allowing for **maximum tourists** the following changes to affordability occur:

- Only apps and tone-activated alert radio could be maintained.
- In terms of moderate effectiveness scores, the following can be established: telephone auto-diallers, SMS-PP text messaging.
- Natural warnings and telephone trees become unaffordable (due to staff time needed for education or database maintenance). We have no evidence to show that holiday home residents are frequent, repeat visitors so cannot assume they are as likely to receive education messages as permanent residents.

5.8.5 Recommendations for Thames-Coromandel District

5.8.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Thames Coromandel CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.

- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.8.5.2 Locally implemented systems

- Natural warnings for tsunami are important and affordable in terms of education for both residents and tourists if targeted at coastal locations and key institutions and tourism providers.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile options across the entire area. They should be considered for targeting specific pockets. The per unit cost basis for Taupo District should be considered as it is much cheaper than the current vendor for Thames-Coromandel. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Large employers/tourist operators should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Alerting to people in the care of institutions should be arranged at a TA level.
- Upgrade of Mediaworks repeaters.
- Existing VHF should be aligned within a new regional VHF framework
- Consistent with the Group (2014) Warning Systems Strategy section 1.3.1, all PAs/sirens should comply with the national tsunami siren standard (MCDEM, 2014).
 - Existing sirens should use a consistent tone (i.e., all sirens should sound the same across the district, preferable using the nationally recommended tone for best audibility)
 - Existing tone-only sirens should be promoted as meaning 'seek further information'
 - New sirens if desired should be voice capable (i.e., PAs).
- Pockets without mobile coverage generally have landlines, these should be prioritised for auto-dialler or telephone tree networks. This option is also recommended for those without smart phones.
- GeoZone Apps that are designed to provide tourism information in up to four foreign languages to international tourists and then track and report on their movements have been trialled during Cyclone Pam. This suite of apps could potentially provide a low cost (but not official) additional method to reach travelling foreign language tourists in districts where tourism is significant such as Thames-Coromandel

- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: “proving effective” means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

5.9 WAIKATO DISTRICT

5.9.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.8

Waikato District has a population of 63,300 residents. The population turnover is relatively high; as at 2013 41% of residents in Waikato District had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions. The district is exposed to a wide range of natural and non-natural hazards. The district is exposed to tsunami, flooding, earthquake, ashfall (distant source) and storm hazards. Some coastal communities have the potential to be isolated. Non-natural hazards in the district include potential dam failure (Karapiro), mine fires or collapse of mines or industrial incidents at Huntly power station.

Waikato District Council has a different boundary to the DHB and Emergency Services boundaries. In the northern end of the district, the Emergency Services are from Auckland. The population also affiliates toward Auckland rather than considering itself part of Waikato. It is a significant travelling distance from Ngaruawahia to the northern towns.

Independent self-maintained networks have been used successfully in previous hazard events (e.g., surf lifesaving for tsunami alert in 2004). Tsunami warning and evacuation has been discussed with communities. There has been positive community stakeholders discussion about the “Blue-line” initiative (Wellington) being adopted in Raglan. The Raglan fire siren is generally not regarded as a good option for public alerting for tsunami.

Waikato District has lots of pockets, some with poor mobile coverage and relatively low access to telecommunications. The elderly are a group that needs special consideration. Culturally diverse pockets are significant. Lifelines are critical in Waikato District as they all feed into and out of Auckland.

The following public alerting systems are in use or available for use:

- Media Releases (Radio, less likely TV)
 - Utilise local radio stations, Radio Tainui, Raglan Radio
- Websites: Waikato DC
- Facebook:
 - Waikato DC (1,566 likes)
 - Port Waikato, Meremere, Te Kauwhata community sites
- Independent self-maintained networks
- Fire serviceman all have pagers for alerts

- Sirens – tone only
 - NZFS/VRFF Raglan siren – has never been used for a non-fire alert and – causes stress and confusion to tourists
 - Port Waikato has a siren
 - Ngaruawahia has a siren
- Public Education needed around the use of sirens
- Port Waikato considered a flag system but rejected it
- Self-maintained networks – surf lifesaving clubs (Raglan has been used it worked well in 2004)
- Fonterra has a text message network with suppliers – could be used with agreement.
- No email subscription service from council but various email lists for different community and stakeholder groups could be used

In Waikato DC there was strong recognition of the importance of public education for all systems – suggestions include fridge magnets, laminated sheets, facebook, and radio. The local Emergency Services have expressed interest in using the (Auckland) CDEM app.

Telecommunications access is good throughout Port Waikato but coverage for mobile phones is limited or non-existent in some locations including Port Waikato, Miranda, Glen Murray, Pukemiro, Waikaretu, Glen Afton, Raglan – Whale Bay, and Mangatangi.

5.9.2 Budget

Start-up	\$0
On-going	\$0

5.9.3 Pockets and groups that need specific alerting

In Waikato DC there are many examples of institutions with people in their care, including campgrounds and school camps, large industrial employers, large public events, Turangawaewae Marae, and several rest homes. However, because they are not located in areas subject to short-lead in time hazards, it was agreed that these groups did not have specific alerting needs different to that of the general public. Transients are significant along the highways year round and also visitors to Raglan in the summer season.

5.9.4 Effectiveness scores and multipliers

Table 13 provides start-up and on-going annual cost indications for the selected alerting options for this TA. No multipliers were applied for Waikato DC.

5.9.5 Recommendations for Waikato District

5.9.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Waikato District CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.

- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.

5.9.5.2 Locally implemented systems

- Alerting to people in the care of institutions should be arranged at a TA level.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an event.
- Existing phone trees could be triggered by a regionally-coordinated auto-dialler.
- Many camp operators and other institutions (e.g., rest homes) have been identified by workshop attendees. These organisations should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Consistent with the GROUP (2014) Warning Systems Strategy section 1.3.1, all PAs/sirens should comply with the national tsunami siren standard (MCDEM, 2014).
 - Existing sirens should use a consistent tone (i.e., all sirens should sound the same across the district, preferable using the nationally recommended tone for best audibility)
 - Existing tone-only sirens should be promoted as meaning 'seek further information'
 - New sirens if desired should be voice capable (i.e., PAs).
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 13 Relative scores for selected alerting options, with indicative costs for Waikato District.

	Score	For Low Density Areas		For High Density Areas		Total	Limitations and notes	
Total Population:		40.8k		22.5k		63.3k		
Minimum desired reach (%)		80%		70%		(mixed %)		
Population budgeted for:		32.6k	15.8k	48.4k		Start-up costs	Annual costs	
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	6	6	3	3	9	9	
Mobile device broadcasting (1)	84%	10,131	131	10,063	63	20194	194	Cheaper with national implementation
Tone-activated alert radio (1)	82%	2,042	2	1,126	1	3168	3	Cheaper with national implementation
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	1	1	1	1	2	2	No heads up, slow to reach 70%
Route alert (door-to-door)	71%	2,122	2,122	1,024	1,024	3146	3146	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	66%	118	118	57	57	175	175	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	85	85	41	41	126	126	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	1,034	14	569	7	1603	21	Reaches only houses/buildings
Telephone auto-dialler	64%	9	9	4	4	13	13	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	63%	11	6	8	3	19	9	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	Unknown	Unknown	Unknown	Unknown	Unknown	Unknown	Cheaper than PA, but slow response
Call-in telephone line	47%	692	672	344	324	1036	996	Very slow to reach 70%
Sirens (signal-only) - Fixed	44%	4,873	272	682	37	5555	309	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	1	1	1	1	2	2	GOOD BACKUP
Independent self-maint networks	66%	6	6	3	3	9	9	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	1	1	1	1	2	2	# vehicles & staff; time required
E-mails	59%	21	6	18	3	39	9	
Newspaper content	58%	0	0	0	0	0	0	
Websites	56%	208	4	115	2	323	6	
Tourist/Iwi radio	49%	1	1	1	1	2	2	
Billboards - static	47%	134	52	18	6	152	58	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.10 WAIPA DISTRICT

5.10.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.9

Waipa District has a population of approximately 46,700 residents. The population turnover is relatively high; as at 2013 37% of residents in the Waipa District had moved into the district in the last five years. This creates challenges for education regarding hazards, and for familiarity and understanding of warnings and appropriate actions. The district includes a large-event location – Mystery Creek. This is the largest event venue in the region. Hamilton Airport is also in Waipa. There are considerable numbers of transients (tourists, commuters, commercial traffic) on State Highways 1, 3 and 39. Waipa District hosts many large national scale sporting events (e.g., rowing, kayaking, outrigger canoeing, track and road cycling, BMX, trotting, equestrian).

Waipa District was agreed by workshop attendees to not be particularly exposed to hazards (natural or non-natural). Severe weather events and localised flooding are the most likely hazards but the consequences are usually not significant. Earthquakes, distant-sourced ashfall and animal disease are plausible hazards. Lifeline utility failures in this district could be nationally significant for power, road, rail and gas as they feed the upper North Island. Hazchem incidents on the state highways or main trunk rail line are also plausible. It was reported that there is only one power line to Te Awamutu at present; however, this is being addressed.

Independent self-maintained networks operating in Waipa include Neighbourhood Watch/support; they are developing phone trees and back up contact systems and are actively engaged with CDEM. Fonterra have a large database for text messaging milk suppliers – it was suggested that could have an arrangement to utilise this database but this is not currently arranged.

The following public alerting systems are already in use or available for potential use:

- Media Releases (Radio, less likely TV)
 - VHF link to radio stations (24/7)
- Waipa DC Website and web banners
- Waipa DC RSS Feed
- Waipa DC Facebook (1,936 likes)
- Waipa_DC and WaipaNZ Twitter (158 and 86 Followers)
- Electronic billboards
- Emergency services route alert/PA
- Neighbourhood watch/support – developing phone trees and back up contact system for when power and phone are out
- Newspapers
- Posters
- RSS feeds
- Electronic billboard – fixed
- Natural warnings (don't do a lot of engagement but support national messaging)
- Marine radio

- Fixed siren in Te Awamutu – more than five signals = seek further information (historic use)
 - Low awareness/understanding of fixed sirens, confusion of signal
 - Locals don't like them because they can't sleep at night
- There is a key stakeholder email list but not currently used for alerting
- Fonterra have a large database for text messaging suppliers – could have an arrangement to utilise this
- Phone trees for most areas are in the development phase.
- Stakeholder email list
- Contact list for clubs and associations
- “Neighbourly” app

Telecommunications access is good in Waipa, particularly mobile phone ownership. However, there is patchy coverage for the Vodafone network in Cambridge, and Owairaka Valley (rural, somewhat remote) has patchy coverage on all networks. In rural parts of Waipa it is sometimes the case that there is mobile network coverage on roads but not at houses.

5.10.2 Budget

Start-up \$0

On-going \$0

Part of one CDEM professional's FTE is spread across three districts (Waipa, Otorohanga, Waitomo).

5.10.3 Pockets and groups that need specific alerting

People in transit on the state highways, especially visitors to the District are the prime concern for Waipa DC. At any time there could be thousands of travellers in vehicles on the road networks and there are also frequent large events for visitors. It was agreed these visitors had special alerting needs.

Some areas had higher than the New Zealand average populations of elderly residents but because of the low hazard environment, it was not considered they had any specific alerting requirements.

5.10.4 Effectiveness scores and multipliers

Table 14 provides start-up and on-going annual cost indications for the selected alerting options for this TA.

5.10.5 Recommendations for Waipa District

5.10.5.1 Regionally coordinated systems

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Waipa CDEM using public education and potentially incentives to install. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted.

- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.
- Alerting to people in the care of institutions should otherwise be arranged at a TA level.

5.10.5.2 Locally implemented systems

- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile device options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an emergency.
- Existing phone trees could be triggered by a regionally-coordinated auto-dialler.
- Consistent with the Group (2014) Warning Systems Strategy Section 1.3.1, all PAs/sirens should comply with the national tsunami siren standard (MCDEM, 2014).
 - Existing sirens should use a consistent tone (i.e., all sirens should sound the same across the district, preferable using the nationally recommended tone for best audibility)
 - Existing tone-only sirens should be used only for 'seek further information'
 - New sirens if desired should be voice capable (i.e., PAs).
- Large event hosts should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 14 Relative scores for selected alerting options, with indicative costs for Waipa District.

	Score	For Low Density Areas		For High Density Areas		Total	Limitations and notes	
Total Population:		17.5k		29.2k		46.7k		
70% of population targeted:		12.3k		20.4k		32.7k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	85%	2	2	4	4	6	6	
Mobile device broadcasting (1)	84%	10,049	49	10,082	82	20,131	131	Cheaper with national implementation
Tone-activated alert radio (1)	75%	876	1	1,461	1	2,337	2	Cheaper with national implementation
Fixed PA loud-speakers	69%	1,499	99	626	42	2,125	141	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	77%	0	0	1	1	1	1	No heads up, slow to reach 70%
Mobile PA loud-speakers (2)	75%	175	0	30	0	205	0	# vehicles & staff; time required GOOD FOR POCKETS
Route alert (door-to-door)	72%	796	796	1,329	1,329	2,125	2,125	# staff available and time to walk/drive
Moderate effectiveness:								
Power mains messaging	61%	350	0	584	0	934	0	Heads up only – slow response
Natural warnings	63%	44	44	74	74	118	118	Only for a few hazards GOOD FOR COAST
Telephone trees	60%	32	32	53	53	85	85	Slow to reach 70%
Radio (UHF, VHF or HF)	59%	443	5	739	9	1,181	14	Reaches only houses/buildings
Telephone auto-dialler	59%	3	3	5	5	9	9	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	61%	7	2	9	4	16	6	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Radio Data Systems (1)	48%	443	5	739	9	1,181	14	No heads up, slow to reach 70%
Call-in telephone line	44%	272	252	441	421	713	673	Very slow to reach 70%
Sirens (signal-only) - Fixed	42%	2,074	102	885	48	2,959	150	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	69%	0	0	1	1	1	1	GOOD BACKUP
Website banners	63%	88	0	147	1	235	1	
Independent self-maint networks	61%	2	2	4	4	6	6	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	68%	0	0	1	1	1	1	# vehicles & staff; time required
E-mails	55%	17	2	19	4	36	6	
Newspaper content	58%	0	0	0	0	0	0	
Websites	54%	89	2	149	3	238	4	
Billboards - static	46%	55	20	23	8	78	28	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally one of the options above should also reach at least 70% of people in every location.

5.11 WAITOMO DISTRICT

5.11.1 Key points from workshops

Note more detailed notes from this workshop can be found in Appendix A1.10

Waitomo District has a population of approximately 8,800 residents. Within the District is the Waitomo Caves tourist destination which receives tens of thousands of visitors each year. Most hazards are slower onset. Hazards identified for Waitomo include: localised flooding, landslides, ashfall (distant source), lifelines failures/incidents, tsunami and coastal erosion. Following the flooding in 1958 there were new stopbanks built which have greatly reduced the risk in the area.

SH3 is a key transport link to New Plymouth with no alternative route from the north but is vulnerable to accidents, landslides and flooding. There are frequent slips at Awakino Gorge. NZTA are looking at alternative routes but no information on the progress with this project was available. The Rail network has a similar vulnerability.

No independent self-maintained networks have been identified for Waitomo DC. A public education programme was run last year where all urban and rural homes got a get ready get through booklet delivered. All areas in Waitomo were covered. There is a remote private community in Waitomo (Taharoa), and among workshop attendees not much information was known about this community.

The following public alerting systems are already in use or are potentially available for use:

- Media Releases (Radio, less likely TV)
- Council websites
- Waitomo DC Facebook (830 likes)
- Marokopa has a response plan with a phone tree but this may be out of date.
- Phone trees for most areas are in the development phase.
- Also in the process of identifying areas where VHF radio connections can be put in, but there is poor radio coverage in some areas so considering HF as a better option.
- Mobile phone coverage is also a problem in Waitomo. Three years ago it was reported that Waitomo had low uptake in internet connection. No more recent updates available on this. Waitomo has lots of small communities that are isolated;
- Mokau is very isolated. Radio system to Mokau must go through New Plymouth. Radio connection to the media is the only communication method tested.
- The Regional Council flood alerting system (SMS-PP and email) works well for residents in flood prone areas.

Waitomo has the lowest mobile phone access and coverage rates in the Region. It was suggested that 50% of residents had no mobile phone coverage, and in any case only 70% of households owned a mobile phone. The mobile phone access and coverage rates indicate that any mobile phone or mobile device based options would not be appropriate for many in Waitomo. However, landline ownership is reasonably good (81%) and when considered together with mobile ownership, the overlap results in only 4% of households reporting no access to telephone communication systems.

5.11.2 Budget

Start-up \$0

Ongoing \$0

Part of one CDEM professional's FTE is spread across three districts (Waipa, Otorohanga, Waitomo).

5.11.3 Pockets and groups that need specific alerting

Groups and pockets identified as present in Waitomo included workers on industrial sites (some overseas, non-English speaking), the thousands of visitors to Waitomo Caves, tourists in remote areas, including coastal areas and other transients (travellers/commuters/freight) on the highways. However, none of these pockets or groups warranted changes to multipliers in the decision tool.

5.11.4 Effectiveness scores and multipliers

Table 15 provides start-up and on-going annual cost indications for the selected alerting options for this TA.

5.11.5 Recommendations for Waitomo District

5.11.5.1 Regionally coordinated systems

Recommendations to Waipa District, in terms of regional support for local systems:

- Any mobile alerting option should be regionally coordinated. The installation (when available) of one or more of the mobile apps discussed in Section 4.4 by residents should be strongly encouraged by Waitomo CDEM using public education and potentially incentives to install. However it must be noted that due to patchy mobile coverage, this option will be less effective in Waitomo than in other districts. Note that some people who are not covered by the mobile network will still have app coverage if they have their phones connected to wifi at home. This should be promoted in particular in Waitomo District.
- Additional pocket coverage should also be regionally coordinated for options that are used by multiple TAs (e.g., telephone auto-diallers, full list Section 6.2).
- Implementation within a TA of a regionally supported system needs an FTE component locally budgeted for local aspects. For example, to populate and maintain a telephone auto-dialler or SMS-PP phone number database.
- Television arrangements should be coordinated through the region.
- Radio arrangements should be planned for at a TA level, not just Group-wide.
- It is important that Social Media alerting is managed to reduce duplication of effort and increase consistency across TAs, and with the CDEM Group. There is a 24/7 regional response in place and TAs can utilise this.
- Use of independently self-maintained networks and alerting to large institutions with people in their care; some networks or institutions may require or are appropriate for regional coordination, to avoid duplication of effort at TA level.
- Alerting to people in the care of institutions should otherwise be arranged at a TA level.

5.11.5.2 Locally implemented systems

- Natural warnings for tsunami are important and affordable in terms of education for both residents and tourists if targeted at coastal locations and key institutions and tourism providers.
- Mobile PA systems are highly effective, but not as rapid or affordable as apps and mobile options across the entire area. They should be considered for targeting specific pockets. Considerations are needed for activation (e.g., phone calls) of PA operations staff, and having them 'on-call' for expected/agreed periods. These must be agreed and documented in an SOP.
- Mobile PA systems owned by third parties are valuable but may have other priorities in an event.
- Existing phone trees could be triggered by a regionally-coordinated auto-dialler.
- Large employers/tourist operators should be identified and a key contacts database developed with each, to maximise the applicability of auto-diallers, telephone trees and/or SMS alerts.
- Existing HF/VHF should be aligned within any new regional VHF framework
- Existing systems that are not in the above recommendations but are already in place and are proving effective should be maintained. Note: "proving effective" means evidence is available to show that the systems have performed well in previous emergencies or that they will reach at-risk communities in a timely manner and that the public understands the system and knows the appropriate response actions.
- Additional systems available and effective for reaching pockets and groups are listed in Section 6.3.

Table 15 Relative scores for selected alerting options, with indicative costs for Waitomo District.

	Score	For Low Density Areas		For High Density Areas		Total		Limitations and notes
Total Population: 70% of population targeted:		4.3k 3.0k		4.5k 3.2k		8.8k 6.2k		
		Start-up costs	Annual costs	Start-up costs	Annual costs	Start-up costs	Annual costs	
		\$k	\$k	\$k	\$k	\$k	\$k	
SYSTEMS...								
With Rapid Widespread Coverage:								
Mobile device apps	83%	1	1	1	1	1	1	
Mobile device broadcasting (1)	84%	10,012	12	10,013	13	20,025	25	Cheaper with national implementation
Tone-activated alert radio (1)	82%	215	0	225	0	440	0	Cheaper with national implementation
Fixed PA loud-speakers	68%	368	24	97	7	465	31	Maintenance, telemetry and testing
That Can reach 70% of the pop.								
High effectiveness:								
Radio announcements	82%	0	0	0	0	0	0	No heads up, slow to reach 70%
Route alert (door-to-door)	71%	196	196	205	205	400	400	# staff available and time to walk/drive
Moderate effectiveness:								
Natural warnings	66%	11	11	11	11	22	22	Only for a few hazards GOOD FOR COAST
Telephone trees	65%	8	8	8	8	16	16	Slow to reach 70%
Radio (UHF, VHF or HF)	64%	109	1	114	1	223	3	Reaches only houses/buildings
Telephone auto-dialler	64%	1	1	1	1	2	2	Slow to reach 70% GOOD FOR POCKETS
SMS-PP text messaging	63%	6	1	6	1	11	1	Slow to reach 70% GOOD FOR POCKETS
Lower effectiveness:								
Sirens (signal-only) - Mobile	56%	0	0	0	0	0	0	Cheaper than PA, but slow response
Radio Data Systems (1)	52%	109	1	114	1	223	3	No heads up, slow to reach 70%
Call-in telephone line	47%	82	62	85	65	167	127	Very slow to reach 70%
Sirens (signal-only) - Fixed	44%	510	25	136	7	646	32	Heads up only – slow response
That cannot reach 70% of the pop.: (3)								
Television announcements	73%	0	0	0	0	0	0	GOOD BACKUP
Website banners	66%	22	0	23	0	44	0	
Independent self-maint networks	66%	1	1	1	1	1	1	GOOD FOR POCKETS
Mobile PA loudspeaker (Police/Fire)	66%	0	0	0	0	0	0	# vehicles & staff; time required
Newspaper content	58%	0	0	0	0	0	0	
Websites	56%	22	0	23	0	45	1	
Marine radio	53%	0	0	0	0	0	0	
Tourist/lwi radio	49%	0	0	0	0	0	0	
Billboards – static	47%	13	5	5	1	18	6	
Billboards - electronic telemetered	45%	0	0	0	0	0	0	GOOD FOR POCKETS

(1) Systems not yet readily available in New Zealand.

(2) No FTE is costed for the use of mobile PA loud-speakers as it is assumed these will be operated by council staff or volunteers, if there is a salary cost this option will become more expensive.

(3) Systems that cannot reach 70% of people for short lead time hazards should be used with caution and ideally on of the options above should also reach at least 70% of people in every location.

5.12 COST AND ABILITY TO PAY

Full cost-benefit analysis for most TAs cannot be completed because there is no budget allocated. Instead indicative costs for all options selected are shown for consideration in future budgets.

The cost basis in the tables for each TA above are indicative based on the population in low and high densities across the whole district. The costs of reaching the total number of individual pockets and groups will need refining once the coverage of any possible Group-wide systems can be fully ascertained and tested.

It is critical to allow enough salary in budgets to pay for staff to work on warnings, across planning, engagement, education, exercises, maintenance and testing of systems. The salary cost of linking with self-maintaining networks and institutions with people in their care will vary depending on the detail of the arrangements that develop with each specific network and institution.

6.0 RECOMMENDATIONS

We are strongly recommending a tiered approach to public alerting in the Waikato Region.

6.1 NATIONAL OPTIONS

As the first and primary tier Waikato CDEM Group should adopt national initiatives around mobile device based alerting (Section 4.4). The Group should (as stated in Section 5.1.5) engage with the national CAP and mobile alerting app development processes and ensure that Waikato Group members' needs are included at the earliest reasonable stage, expected to be within the 2015/16 financial year.

The Group should liaise with TAs to support them to use the national public mobile alerting app(s). The Group should continue over time to represent the TA's interests at a national level as these options evolve and develop. TAs should use the mobile alerting option(s) as their primary alerting option to reach everyone within mobile coverage (as stated in the recommendations section for each TA in Section 5). Note that smartphone uptake is rapidly increasing and 3G network coverage along with it. Rural wireless is also burgeoning, e.g., Lightwire in the Waikato region (see Appendix A3.1). Community education and engagement efforts around alerting will need to be focussed on making sure all of the public have a suitable app installed and operational.

A mobile device broadcasting business case lead by MCDEM is still in development, if this is funded this option should be adopted along with the app option above.

The Group should continue to engage with the MCDEM public education team and leverage off of their activities, especially around natural warnings for tsunamis.

Opportunities for alerting via the national radio and TV broadcasting MoU should also be fully incorporated into alerting planning by the Group and the TAs.

6.2 REGIONAL OPTIONS

This section provides recommendations for regionally implemented or coordinated public alerting adoption, in terms of options both managed and maintained by the CDEM Group, for use both regionally and locally.

Access to the national mobile app (above) to generate alerts should be coordinated and advocated for on behalf of the TAs by the Group. The Group should help to set it up and help TAs promote it, but any TA can and should use it for alerting when required.

An additional layer of regionally-coordinated alerting is also needed for people and areas (groups and pockets) that are without mobile phone coverage or smartphone access. These will depend on the cost structure between the Group and Local Authorities and the total number of people each Local Authority needs to reach. The following high-scoring relatively low-cost systems should be coordinated at a regional level and made available for CDEM Group members to use:

- VOIP auto-dialler system – should be investigated as a first priority
- Potentially tone-activated alert radio - if available (in development with Auckland now) – note the unit cost is high (Auckland have found it beneficial to explore opportunities for third party funding of units).

These should at least be able to reach the following types of pocket, which were each specified by more than one TA:

- Geographically isolated communities without mobile phone coverage
- Large employers/industries
- Schools
- Large events
- Rest homes
- Shopping malls
- Isolated tourist locations
- Those on highways via electronic billboards - triggered by contacting NZTA (this could be a high priority personal call rather than VOIP)
- School camps
- Marae

And the following groups, again specified by more than one TA:

- Elderly
- English as a second language (for example would need to be implemented with a separate VOIP list and recording for each language)
- Transients (domestic and international)

The Group and TAs should engage with independent self-maintained networks. The following were either suggested by multiple TAs or have clear applicability across multiple TAs. The Group should facilitate and initiate discussion and ideally agreement with the following networks to then allow TAs to directly use them:

- Neighbourhood Watch/support/societies
- Community service groups/Rotary/Lions
- Māori Wardens
- NZTA (electronic billboards)
- Te Mana Whenua/Iwi networks
- Rural Support Trust
- Transport operators networks
- CDEM volunteers/LSAR
- Surf lifesaving
- Coastguard
- Religious organisations
- Federated Farmers
- Volunteer Rural Fire Force

The Group should also coordinate engagement with the following large institutions with people in their care:

- Large tourism operators and collectives
- Business collectives
- Department of Conservation
- Schools
- Prisons

- Hospitals and rest home franchises
- Fonterra

The Group should develop and maintain a database structure (or at least facilitate consistency amongst TAs) that Local Authorities can use to store and access auto-dialler, phone tree and self-maintaining network contact lists and details. This may be as simple as a web hosted shared spreadsheet and simplicity should be a goal. The database could be capable of being queried by the Group Members to extract geographic distribution lists based on the nature and location of the emergency.

6.3 TA SPECIFIC OR LOCAL OPTIONS

A large number of groups and pockets with specific alerting needs have been identified in Appendix A1, and summarised in each TAs sub-section of the Results chapter. The large majority of these will be reached via the national mobile app option recommended under Section 6.1, and the additional regionally supported options listed in Section 6.2. Updating any contact database maintained by the Group (or separately by TAs) needs to be budgeted in terms of FTE within each TA as their own responsibility, along with FTE effort around implementing the mobile app.

Any remaining isolated pockets or groups will need to be identified as the above options are tested. Specifically the following options are likely to be of most effective and low-cost use:

- Telephone trees
- Local independent self-maintained networks (beyond those listed in 6.2 above)
- Institutions with many people in their care
- Mobile PA – but note that FTE effort is needed to maintain readiness here, and there is direct cost too. It is also limited by the on-demand availability of staff and vehicles
- Third party mobile PA – notes as per Mobile PA point above.
- SMS-PP may have some additional coverage beyond the mobile app to current non-smartphone users (such as of the elderly and farmers), but this is likely to rapidly drop off as smartphone uptake continues to rapidly rise.
- VHF or HF radio into pockets, probably to trigger a local response tree (to save on equipment costs) – but note there is a substantial hardware (EOC, repeaters and receivers), training, and upkeep cost to this, particularly if radio is not being used by the EOC.
- Route alert (door knocking) but note that FTE effort is needed to maintain readiness here. It is also severely time limited by the on-demand availability of staff.

These will all have FTE costs as well as direct costs that must be budgeted for.

6.4 POTENTIAL SUPPLIERS OF SYSTEMS

Key systems emerging from workshops were explored (Appendix A3) in terms of cost and further detail, for the following reasons:

- National mobile alerting will be available free of charge from one or more of the ERS, Red Cross and/or Google apps (Section 4.4). The Group and TAs should budget permanent FTE time to maintain the effective use of these systems, both in terms of entering alerts into the system, and promoting/assisting the public install and being able to use the app(s).

- Rural broadband suppliers can provide internet to smartphones (and thus app connectivity without mobile coverage). See Appendix A3.1.
- Radio networks – these were identified as public alerting options either already in use, or available for use, by many TAs.
- Voice Over IP (VOIP) auto-diallers – identified as a particularly cost-effective way of reaching both location ‘pockets’ and public ‘groups’ that may need further alerting via mobile phones and landlines. Two supplier costs are supplied to indicate both the low and high ends of the cost range (Appendix A3.3). The ideal supplier will depend on the volume of calls expected and the Group IT infrastructure.
- SMS-PP services – identified as a potentially cost-effective way of reaching both location ‘pockets’ and public ‘groups’ that may need alerting beyond the reach of national mobile alerting (could reach non-smartphone users such as some of the elderly and farmers). BULLETiN is well recommended by the Bay of Plenty CDEM Group already – it has a competitive cost basis.
- Mobile PA – identified as a potentially cost-effective way of reaching both location ‘pockets’ that may need specific alerting beyond the reach of national mobile alerting. The Taupo District cost basis is the most cost effective solution reviewed (note even cheaper suppliers are available, Appendix A3.5). Mobile PA is nominally costed at 0.05 FTE per 100,000 people reached based on the staff effort needed to maintain the system, it assumes no salary or wages need to be paid to drivers.
- VHF Radio – cost is roughly projected from the experience of Gisborne to reach groups of 200 people including the effort to coordinate response groups and exercise. The reality will vary depending on EOC and repeater costings depending on the scale and design of the network.
- Other districts may want to engage with Taupo to learn how they engage with neighbourhood support, Fleetlink (based on Trunked Mobile Radio technology that allows radios to talk to one another anywhere in the country where there is coverage) and NZTA for fixed digital billboards.
- Telephone trees are nominally costed as requiring four FTE per 100,000 people reached, assuming a high level of involvement from the TA in engaging with individuals on the tree, connecting them and maintaining and triggering the tree. The real cost will vary depending on any level of autonomy within the trees for their own development and upkeep.
- See also the key independent self-maintained networks and large institutions with people in their care recommended in Section 6.2. These are nominally costed at 0.2 FTE per 100,000 people to be reached, but this depends on the size of the networks and institutions.
- Specific targeted options should be explored further through existing relationships within the region:
 - GeoZone apps for domestic and foreign language tourists
 - School-links emergency alerts is well recommended by Waikato TAs already and has been shown to be cost-effective.

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APPENDICES

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A1.0 DETAIL FROM TA WORKSHOPS

A1.1 HAMILTON CITY

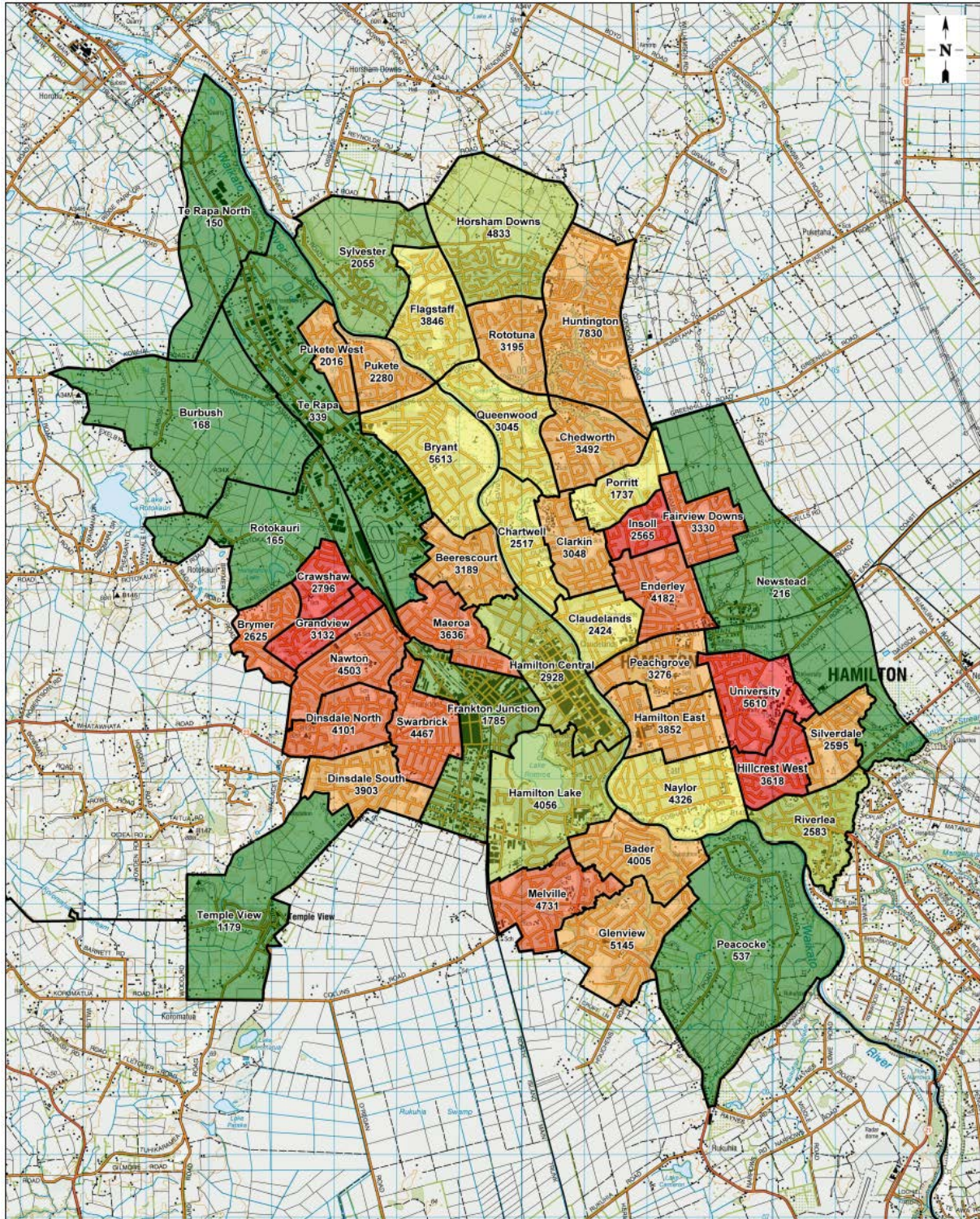


Figure A1.1 Hamilton City Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

- Dam failure (20 minutes flow time down the Waikato River from Karapiro)
- Industrial hazchem (e.g., hazmat train under CBD) or rapid onset traffic incidents
- Chlorine gas from treatment plant in Te Rapa
- Heavy rainfall, tornados and hail (Frankton had a tornado with 7 fatalities in the 1940s)
- Pandemic or bio-emergency

Institutions with people in their care

- Transient populations are important, especially into large events in stadiums, into CBD and into the large shopping complex of “The Base” at Te Rapa (estimated thousands of visitors on weekends)
- Several aged care facilities
- Three tertiary education institutions
- Large employers – these workers are in the care of employers and may not have access to communications while at work e.g., Lifeline Utilities, Fonterra, Gallaghers, Primary Industry factories, Councils, Government Agencies, Hospitals/Medical Centres, Schools, Shopping Centres.

Pockets that may need specific alerting

- Te Rapa
 - High proportion of elderly residents (>25%)
 - Low number of usual residents but influx of thousands of transients (workers and shoppers) during the day and weekend
 - Usual residents have relatively lower access to telecommunications
 - Lots of workers (>1,000) under the care of large institutions
- CBD (Hamilton Central)
 - Large influx of transients (workers, shoppers and clubbers) during the day and weekend nights.
 - Lots of workers (>1,000) under the care of large institutions
 - Usual residents have relatively low access to telecommunications
 - Culturally diverse: > 50% of residents identify as being of non-European descent
- Insoll
 - Relatively low access to telecommunications
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent
- Hamilton East
 - Lots of workers (>1,000) under the care of large institutions
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent
- University
 - Lots of workers (>1,000) under the care of large institutions
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent

- Other culturally diverse CAU/suburbs (>50% of residents identify themselves as being of non-European descent)
 - Clarkin
 - Swarbrick
 - Enderly
 - Grandview
 - Crawshaw
 - Bader
 - Fairview Downs
 - Poritt
 - Melville
- Other CAU/suburbs with lots of workers (>1,000) under the care of large institutions
 - Rotokauri
 - Frankton
 - Hamilton Lake
- Templeview/Latter Day Saints – Culturally diverse: >50% of residents identify as being of non-European descent – are they connected to mainstream news and communication channels?
- Claudelands event centre and Waikato Stadium – large events
- Hamilton Gardens – large numbers of transients all year round
- Newstead – new expanding suburb and employment area in the future
- Peacocke – High proportion of elderly residents (>25%)

Groups that may need specific alerting

- 160 languages spoken
- Māori are 20% of the population
- Transients (tourists and people on highways especially) – highways can be considered a ‘pocket’ to some degree.
- New residents – in 2006 35% of current (2013) usual residents lived in another NZ district and 8% lived overseas.

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Hamilton City from 2013 census:

- Percent of households with access to mobile phones: 85%
 - No significant coverage issues identified
- Percent of households with access to landline phones: 83%
- Percent of households with no access to telecommunications: 2%

A1.2 HAURAKI DC

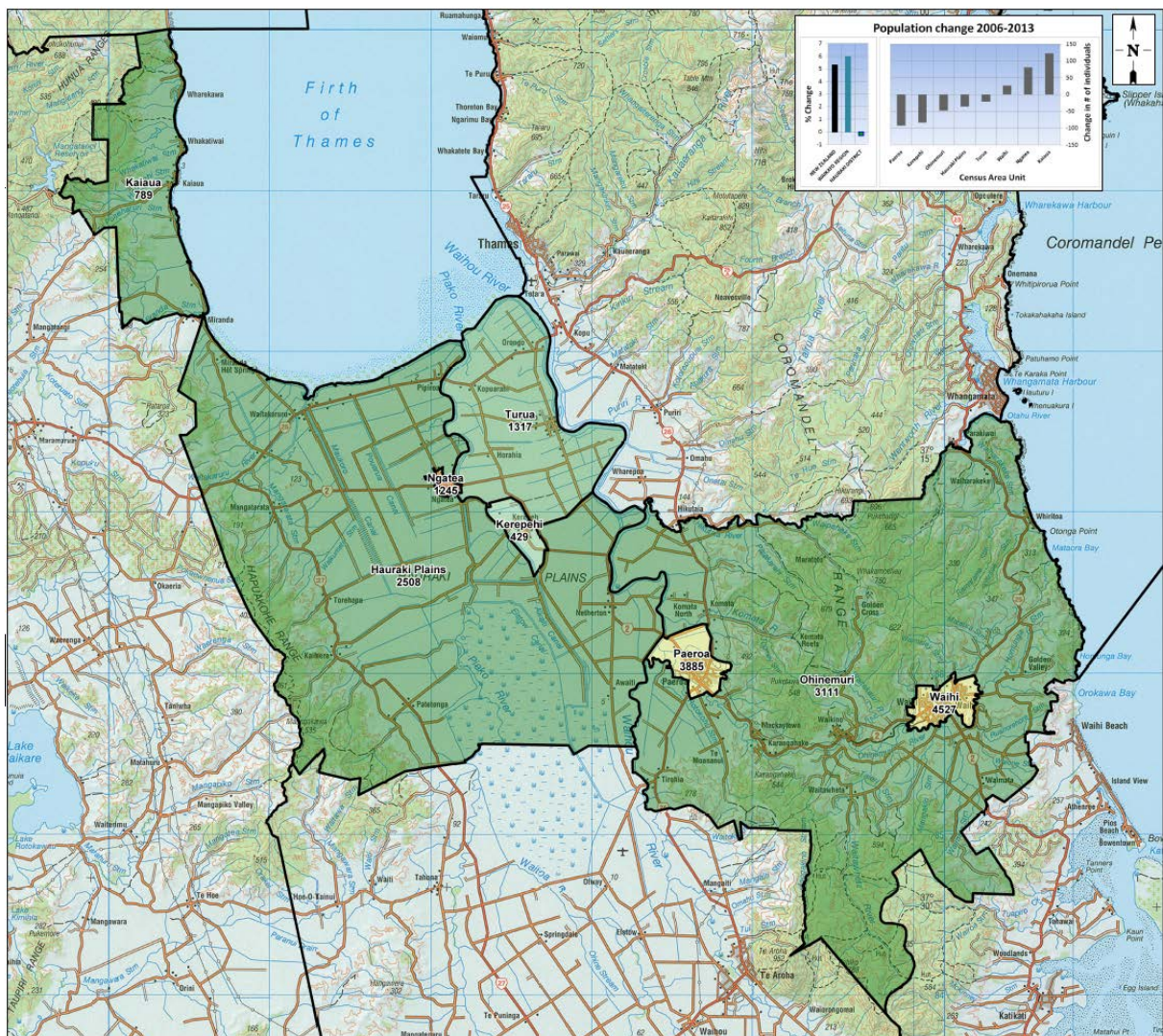


Figure A1.2 Hauraki District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

History of flooding with warnings that have been effective in the past. Considerable flood protection scheme in place so flood risk areas are generally well known and controlled. Failure of flood protection works could be catastrophic. Also:

- Coastal erosion.
- Tsunami threat.
- Ashfall (distal source)
- Lifelines – SH2. Hazardous substances.
- Earthquake (Kerepehi Fault)
- Animal epidemics
- Geothermal – Miranda

Institutions with people in their care

- Retirement villages – especially Ohinemuri House and Hetherington House
- Goldfields school – high dependency kids
- Waihi Academy of Studies (Taiwanese Language School)
- Schools
- Hauraki District Council
- Newmont Gold Mine
- Leaches Quarry
- Kerepehi Industrial Development Area – Chinese Ice Cream Factory
- Silver Fern Farms

Pockets that may need specific alerting

- Paeroa
 - Relatively low access to telecommunications (excl. mobile)
 - High proportion of elderly residents (>25%)
 - Large event (Battle of the Streets) attracts over 10,000 people
- Ohinemuri
 - Influx of thousands of transients (tourists, travellers, hikers, cyclists, workers) especially during the peak summer holiday season.
 - Whiritoa receives approximately 7,000 additional visitors in summer – peak holidays
 - Karangahake Gorge – Very popular with tourists and has SH2 running through it but poor mobile phone coverage
- Kaiaua
 - High proportion of elderly residents (>25%)
 - Popular coastal route with transients from Auckland – especially in summer
- Waihi
 - High proportion of elderly residents (>25%)
 - One major employer

- Ngatea
 - High proportion of elderly residents (>25%)
 - Seasonal fruit-pickers from overseas,
- Kerepehi
 - Relatively low access to telecommunications (excl. mobile)

Groups that may need specific alerting

- Transients (tourists and people on highways) on State Highways and Hauraki Rail Trail (cycleway – Karangahake Gorge to Kaiaua along the coast) – highways can be considered a ‘pocket’ to some degree.
- Freedom campers.

Telephone access

Telephone household (usually occupied private dwellings) access statistics for Hauraki District from 2013 census:

- Percent of households with access to mobile phones: 81%
 - Coverage issues mentioned in workshop:
 - Karangahake Gorge – Significant with tourists and travellers on SH2
 - Poor mobile coverage probably only affects 10% of population
- Percent of households with access to landline phones: 80%
- Percent of households with no access to telecommunications: 3%

A1.3 MATAMATA-PIAKO DISTRICT

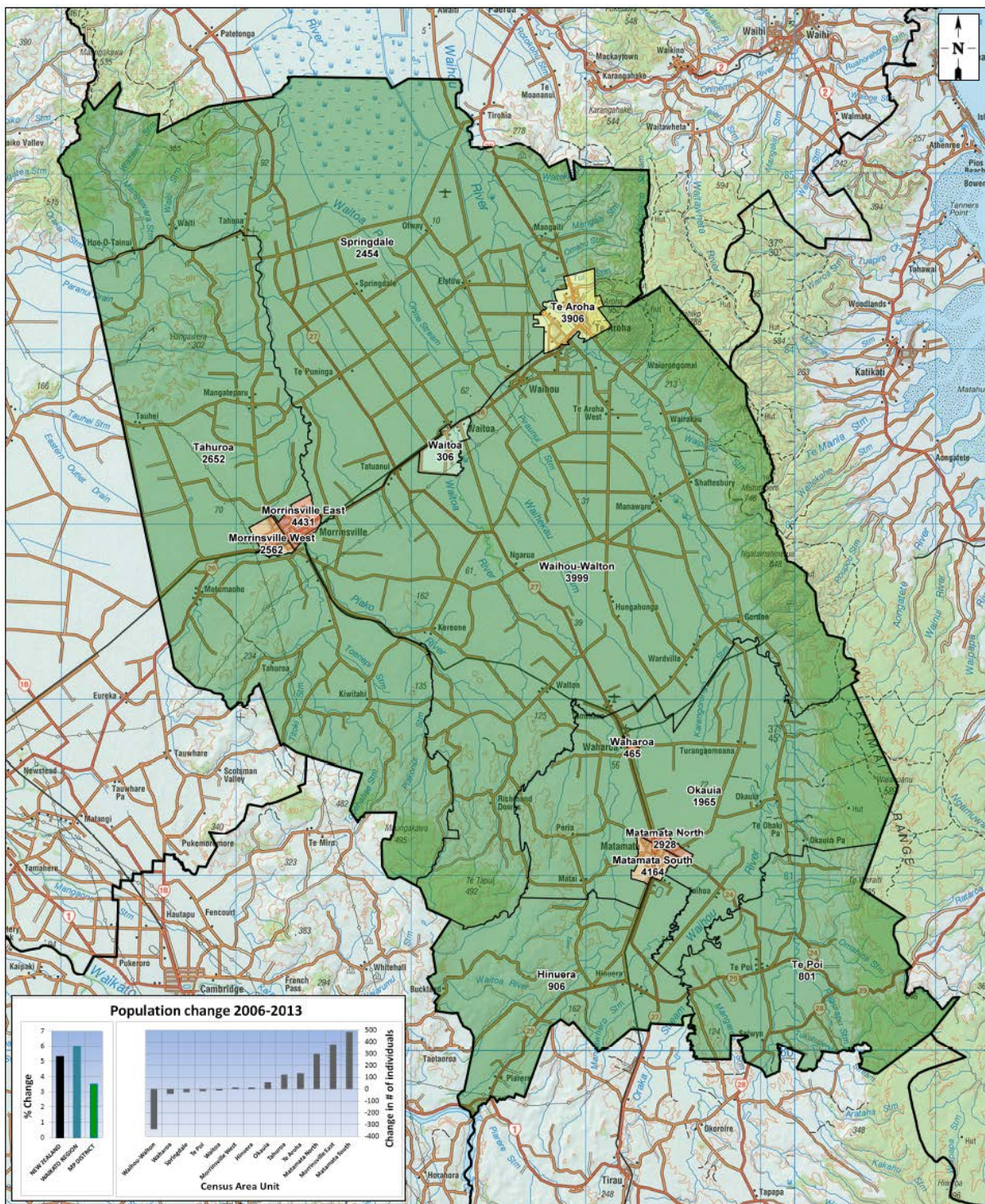


Figure A1.3 Matamata-Piako Area Units with 2013 usual resident population count and density shown (green = low density, red = high density)

Hazards

Mostly flooding and also many Hazchem sites including large employers with Hazchem materials on-site and in transit on road and rail corridors. Winds, in particular the “Kaimai Buster” in the lee of the Kaimai ranges during strong easterlies. Also:

- Animal epidemic
- Earthquakes (1972)
- Ashfall (distal source)
- Geothermal areas

Large institutions with people in their care

Many working in large facilities (including sites with hazchem):

- Silver Fern Farms
- Dairy Factories – Waihou, Tatua and Morrinsville
- Inghams poultry processing – two sites
- Pohlen Elderly Care Hospital – Te Aroha
- Schools
- Rest Homes and Residential Villages

Pockets that may need specific alerting

- Morrinsville
 - Lots of workers (>1,000) under the care of large institutions
 - Large events = Morrinsville Fireworks (~5,000 people), A&P Show and Summer Harness Raceday
- Matamata
 - High proportion of elderly residents (>25%)
 - Large events = Christmas Races and A&P Show
- Te Aroha
 - High proportion of elderly residents (>25%)
 - Large events = Aroha “Cruise in” Annual Motorcycle and Classic Car Poker Run (~3,000 people) and A&P Show
- Waharoa
 - Low access to telecommunications (excl. mobile)
 - Culturally diverse - high Māori population, lower socio-economic area
- Hinuera
 - Hobbiton – up to 4,500 tourists per day
 - Poor mobile phone coverage
- Other areas with lots of workers (>1,000) under the care of large institutions
 - Waitoa
 - Waihou-Walton
- Other areas with patchy, poor or no mobile phone coverage
 - Te Tapui/Maungakawa foothills
 - Lower slopes of Kaimai Range

Groups that may need specific alerting

- Tourists/cyclists on the Rail Trail – Te Aroha to Paeroa
- Transients (tourists and people on highways especially) – highways can be considered a ‘pocket’ to some degree.

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Matamata-Piako District from 2013 census:

- Percent of households with access to mobile phones: 84%
 - Coverage issues mentioned in workshop:
 - Not really a problem in most areas but patchy in some valleys – Spark generally has good coverage.
- Percent of households with access to landline phones: 84%
- Percent of households with no access to telecommunications: 2%

A1.4 OTOROHANGA DISTRICT

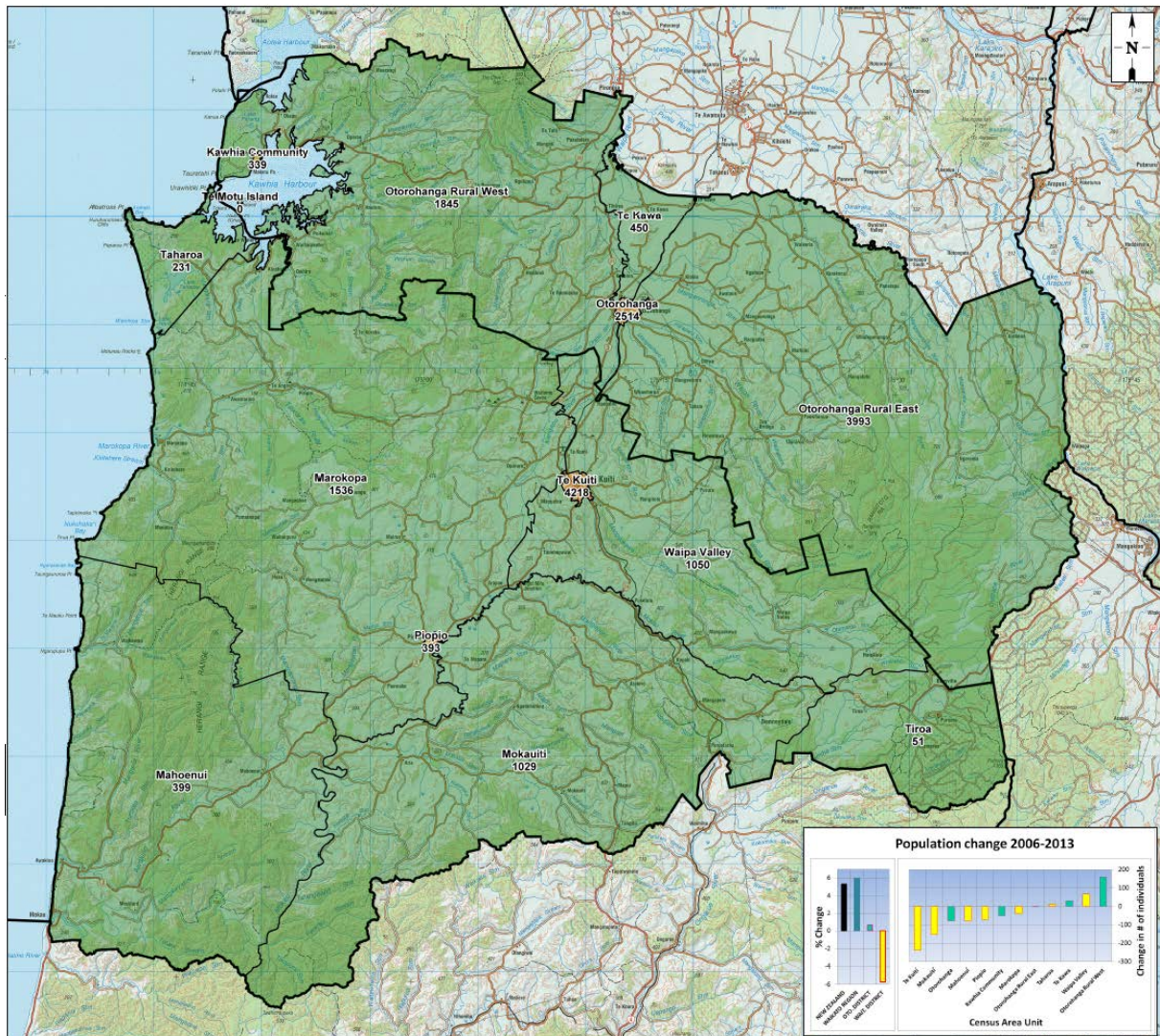


Figure A1.4 Otorohanga and Waitomo Districts Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

- Flooding
- Coastal Erosion
- Landslides
- Coastal Inundation/Tsunami
- Ashfall (distal source)
- Lifelines failures/incidents (Highways, rail, power, water, gas)

Institutions with people in their care

- Waikeria prison is well connected with robust systems.
 - Has a direct link to CDEM – Martin Berryman – via phone
- Largest school is Otorohanga High School. There are a few rest homes.
- Large public events include the Kai festival in Kawhia with about 3000-4000 people attending in February.
- Waitomo caves – thousands of visitors per day travel through the district to get to the caves (just over the district boundary in Waitomo).

Pockets that may need specific alerting

- Kawhia/Aotea (not particularly vulnerable other than being isolated though.)
 - High proportion of elderly residents (>25%)
 - Large volumes of tourists in the summer holiday peak season (mostly domestic but some foreign)
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent
 - Large events – Kai Festival
 - Patchy mobile phone coverage
- Other areas with poor mobile phone coverage
 - Hill country in between Otorohanga town and Kawhia (incl. SH31) – Otorohanga Rural West
 - To the east and south of the district (but is sparsely populated) – Otorohanga Rural East

Groups that may need specific alerting

- Transients on SH3 – travellers heading to and from Taranaki and Southern North Island and to Ski-fields on Ruapehu. Tourists travelling to Waitomo Caves.
- New residents – in 2006 37% of current (2013) usual residents lived in another NZ district and 3% lived overseas.
- High Māori population in western/coastal areas

Telephone access

Telephone household (usually occupied private dwellings) access statistics for Otorohanga from 2013 census:

- Percent of households with access to mobile phones: 82%
 - Coverage issues discussed in workshop
 - Younger populations have a higher uptake of smartphones than older populations, Telco companies are pushing smartphone uptake so there is an increase, but there would be fairly poor access in some areas
 - It is estimated Otorohanga District has better than 50% coverage as there aren't as many isolated populations. Noted that coverage is more important than access to a mobile phone here when considering census data as those with access to a mobile phone often only have coverage and use it when in town. Landline coverage is very good.
- Percent of households with access to landline phones: 81%
- Percent of households with no access to telecommunications: 2%

A1.5 SOUTH WAIKATO DISTRICT

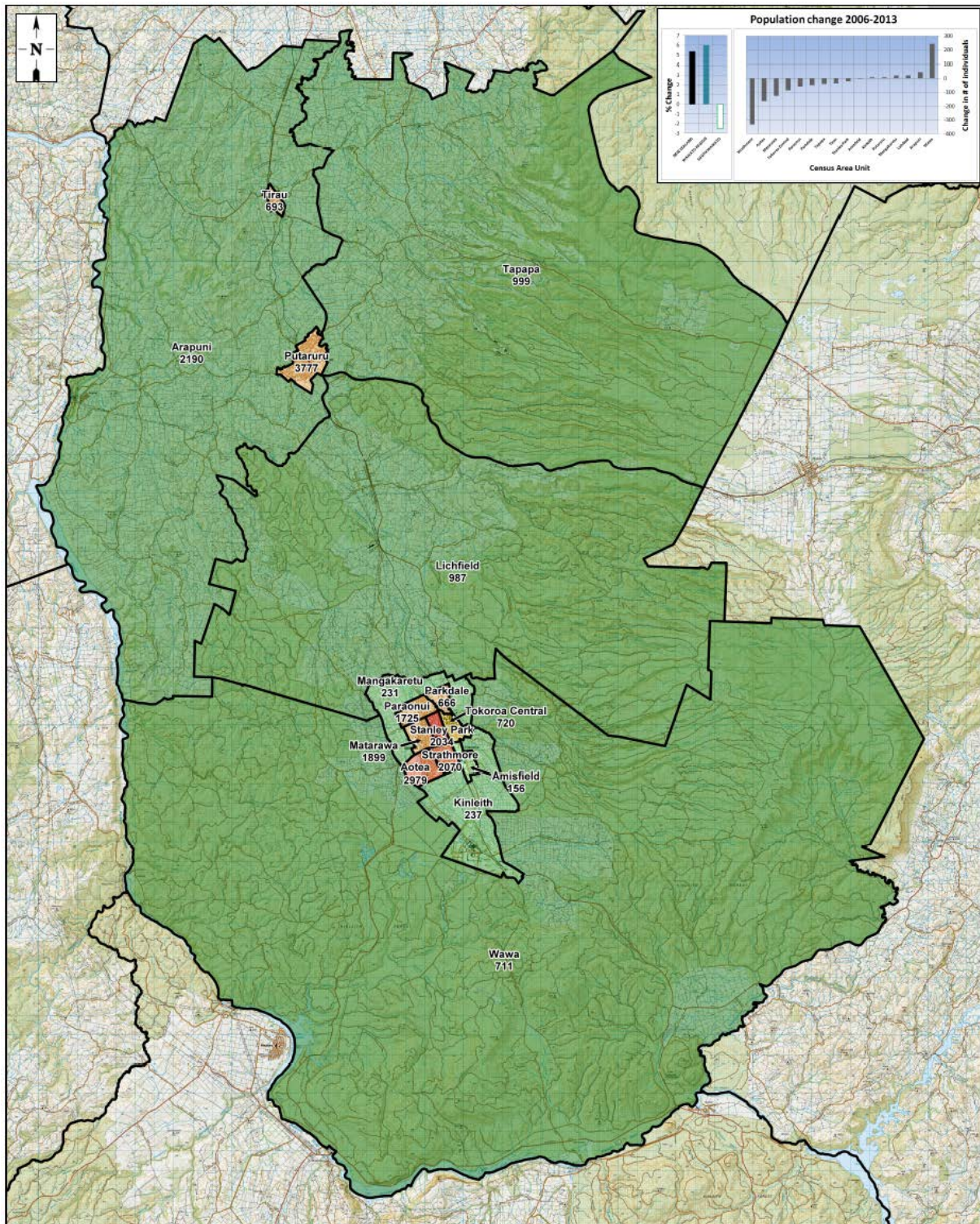


Figure A1.5 South Waikato District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

- Hazchem incidents from large industrial sites – e.g., Chlorine Leak at Kinleith Mill
- Rural Fire
- Biological/Animal epidemic
- Volcanic ashfall (distal source)
- Lifelines failures/incidents (Highways, rail, power, water)

Institutions with people in their care

- Lichfield Dairy Factory
- Kinleith Mill
- Forestry companies
- Schools and some camps along the Waikato River
- Waratah New Zealand

Pockets that may need specific alerting

- Tokoroa Central and Stanley Park
 - Relatively low access to telecoms (excl. mobile phones).
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent (mostly Māori and Pacific Peoples)
- Area units with patchy, poor or no mobile phone coverage (mostly rural farmland, exotic forestry or conservation estate.)
 - Wawa
 - Lichfield
 - Tapapa
 - Arapuni
- Area units that are culturally diverse (>50% of residents identify themselves as being of non-European descent – mostly Māori and Pacific Peoples)
 - Strathmore
 - Aotea
 - Matarawa
 - Parkdale
- There are several retirement villages (Putaruru, Tokoroa). There is a residential village of intellectually disabled people in Tokoroa. These can be handled separately.

Groups that may need specific alerting

- Some recent changes in rural areas with forestry to dairy conversion – leads to population density increases
- Transients – Some community events and hard to reach people on river trails and riverside camping areas. A lot of travellers on SH1.

Telephone access

Telephone household (usually occupied private dwellings) access statistics for South Waikato District from 2013 census:

- Percent of households with access to mobile phones: 83%
 - Coverage issues discussed in workshop
 - No locations with poor access to mobile phones
 - Most residential areas and areas close to the main highways have reasonably good mobile phone coverage
 - Areas with patchy, poor or no coverage are mostly rural farmland, exotic forestry or conservation estate
- Percent of households with access to landline phones: 78%
 - Tokoroa Central 65%
 - Stanley Park 70%
- Percent of households with no access to telecommunications: 3%
 - Stanley Park 5.5%
 - Tokoroa Central 4.7%

A1.6 TAUPO DC

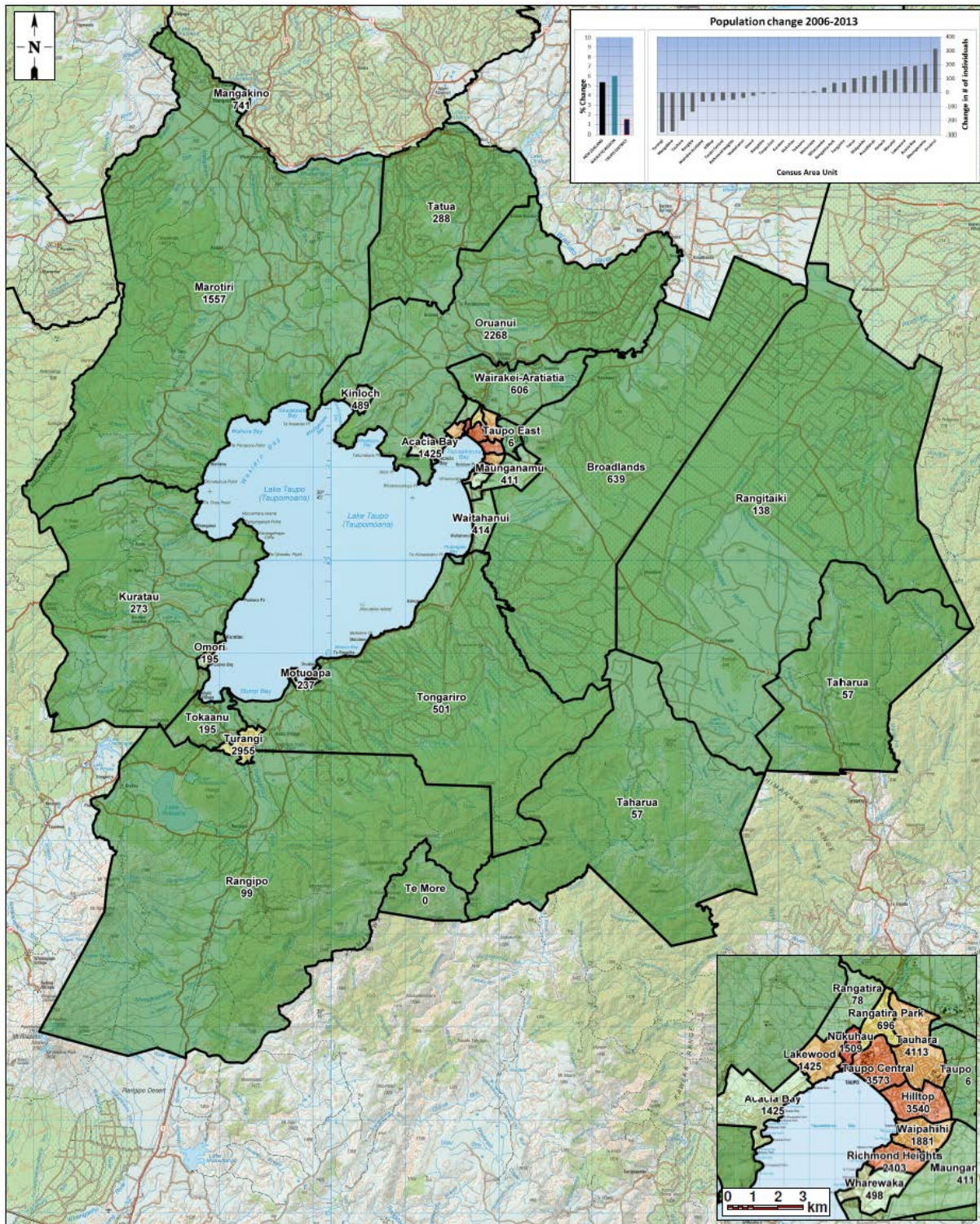


Figure A1.6 Taupo District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

- A range of hazards possible, especially:
 - volcanic
 - meteorological
 - flooding
 - geophysical (landslides)
 - geothermal
 - earthquakes

Existing Systems in Use

- Natural warnings – actively promoted
 - Waihi Village landslide scenario
 - Local geothermal eruption or subsidence
 - Eruption columns from volcanoes
- Websites (Taupo DC, Chamber of Commerce, Enterprise Great Lake Taupo)
- Email distribution lists
 - Waihi Village landslide scenario
 - All tourist accommodation providers – PIM uses
- Independent Self Maintained Networks
 - Neighbourhood Watch
 - Potential to fleetlink radio into all commercial trucks in district via truckstops
- Electronic Billboards
 - NZTA arrangement for fixed billboards
 - Mobile arrangement (through contractors?)
- Helicopter PA
- Mobile PAs
 - Rural Fire (8)
 - One on CDEM Ute
- Radio
 - MoU – within an hour to get messages out
 - All local radio stations
 - Includes 2 x Iwi radio stations
 - CDEM Sting sound
 - Media Releases (Radio, less likely TV)
- Taupo DC Facebook (1453 likes)
- Dedicated CDEM Facebook (682 likes)
- Dedicated CDEM Twitter (574 followers) – Used for alerts only
- Stakeholder text distribution lists
- Phone Trees
 - Volcano – Te Maari scenario (Bub Smith)
 - ESOL (English for Speakers of Other Languages) group contacts – Also radio broadcasts.
 - Schools

- Fax to schools
- Dedicated CDEM Siren (Waihi Village)
- Marine radio
Direct links to DIA Harbourmaster

Independent Self-maintained networks

- Neighbourhood watch
- Truckstops
- Neighbourly App
- Logging contractors
- Rangitaiki Pub
- Lions and Rotary Clubs
- Iwi
- Lochnivar Station
- Local CDEM links in Omori and Kinloch

Institutions with people in their care

- Two prisons
- Hospital
- Mill
- Geothermal power stations
- Four large rest-homes
- Camp grounds
- Conferences and sporting events very significant
 - CDEM has direct existing connections via events managers
- Tourist operators
- Forestry companies/Logging contractors
- Marae

Pockets that may need specific alerting

- Tokaanu
 - High proportion of elderly residents (>25%)
 - Patchy, poor or no mobile phone coverage
 - Popular with transients
 - Culturally diverse (>50% of residents identify themselves as being of non-European descent)
- Omori
 - High proportion of elderly residents (>25%)
 - Patchy, poor or no mobile phone coverage
 - Popular with transients

- Wairakei-Aratiatia and Taupo Central
 - Lots of workers (>1,000) under the care of large institutions
 - Popular with transients
 - Popular for hosting large events
- Taharua and Rangitaiki
 - Relatively low access to mobile phones
 - Patchy, poor or no mobile phone coverage
- Tongariro and Rangipo
 - Patchy, poor or no mobile phone coverage
 - Popular with transients
 - Culturally diverse (>50% of residents identify themselves as being of non-European descent)
- Kuratau
 - Patchy, poor or no mobile phone coverage
 - Popular with transients
- Turangi
 - Popular with transients
 - Culturally diverse (>50% of residents identify themselves as being of non-European descent)
- Tongariro National Park
 - Patchy, poor or no mobile phone coverage
 - Popular with transients
 - Popular for large events
- Lake Taupo and its shores
 - Popular with transients
 - Popular for large events
- Other area units with a high proportion of elderly residents (>25%)
 - Lakewood
 - Rangatira Park
 - Wharewaka
- Other area units with patchy, poor or no mobile phone coverage
 - Broadlands
 - Kuratau
 - Marotiri
 - Tatua
 - Oruanui
 - Places specifically mentioned at the workshop included:
 - Waihi Village and other holiday settlements along the western bays
 - Napier-Taupo Highway (SH5) black spot (both radio and mobile). HB have put a new repeater in.
 - Hatepe Hill Plateau
 - Poihipi Road

- Whangamata Road
- Western Bays Road (SH32)
- Hatepe Village (Dam above it) – Population swells into the hundreds during the summer holiday season.
- Other areas especially popular with transients (tourists/travellers/commuters)
 - Orakei Korako
 - Kinloch
 - Taupo Airport
 - Accacia Bay
 - Motuoapa
 - Local rivers and streams for fishing
 - State Highways (1, 5, 32, 47 and 46)
- Other Area units that are culturally diverse (>50% of residents identify themselves of being of non-European descent).
 - Waitahanui
 - Mangakino
- Other areas popular for large events
 - Taupo motorsport park and raceway
 - The roads around Lake Taupo

Groups that may need specific alerting

- Transients
 - December to mid-February population swells by thousands, mostly New Zealanders (estimated 90–100% increase in population)
 - Campgrounds are busier for longer than this, freedom campers are especially hard to reach
 - Overseas visitors usually are backpackers
 - People on remote mountain bike tracks. Uncertain how to reach them if in a mobile phone black spot.
 - An estimated 40% of houses in Taupo District are holiday homes
 - Large influxes of visitors for sports events and conferences
 - Many of these transients may be unfamiliar with local hazards and systems
- English as a Second Language
 - Some immigrant populations recently arrived to help in the dairy sector (low English levels)
- Council Iwi liaison officer works directly with local Iwi in events
- Remote forestry workers
- New residents – in 2006 32% of current (2013) usual residents lived in another NZ district and 6% lived overseas – significant for public education

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Taupo District from 2013 census:

- Percent of households with access to mobile phones: 85%
 - Taharua 37.5%
 - Rangitaiki 44.4%
 - Coverage issues discussed in workshop
 - Western Bays patchy coverage with high numbers of transients during summer
 - Rangitikei – no coverage
 - State H/Way 5 poor coverage
 - Mangakino poor coverage and fewer landlines
- Percent of households with access to landline phones: 81%
 - Rangipo 44.4%
 - Tokaanu 59.1%
 - Taharua 62.5%
 - Waitahanui 63.8%
 - Mangakino 66%
 - Wairakei-Aratiatia 68.9%
 - Tatua 69%
- Percent of households with no access to telecommunications: 3%
 - Mangakino 7%
 - Waitahanui 6.4%
 - Turangi 4.3%

A1.7 THAMES COROMANDEL DC



Figure A1.7 Thames-Coromandel District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards (and implications)

Most likely Faster Onset, localised and widespread hazards. Local or regional source Tsunami is the primary concern in terms of consequence. Whole district is prone to flash flooding and debris flow/landslides as there is a short distance between the hills and the sea. Slips causing road closure are very common. Also:

- Severe weather
- Storm surge/coastal erosion
- Earthquake
- Ashfall – distal source
- Hazardous sites
- Animal disease
- Cascading lifelines failure – power outages to isolated communities in storms

Large institutions with people in their care

- DOC
- Thames Hospital
- Thames Mill
- Schools
- Tourist operators
- Wintec
- Language School
- Toyota Thames
- Whitianga Fish Processing
- Forestry
- Retirement Villages and Rest Homes
- Prices Foundry
- Supermarkets and Warehouse

Pockets that may need specific alerting

- Moanataiari (Thames)
 - High proportion of elderly residents (>25%)
 - Lots of workers (>1,000) under the care of large institutions
 - Especially popular with transients/tourists
 - Hosts large events
- Whangamata
 - High proportion of elderly residents (>25%)
 - Especially popular with transients/tourists (especially in summer)
 - Hosts large events (“Beach Hop” in Mar/Apr >100,000 people)
- Whitianga and Coromandel Town
 - Especially popular with transients/tourists
 - Hosts large events

- Other area units with a high proportion of elderly residents (>25%)
 - Parawai
 - Te Puru-Thornton Bay
 - Tairua
 - Pauanui Beach
- Other areas with patchy, poor or no mobile phone coverage
 - Most rural and conservation areas including many places along SH25 and 25A.
 - Most lowly populated coastal areas including some places that are popular with transients such as Cathedral Cove.
- Other areas especially popular with transients/tourists
 - Most of peninsula but especially coastal settlements and beaches, hiking and mountain biking trails in the valleys and ranges, and state highways.
- Other areas hosting large events
 - Hikuai (Kauaeranga Valley)
 - Coastal roads and remote inland trails – Sports events (cycling, mountain biking, trail running)

Groups that may need specific alerting

- ESOL (English as a second language) tourists
- Freedom campers group all year round, actually within ESOL Tourists and NZ tourists. Remaining barrier is simply a remote camping pocket coverage issue – links to DoC rangers in remote areas will be valuable
- Large numbers of commuters between towns
- Elderly group in most coastal towns
- New residents – in 2006 31% of current (2013) usual residents lived in another NZ district and 5% lived overseas – significant for public education

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Thames-Coromandel District from 2013 census:

- Percent of households with access to mobile phones: 81%
 - Coverage issues discussed in workshop
 - Access is OK. Coverage is the problem.
 - Elderly and rural residents tending not to buy smartphones but almost everyone else is.
 - Power outages relatively common and there is a lack of backup at some mobile repeater sites
 - Coverage is poor in most rural and conservation areas including many places along SH25 and 25A and also in most lowly populated coastal areas including some places that are popular with transients such as Cathedral Cove.
- Percent of households with access to landline phones: 82%
- Percent of households with no access to telecommunications: 3%

Other information

Other detailed information is listed below as there was too much to put in section 5.8.

Independent Self-maintained networks

Alerting via self-maintained networks (e.g., rural fire, neighbourhood watch, religious groups), the following opportunities are highlighted:

- Surf Lifesaving
- Coastguard
- Rotary
- DOC
- Federated Farmers/Rural Support Trust
- Iwi phone trees
- Schools, text lists etc.
- Religious Groups
- Neighbourhood Watch in some areas
- VRF Force
- LSAR
- Emergency services HF coverage, including DOC, Police, SAR, Amateur Radio etc.
 - HF on way out, VHF replaces all of these?

Existing Alerting Systems and notes on each system

- Radio
 - Iwi, Gold and Coromandel FM. Locals don't tend to listen to Auckland or national radio stations.
 - Many people listen to radio over satellite TV, requires power
 - Mediaworks, Coromandel FM – more robust repeaters + generators – does go down in power outages
 - More repeaters are required
 - Gaps in radio coverage – geographic pockets
- Websites (TCDC, Thames Valley CD)
- Facebook (TCDC, 2167 likes)
- Twitter (TCDC, 692 followers; Thames Valley CD 318 followers)
- Email subscription service
- SMS-PP subscription “follow tc_dc” – generic TCDC topics published though
- Fixed tone only sirens (most owned by NZFS/VRFF, 27 of 30). Some not integrated into CDEM alerting system
 - Contrary to national standard meaning and tone – meaning for TCDC sirens is “evacuate” rather than “seek further information”, and there are multiple, non-compliant tones
 - Rely on power
 - Thames siren coverage patchy with wind. Not audible indoors unless close.
 - Whitianga siren coverage has patchy audibility
 - Double glazing bylaws reducing penetration

- Heads up only – slow response
- TCDC surveyed 2011 – comments from communities can't hear
- Annual siren testing once a year in Sep (fri before DST change). 6 monthly servicing.
- Resource consent limiting at Whangamata
- Models of Maintenance and ownership are not consistent (not all TCDC)
- Single tone on for minimum 10 minutes is just for Tsunami
- False alarms cause CDEM headaches
- Emergency services PA, only on rural fire trucks
- Regional flood warning system (SMS-PP and email)
- Route Alert (CDEM and council staff undertake limited area door-knocking)
 - Especially for flooding around the Thames Hospital Zones
- Natural warnings – public education materials (“Know the signs”)
 - Tsunami signs exist in ‘at-risk areas’ – Larger communities on east coast.
 - Problem is that the sign is similar to the Pacific Coast Highway sign
 - Some communities have maps indicating 20m contour. All education material is focussed around tsunami risk nature signs. Open days are used to get message out. Fridge magnets with warning signs and an attached notepad have been issued. All hazards brochures were delivered to camp grounds. All schools are required to have an all hazards plan – MinEdu. Noted that Shakeout isn't a good time for schools as they are right in the middle of exams. Day care facilities well set up for an incident but want a call from CDEM which is a bit difficult.
- Use VHF and UHF – links to DOC
- Mobile PAs
 - TCDC project
 - Compliance Officer 4WD Vehicles
 - Targeting remote areas
 - Triggering mechanism likely to be phone calls to staff. 24/7 response expectation?
 - MPI (Fisheries Officers) - 2+ vehicles with lights and loudspeakers
- Rural fire
 - Local brigades part of response plans
 - Note they rapidly have response, not alerting, commitments during a crisis

Other key points noted from the workshops

- Sirens in use (<30 operational) – see existing system notes
- Note mobile phones rely on Waiheke Island repeater?
- Huge transient numbers
 - 130k-150k people at summer peak, most from Auckland, Waikato and Tauranga (mostly English speaking New Zealanders)
 - A few thousand international tourists all year round –notably Germans and Chinese
 - Social risk – high if international visitors lost.

- Tsunami hazard sets the performance standard for CDEM but less effective for other TAs
- Roads can often be closed
- Absentee owners significant
 - Aucklanders will expect the Auckland CDEM app and know a siren as 'all clear' when in fact it means the opposite in the Coromandel.
 - Usually resident pop can be very disperse as a result of widespread holiday homes
- Schools and daycares required to evacuate
 - Many hope for a phone call instructing evacuation from CDEM

A1.8 WAIKATO DISTRICT

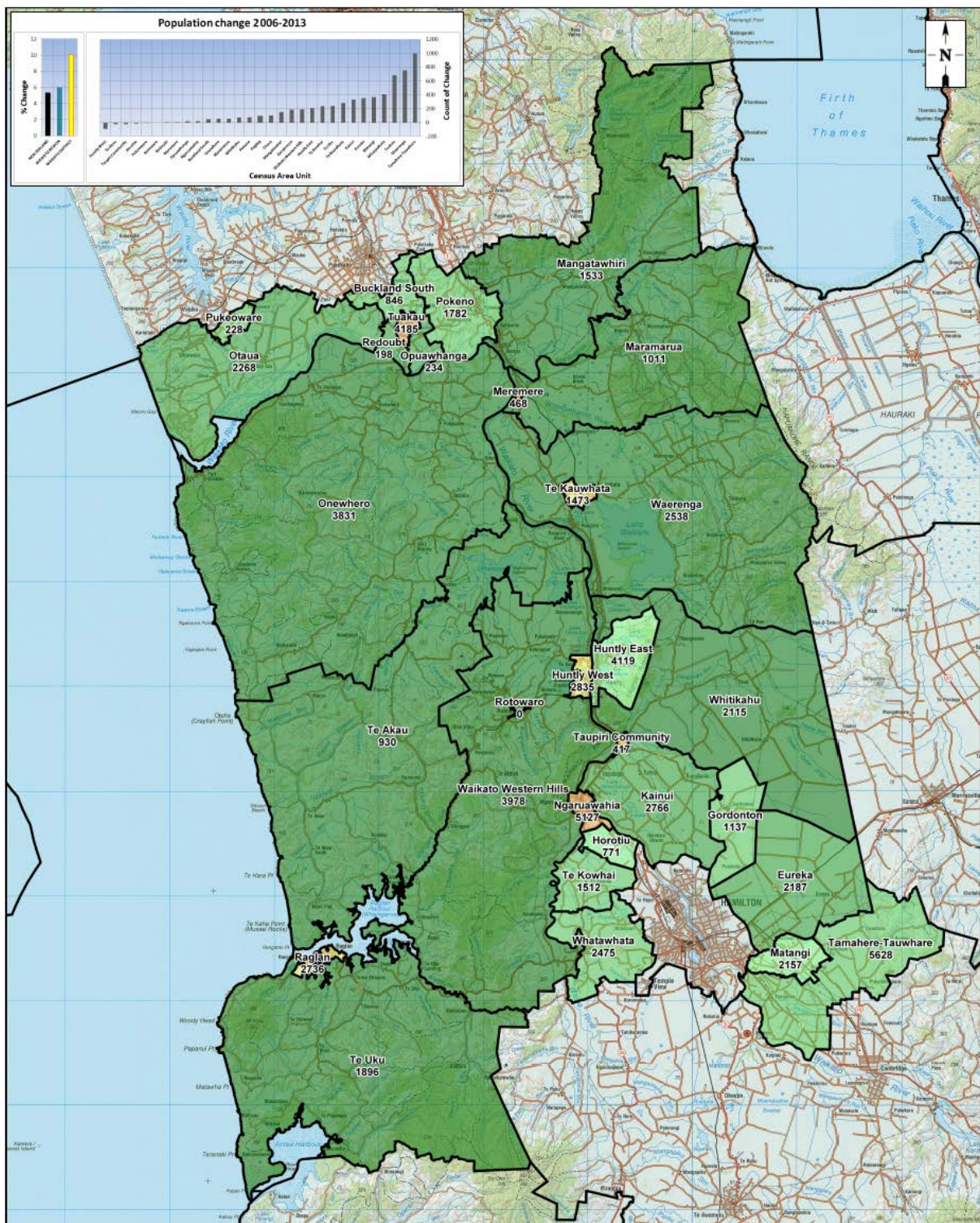


Figure A1.8 Waikato District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density).

Hazards

- Dam failure (Karapiro 40 minutes away)
- Potential isolation at Port Waikato (one road in and out)
- Hamilton Airport – Flight path over Tamahere
- Recently identified Hamilton fault (extends to Gordonton)
- Infrastructure failure or sabotage
- Industrial incident, especially Huntly Power Station
- Rural fire including peat fires
- Highway 22 – Landslide and isolation risks
- Mine collapse or burning
- Tsunami (west coast)
- Ashfall – distal source
- Volcanic event in Auckland would cause major evacuation impact in Waikato
- Cyclone/Storms
- Flooding (last serious flooding was 1958)
- Animal disease
- Both short lead-in time and long lead in time events are important
- Both local and widespread events are important
- **Agreement multipliers for hazards not necessary**

Institutions with people in their care

- Port Waikato – School Camp
- Christian Youth Camps
 - Raglan – Karioi Camp Karakariki
 - Ngaruawahia Huntly Lake Pukemiro Camp
- Turangawaewae Marae – Koroneihana, Poukai events, Marae based events
 - 36 Marae within the Waikato district
- Large influx of population when events held at Turangawaewae Marae
- Major Regatta – March
- Hopuhopu – Tainui games, Māori Touch Nationals
- Springhill Prison
- Affco and other large industrial sites in Horotiu
- Huntly Genesis Energy Power Station
- Quarries and Mines
 - Huntly
 - Solid Energy
 - Stephenson's
 - Puke Coal
- Yashilli Dairy Factory
- Residential Rest Homes
 - Tamahere - Eventide Rest Home
 - Te Kowhai

- Aparangi, Te Kauwhata,
- Hospital – Raglan residential care
- Kimihia Home, Huntly
- Jellicoe Home – Tuakau
- Pensioner Flats
 - Tuakau
 - Huntly
- Hampton Downs – Raceway, public events
- Council camping areas
 - Ngaruawahia Domain
 - St. Stephen’s car park, Tuakau
 - Lake Hakanoa Motor Caravan Park
- Raglan Kopua Holiday Park Bryant Home – Raglan Children Camp
- Hakarimata Tracks – estimated to be used by over 400 people per day during the peak season

Pockets that may need specific alerting

- Te Kauwhata
 - High proportion of elderly residents (>25%)
- Meremere and Huntly West
 - Relatively low access to telecommunications (excl. mobile phones)
 - Culturally diverse (>50% of residents identify themselves as being of non-European descent)
- Te Akau
 - Relatively low access to mobile phones
 - Patchy, poor or no mobile phone coverage
- Raglan
 - Especially popular with transients (tourists, travellers, commuters)
 - Hosts large events
- Ngaruawahia
 - Culturally diverse (>50% of residents identify themselves as being of non-European descent)
 - Hosts large events (Turangawaewae Marae)
- Waerenga
 - Patchy, poor or no mobile phone coverage in east
 - Host large events (Hampton Downs motorsport park and drag strip)
- Other area units with patchy, poor or no mobile phone coverage
 - Onewhero (incl. Port Waikato)
 - Waikato Western Hills
 - Te Uku
 - Mangatawhiri
 - Maramarua
 - Waerenga

- Eureka
 - Lots of workers (>1,000) under the care of large institutions
- Other areas especially popular with transients (tourists, travellers, commuters)
 - State highways (1, 2, 23, 39)
- Other area units that are culturally diverse (>50% of residents identify themselves of being of non-European descent)
 - Taupiri Community (Māori/Pacific Peoples)
- Other areas that host large events
 - Kainui (Hopuhopu events and regatta)
 - Several Christian youth camps (see institutions...)
- Other pockets noted at workshop
 - Department of Conservation Land – Pirongia/Whatawhata
 - Maramarua Village – Poor Mobile phone reception
 - Aotea Harbour – Sparse population and access can be difficult

Groups that may need specific alerting

- Large transient influxes in some locations e.g., Raglan (seven month summer season, population quadruples; and doubles seasonally)
 - Many campgrounds (including DOC) with basic facilities and no-one on site – most have poor mobile coverage across the district
- Some substantial elderly residential villages across the district
- Seasonal workers from overseas (Viet Nam, India etc) on rural properties around Gordonton (100s)
- Transients and cargo on highways 1,000's of vehicles per hour at peak times
- Growing faster than national average, especially in the north of the district
- Tamahere – major growth, more than another 1,000 people over 8 years
- Areas where English for Speakers of Other Languages may be an issue include Yashili Dairy Factory in Pokeno, workers to build the factory
- *New residents – in 2006 37% of current (2013) usual residents lived in another NZ district and 4% lived overseas – significant for public education*

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Waikato District from 2013 census:

- Percent of households with access to mobile phones: 84%
 - Te Akau 57%
 - Coverage issues discussed in workshop
 - Port Waikato – no mobile phone coverage, one road in, one road out, 350 population, not everyone has a landline, low socio-economic issues have an effect on communication availability/access.
 - Poor coverage: Miranda Glen Murray, Pukemiro, Waikaretu, Onewhero, Glen Afton, Whale Bay – Raglan, Mangatangi

- Percent of households with access to landline phones: 83%
 - Meremere 43%
 - Huntly West 55%
- Percent of households with no access to telecommunications: 2%
 - Meremere 9.5%
 - Huntly West 7%

A1.9 WAIPA DC

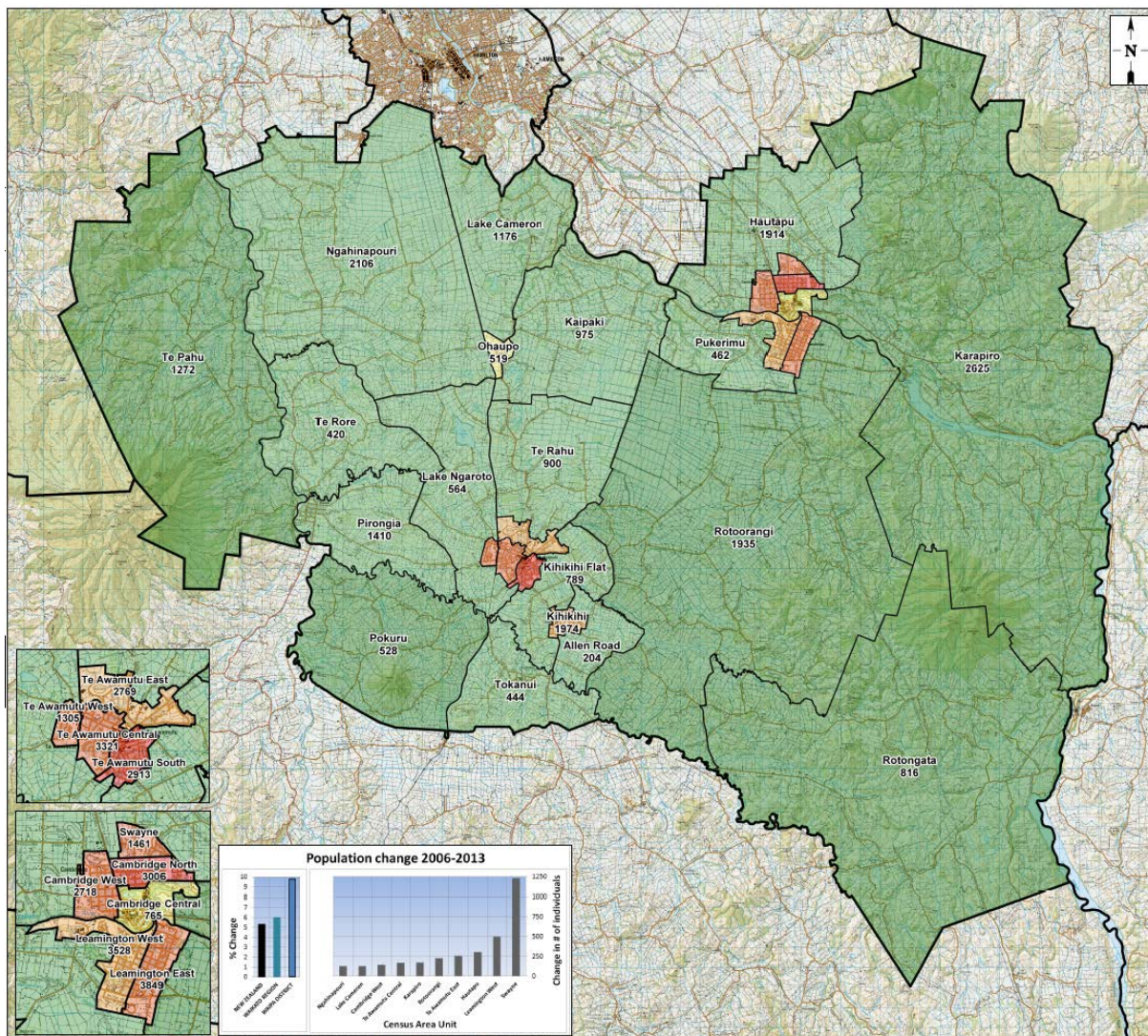


Figure A1.9 Waipa District Area Units with 2013 usual resident population count and density shown (green = low density, red = high density)

Hazards

- Severe weather (two recent tornado events near Cambridge)
- Flooding (especially near the Waipa River)
- Earthquakes
- Ashfall – distal sourced
- Animal disease
- Lifeline utility failures
- Fire (Maungakawa Hill)
- Dam Break (Karapiro)
- Hazchem incidents (State Highways and Main Trunk Rail Line)

Institutions with people in their care

- Mystery Creek Events Centre
- Velodrome – Cambridge
- Rowing – Lake Karapiro
- Harness Racing – Cambridge
- Equestrian – Kihikihi
- Three large high schools and many intermediate/primary schools

Pockets that may need specific alerting

- Cambridge
 - High proportion of elderly residents (>25%)
 - Especially popular with transients (tourists, travellers, commuters)
 - Hosts large events (Velodrome, water sports on Lake Karapiro nearby, Harness Racing, Fireworks)
- Te Awamutu
 - Lots of workers (>1,000) under the care of large institutions
 - Especially popular with transients (tourists, travellers, commuters)
- Ohaupo
 - High proportion of elderly residents (>25%)
 - Hosts large events (fireworks)
- Lake Karapiro, Mystery Creek Events Center, Pirongia
 - Especially popular with transients (tourists, travellers, commuters)
 - Hosts large events
- Area units with relatively low access to telecommunications (excl. mobile)
 - Tokanui
- Area units with patchy, poor or no mobile phone access (all in the hill country)
 - Te Pahu
 - Karapiro
 - Rotoorangī
 - Rotongata
- Other areas with lots of workers (>1,000) under the care of large institutions
 - Hautapu

- Other areas especially popular with transients (tourists, travellers, commuters)
 - Hamilton Airport
 - Maungatautari
 - Pirongia Forest Park
 - State Highways (1, 3, 39)
 - Arapuni Road
 - Owairaka Valley/Waipapa Road
- Other areas that host large events
 - Kihikihi - Equestrian

Groups that may need specific alerting

- Many transients unfamiliar with local hazards and systems, especially at events and travelling on the highways and local roads
- New residents – in 2006 32% of current (2013) usual residents lived in another NZ district and 5% lived overseas – significant for public education

Telephone Access

Telephone household (usually occupied private dwellings) access statistics for Waipa District from 2013 census:

- Percent of households with access to mobile phones: 85%
 - Coverage issues discussed in workshop
 - People might have smartphones but doesn't mean they use them in a smart way – may not have notifications, data or wifi turned on
 - Cambridge has patchy coverage for Vodafone
 - Owairaka valley area patchy coverage (farmers and climbers)
 - In rural areas sometimes there is coverage on the roads but not at the house
- Percent of households with access to landline phones: 87%
 - Tokanui 67%
- Percent of households with no access to telecommunications: 1%

A1.10 WAITOMO DC

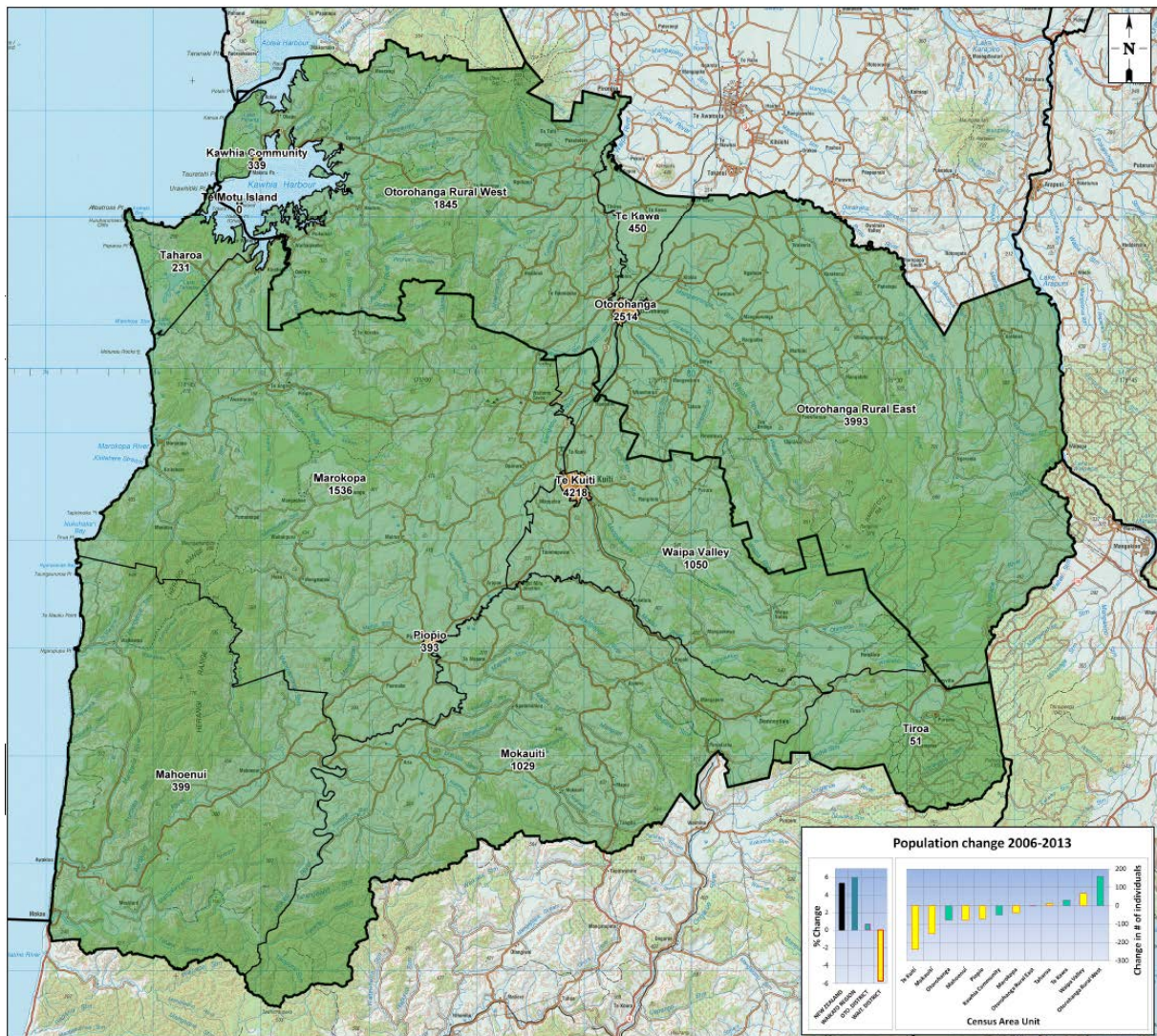


Figure A1.10 Waitomo and Otorohanga Districts Area Units with 2013 usual resident population count and density shown (green = low density, red = high density)

Hazards

- Flooding
- Coastal Erosion (Mokau/Awakino/Marokopa)
- Landslides
- Coastal Inundation/Tsunami
- Ashfall (distal source)
- Lifelines failures/incidents (Highways, rail, power, water, gas) – SH3 via the Awakino Gorge is a key transport link to New Plymouth with no alternative route from the north. It is often closed due to accidents and landslides.

Institutions with people in their care

- Largest school is Te Kuiti High. One hospital in the district – Te Kuiti hospital. A few rest homes.
- Waitomo caves – thousands of visitors (including large numbers of international tourists) per day.

Pockets that may need specific alerting

- Te Kuiti
 - 5% of households with no access to Telecoms
 - Large public events – sheep muster Te Kuiti – late march/early April 3,000–4,000 people.
- Waipa valley
 - Crusader Meats use islander workers.
 - Despite good household telecoms access only areas close to SH3 have mobile phone coverage.
- Mokauiti
 - 60% of households with no mobile access
 - 4% of households with no access to telecoms
 - Generally poor mobile phone coverage except near Piopio and SH3.
- Mahoenui
 - 47% of households with no mobile access
 - Generally poor mobile phone coverage except near some parts of SH3
- Marokopa
 - 31% of households with no mobile access
 - Poor mobile phone coverage except around Piopio, Waitomo Caves and SH3.
- Waitomo Caves – year round attraction with foreign and local tourists, also buses (30–40 per day) on highways to and from Waitomo Caves. Taharoa
 - 32% of households with no landline access
 - Poor mobile phone coverage but high household access to mobile phones indicates it may have a private system provided by NZ Steel – needs checking.
 - large isolated iron sand mining operation – a lot of people travelling in to work each day from other areas
 - Culturally diverse: >50% of residents identify themselves as being of non-European descent
- Tiroa
 - Poor household access to telecoms and mobile phone coverage
 - Small, remote population
 - Pureora mountain bike trail – popular all year round mostly with Aucklanders

Groups that may need specific alerting

- Some dairy farmers in south of district use Philippine labour which explains slightly lower English proficiency in that area.
- Coastal Marokopa and Mokau areas have summer peaks in tourists. Mostly domestic but some foreign tourists.
- Transients (tourists and people on highways especially) – highways can be considered a ‘pocket’ to some degree.

Telephone access

Telephone household (usually occupied private dwellings) access statistics for Waitomo District from 2013 census:

- Percent of households with access to mobile phones: 70% (This is well below the national and regional average).
 - Coverage/access issues mentioned in workshop:
 - Taharoa signal access may be private access provided by the mining company.
 - Younger populations have a higher uptake of smartphones than older populations, Telco companies pushing smartphone uptake so there is an increase in general, but there would be fairly poor access in many areas.
 - There are many areas of limited coverage and there are whole communities in no reception areas. Areas of patchy to no coverage include: Aria (there is VHF coverage there), Mokau, Awakino, Marokopa and Pureora.
 - Most of these areas are not particularly vulnerable to hazards other than being isolated. Farmers who lack coverage and are prone to being isolated are also fairly resilient.
 - For Waitomo District in general it is estimated that ~50% of the usual resident population (about 4,500 people)
 - For Waitomo District in general – 50% of the population (about 4,500 people) are out of coverage areas.
 - Noted that coverage is more important than access to a mobile phone when considering census data as those with access to a mobile phone often only have coverage and use it when in town.
- Percent of households with access to landline phones: 81%
- Percent of households with no access to telecommunications: 4%

A2.0 BASELINE DATA SOURCES

Information on priority hazards in each TA was sourced from the Waikato Regional Council, Waikato CDEM Group and TA reports and websites. Information on alerting systems currently in use in each TA was available from surveys undertaken by GNS Science during development of the updated decision support tool in 2014, and from Waikato CDEM Group from the process of developing the Waikato CDEM Group Warning Systems Strategy 2014–2020.

Where possible, GIS analysis of Census and other data was used to interpret and process the data. For example, population and spatial area data for each census area unit (CAU; generally equivalent to suburbs or localities) was analysed to determine high and low density populations for each CAU in each TA.

The percentage of residents that could speak English was directly available from NZ Census data. Some values for groups with impairments that could inhibit receipt or understanding of warnings were not available. Most likely proxies for these groups based on NZ Census data were identified and tabulated to use as a basis for discussion of such groups in the local workshops.

For sight, hearing and mobility impairment the closest match to this type of information available publicly was considered to be Census NZ data of age bands for each TA and CAU. The proportion of normally resident citizens over the age of 65 was used as a starting value for discussions in workshops.

Access to telecommunications was analysed from two main sources:

1. Coverage maps for mobile phone networks from the websites of the main providers (Spark, Vodafone and 2Degrees)
2. NZ 2013 Census data on household access to mobile and to landline telephones.
 - This was used as a proxy for the proportion of the population with access to telephones, mobiles and landlines at home and is reported for each TA in the results. Network operators' coverage maps have not been used because they are providers' estimation of coverage and there is no reason to expect these are a more accurate approximation of real coverage than the census access data.

A2.1 STATISTICS NEW ZEALAND 2013 CENSUS DATA DISCUSSED

- % of total households in occupied private dwellings with:
 - No access to telecommunications
 - Access to a Mobile Phone
 - Access to a landline telephone
 - Access to the internet
- usually resident population
- number of low density usual residents (<200 people per km²)
- number of high density usual residents (>200 people per km²)
- % population growth since 2006
- % of usual residents that lived in another New Zealand district or overseas in 2006

- % population aged 65 and over
- % population that can speak English
- ethnic diversity
- number of large institutions (over 100 employees)
- area units with over 1000 employees working in moderate-large institutions (50 or more employees per institution)

A2.2 OTHER INFORMATION SOUGHT BEFORE THE WORKSHOPS AND DISCUSSED

- Existing public alerting systems currently in use – case studies of recent use
- Hazard priorities – both natural and anthropogenic
- Spark, Vodafone and 2degrees mobile coverage (available from online maps)
- Number and source of transients during the peak holiday season
- Vulnerable lifeline networks

A2.3 OTHER INFORMATION SOUGHT FROM THE WORKSHOPS

- Budget, for set-up, maintenance and staff time applied to warning systems
- Other systems used not already identified
- Exercise/testing regime of existing systems
- Desired maximum reach of any one system
- Levels of public education/awareness about alerts
- Levels of natural warnings awareness
- Smartphone uptake – old style versus Smartphone
- Landline phone coverage
- Mobile coverage “black spots”
- Communities prone to being isolated due to lifelines outages
- Important lifelines corridors and facilities
- Areas where visitor and tourist numbers are especially significant
- Daily worker migration
- Significant worker commute corridors
- Significant large institutions where workers may be out of reach
- Significant large public events and venues
- Systems that are not likely to be used in the foreseeable future

A3.0 ALERT PROVIDERS

A3.1 NATIONAL MOBILE ALERTING

It is envisioned that at least one (and probably all) of these options will be available for the Waikato CDEM Group within the 2015/16 financial year. All four public app developers (i.e., other than GeoZone) are geo-targeted and are discussing the implementation of Common Alerting Protocol (CAP) as part of a standard New Zealand implementation for all apps, ideally with a single input platform for emergency managers to enter public alerts securely into, which will then go to all apps.

A3.1.1 Emergency Response System alerts

MBIE and Police are leading the emergency response system (ERS) application project – which includes both 111 calling and location-based alerting (service to be established by July 2016). This will provide geo-targeted alerts.

MCDEM is further exploring telecommunications based public alerting options (e.g., mobile device broadcasting). A business case has been provided to Government.

A3.1.2 Auckland CDEM app

CloudM and the Auckland CDEM Group has developed a native Apple iOS and Android app called Civil Defence New Zealand Application. It is available to other regions, currently on a cost-basis. This will provide geo-targeted alerts.

A3.1.3 Google Now

Google Public Alerts via the Google Now app. Google is working directly with GeoNet, MetService and MCDEM to develop alerting. This will provide geo-targeted alerts.

A3.1.4 Red Cross

Red Cross is piloting its Hazard app with Wellington Region Emergency Management Office. It will be available to other regions and will provide geo-targeted alerts.

A3.1.5 Apps by GeoZone (e.g., Campermate)

GeoZone apps are specifically developed to target the camping and international tourist market. They supply their apps when tourists hire vehicles through providers such as Britz, Jucy, Thrifty, Wicked and Maui. Products can deliver geo-targeted push notifications (max 225 characters) to phones with one of the apps installed. The apps are available as native Android and iOS. This is potentially a useful way to reach freedom campers and independent travellers in remote areas. Geo-targeted messages can be delivered 24/7 and translated into French, German or Chinese. GeoZone is also capable of monitoring locations and times of app use and thereby reporting on tourist movements.

A3.1.6 Rural broadband

Rural broadband suppliers can provide internet to smartphones (and thus app connectivity without mobile coverage). Some providers with pricing are listed here: <http://www.therural.co.nz/country-living/rural-broadband-options-in-new-zealand>. Lightwire (<https://www.lightwire.co.nz/rural>) in the Waikato area starts at \$65 per month.

A3.2 RADIO STATIONS

Note that Radio New Zealand National, and other radio stations within the Radio Broadcasters Association, are covered in terms of expectations for alerting by the MCDEM MoU found at:

<http://www.civildefence.govt.nz/assets/Uploads/publications/Radio-MoU-october-2013.pdf>

Further specific aspects of key radio stations mentioned in workshops or apparently available in the region are given here (where comment from those stations was given in response to the project team’s enquiry).

A3.2.1 Switch FM

87.8	Switch FM Radio	Community Radio	2010	Frequency was changed to 87.8 in late 2010.
<p>Transmits to: Cambridge – streams online worldwide FM Live DJs? Mon–Fri 8am–12 midday. Tues 5.30pm–7pm. Sunday 10–12 midday. Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – Cambridge residents plus 2. Listeners – targeting whole community with various shows 3. More people tune in – 8–12midday weekdays 4. Community notices? YES 5. Council, EM CD asked you to put out EM message or information? ??? 6. Could you do this? ??? 7. Preferred method to receive emergency messages. ??? 				

A3.2.2 Contact FM

88.1	Contact FM	Student Radio	2005
NOT OPERATING AT PRESENT			

A3.2.3 Free FM

89.0	Free FM	Access Radio – Local (Not for Profit)	2012	Free FM is previously known as Community Radio Hamilton and re-launched to 89fm - a full power FM frequency after 21 years of broadcasting on 1206AM and 106.7FM.
<p>Transmits to: From Cambridge to entire Waikato CDEM Group. Bombay Hills – Paeroa – summit of Kaimais – Tirau – Rotorua – beyond Tokoroa – past Te Kuiti</p> <p>FM – Yes gaps where there are hills/ranges e.g., Arapuni Hills, Raglan, Bombay Hills. FM radio is a ‘line of sight’ broadcasting tool.</p> <p>Live DJs – Yes – only during Breakfast show. Staff are in the studio at all times but most shows are pre-recorded. Some other shows broadcast live – all shows are prepared by community groups e.g., Burmese, Chinese, Health and Disability etc. different languages too. Can break into programming to broadcast emergency messages. Can break remotely into programming to play pre-recorded emergency messages. After Chch they took the initiative and created a better version of the ‘Language Line’ messaging and sent it to radio stations in Chch as the original version created by Govt(?) was not of broadcasting quality.</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target audience – various niche sectors – don’t aim at any particular group as they are ‘not for profit’ 2. Listeners – don’t measure 3. Most people tune in? Breakfast, then evening shows 4. Community notices or messages – yes to various communities 5. Council, emergency services, civil defence etc. asked to put out an emergency message or information – NO 6. Could you do this if you were asked – YES 7. How would you prefer to receive requests and emergency messages phone/email etc. – Phone, followed by txt and/or email 				

A3.2.4 Mediaworks stations

92.2	MediaWorks covers: More FM Waikato, LiveSport (AM), RadioSport (AM), The Edge, The Rock, The Breeze, RadioLive, MaiFM, George, The Sound, Hauraki, The Hits, The Coast		Adult Contemporary	1999
<p>Transmits to: Whole of Waikato.</p> <p>AM and FM – no coverage gaps</p> <p>Live DJs? Varies with each station. 5am–12 midnight, 24/7 music, can be broken into to go local</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – cover everyone with all stations above. Community based, female skewed. The Edge is most listened to – no live DJs. 2. Listeners – whole of Taranaki plus... 3. More people tune in – Breakfast show then afternoon Drive show. 4. Community notices? YES on radio and facebook and webpage 5. Council, EM CD asked you to put out EM message or information? YES, strong relationship with CDEM and councils. 6. Could you do this? YES 7. Preferred method to receive emergency messages. Mobile phone best then txt, email. 				

A3.2.5 Nga Iwi FM

92.2	Nga Iwi FM	Hit Music/Urban/Iwi	1991
<p>Transmits to: Coromandel, Kaiaua, Ngatea, Waiomu, Matarangi, Mangatangi, Tapu, Waitakaruru, Huntly Maramarua, Te Aroha, Waihi, Hauraki Plains, Miranda, Thames, Paeroa.</p> <p>FM – no coverage gaps</p> <p>Live – DJs 7am–6pm. 24/7 music</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – Hauraki people – South Auckland – Huntly. Teens to 60s 2. Listeners - ~5000 3. More people tune in from 1pm – 6pm 4. Community notices? YES 5. Council, EM CD asked you to put out EM message or information? YES 6. Could you do this? YES 7. Preferred method to receive emergency messages. Phone best then txt, email. 			

A3.2.6 Tainui FM

95.4	Tainui FM	Urban/Iwi	1989	1989–1993 Te Reo Irirangi O Tainui 1993–2000 Tainui FM 2000–2011 Radio Tainui 2011 Tainui FM
<p>Transmits to: Entire Waikato CDEM Group</p> <p>FM – 3 frequencies because of ranges/hills. Gap in South Auckland</p> <p>Live DJs – 7am–9pm. 9pm–7am automated but can be contacted to broadcast emer. messages</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – Waikato Tainui tribal members + anyone else 2. Listeners - ~ assume Tainui iwi but not sure of total number 3. More people tune in from – Breakfast 6–10am and Drive 2–6pm 4. Community notices? YES – local schools, marae, sporting groups 5. Council, EM CD asked you to put out EM message or information? YES – water use, water pipe damage 6. Could you do this? YES 7. Preferred method to receive emergency messages – txt then email to info@tainui.co.nz 				

A3.2.7 Newstalk ZB

97.0	Newstalk ZB	Talk radio	1999	1992–1993 Easy Listening 97FM 1993–1999 Easy Listening i97FM
<p>Transmits to: all of NZ AM/FM both – no gaps Live DJs – 24/7 Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – everyone 2. Listeners - ~ ??? all of NZ potentially 3. More people tune in from – Breakfast and Drive 4. Community notices? YES 5. Council, EM CD asked you to put out EM message or information? YES 6. Could you do this? YES 7. Preferred method to receive emergency messages – phone, txt, email 				

A3.2.8 Raglan Community Radio

98.1	Raglan Community Radio	Community Radio	2006	from 1994 was on 96.6
<p>Transmits to: Raglan FM – gaps around town because of topography Live DJs – 6 hours per day average – changeable Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – everyone in Raglan and some local rural listeners. 2. Listeners - ~ 3. More people tune in from – Breakfast 6–10am and Drive 4–7pm 4. Community notices? YES – local schools, marae, sporting groups 5. Council, EM CD asked you to put out EM message or information? Not to manager's knowledge. MOU with MCDEM for broadcasting emergency messages. Had information via a press release but not directly from CDEM. No agreement with local CDEM group. 6. Could you do this? YES 7. Preferred method to receive emergency messages – 1. Phone then confirmation email before message broadcast. It is essential to get hold of a real person – no messages. 				

A3.2.9 Niu FM

103.4	Niu FM and Radio 531	Pacific Mix	2002
<p>Transmits to: Nationally FM – Live DJs – 6 hours per day average – changeable – 6am–6pm NiuFM, 6pm–6am 531.P.I.</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – everyone in Raglan and some local rural listeners. 2. Listeners - ~ Pacific communities in NZ 3. More people tune in from – Breakfast 6–10am and Drive 4–7pm 4. Community notices? YES – local schools, marae, sporting groups 5. Council, EM CD asked you to put out EM message or information? Not to manager's knowledge. MOU with MCDEM for broadcasting emergency messages. Had information via a press release but not directly from CDEM. No agreement with local CDEM group. 6. Could you do this? YES 7. Preferred method to receive emergency messages – 1. Phone then confirmation email before message broadcast. It is essential to get hold of a real person – no messages. <p>*Would like messages translated into at least the 5 main Pacific Island languages as the station is for all Pacific Islanders and each weekday evening show concentrates on an individual island.</p>			

A3.2.10 The Yak FM

107.1	The Yak FM	Student Radio	2004	Formerly Max FM. Rebranded in 2011
Not transmitting at present				

A3.2.11 AM Christian Radio

AM Stations				
855	Radio Rhema, Life FM, Southern Star& AM network, The Word (about to shut down)	Christian Radio	1988	1985 and 1988 Ag Week Radio (temporary station used during Fieldays).
<p>Transmits to: All of NZ AM and FM – no gaps Live DJs – Mon–Fri 24 hours. Ability to remotely voicebreak from anywhere in the world.</p> <p>Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – everyone in NZ. LifeFM – young adults – 30s, Southern Star 55+, Rheema 30-55 2. Listeners - ~ email coming with figures 3. More people tune in from – Breakfast 6–10am and Drive 4–7pm 4. Community notices? YES – local schools, marae, sporting groups 5. Council, EM CD asked you to put out EM message or information? Not to manager's knowledge. MOU with MCDEM for broadcasting emergency messages. Had information via a press release but not directly from CDEM. No agreement with local CDEM group. 6. Could you do this? YES 7. Preferred method to receive emergency messages – 1. Phone then confirmation email before message broadcast. 				

A3.2.12 Bitter FM

87.6 FM	Bitter FM			
<p>Transmits to: Taupo. FM Live DJs No – Music 24/7 no ads. Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – music lovers 2. Listeners – ?????? 3. More people tune in – ?????? 4. Community notices? ?????? 5. Council, EM CD asked you to put out EM message or information? ?????? 6. Could you do this? ?????? 7. Preferred method to receive emergency messages. ?????? 				

A3.2.13 Tuwharetoa FM

97.6 FM	Tuwharetoa FM (Turangi)	Māori radio	
<p>Transmits to: Reporoa, Mangkino, Wairouru, Taihape, Turangi – right around the mountain FM – yes some gaps but gets to more places than other radio stations. Live DJs – Mon–Fri 7am–10am. 11am–7pm. Ability to voicebreak because staff live locally Listenership</p> <ol style="list-style-type: none"> 1. Target Audience – Māori 5–90 years in am show. 30–55 years in pm show 2. Listeners - ~ 70,000 at last count in 2006 3. More people tune in from – different audiences at different times as above 4. Community notices? YES – local schools, marae, sporting groups, non-profit 5. Council, EM CD asked you to put out EM message or information - YES 6. Could you do this? YES 7. Preferred method to receive emergency messages – 1. Phone then 2. txt then confirmation email before message broadcast. 			

A3.3 VOICE OVER IP (VOIP) PROVIDERS

A3.3.1 TNZ Limited

1. What communications methods does this product use to distribute messages
 - text message, phone calls to landlines, phone calls to mobile phones
2. Any start-up or registration cost?
 - No
3. Cost per call: set rate or cheaper if higher numbers (e.g., over 1000)
 - Yes cost per call. Mobile calls more expensive but txt and mobile phone call same cost.
 - Yes dependent on number of calls.
4. What is the capacity of the product in terms of number of messages per minute or hour? Any evidence to support this claim?
 - Txt = 1000/minute
 - Phone = 1000/minute
 - Evidence – used for non-emergency everyday service so they know its capabilities
5. Estimated time to call 1000 numbers? 10,000 numbers?
 - Txt – 2-3 minutes
 - Phone – 3-4 minutes
6. Is the provider (not the CDEM officers) able to provide a ballpark quote for 1000 calls? 10,000 calls?
 - Assume 1000 calls >1 minute = \$200
 - 10000 calls > 1 minute = \$2000
7. Who provides the telephone numbers?
 - Customer e.g., council
8. How is the database updated?
 - Customer supplies numbers and messages
9. What other requirements are needed for this product to operate? E.g., electricity mains, telephone lines, internet connection?
 - Electricity, telephone lines, internet connection. Mobile phones will work as long as the towers are operating
10. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning)
 - Txt 2-3 minutes
 - Phone – 3-4 minutes
11. Can it be pre-programmed e.g., recorded messages? Typed messages?
 - Yes
12. How is the service activated?
 - Email, phone, web based, txt by customer verified contact number and address only

13. How do you know messages have been received?
 - When txt is sent the system tells us when it is received
14. What happens if a message fails (e.g., number engaged, incorrect email address, no such phone number etc.)
 - If phone number is incorrect it will not be rung – the system will reject it

A3.3.2 GetsReady

1. What communications methods does this product use to distribute messages
 - Email, text
2. Any start-up or registration cost?
 - \$10,000 + \$180 per month
3. Cost per call: set rate or cheaper if higher numbers (e.g., over 1000)
 - No
4. What is the capacity of the product in terms of number of messages per minute or hour? Any evidence to support this claim?
 - ~5600 numbers on database at present – takes 10-15 mins to send messages
5. Estimated time to call 1000 numbers? 10,000 numbers?
 - 1000 – 5–10 minutes
 - 10000 – 15–20 minutes
6. Is the provider (not the CDEM officers) able to provide a ballpark quote for 1000 calls? 10,000 calls?
 - No cost per call
7. Who provides the telephone numbers?
 - Residents enter their own information
 - Those without internet can fill in a form and get local volunteers to enter info.
8. How is the database updated?
 - Residents and volunteers
9. What other requirements are needed for this product to operate? E.g., electricity mains, telephone lines, internet connection?
 - Mobile phone towers, internet connection, electricity
10. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning)
 -
11. Can it be pre-programmed e.g., recorded messages? Typed messages?
 - Yes template
12. How is the service activated?
 - By CDEM controllers
13. How do you know messages have been received?
 - CDEM controller includes self so knows when messages have been sent

14. What happens if a message fails (e.g., number engaged, incorrect email address, no such phone number etc.)
 - Will not know if incorrect number or if someone does not receive the message

****Are looking to expand their business with more alerting options in the future**

A3.4 SMS TEXT MESSAGE

A3.4.1 LERT Info

1. What communications methods does this product use to distribute messages
 - Txt messages
 - Email messages
 - Up to 400 characters
2. Any start-up or registration cost?
 - \$19.95 per mobile phone signup – per phone
 - Email no cost
 - Smartphone can have specific ring tone
3. Cost per call: set rate or cheaper if higher numbers (e.g., over 1000)
Councils:
 - 1-5000 numbers \$0.12 per call
 - 5001-10000 \$0.11 per call
 - 10000-20000 \$0.10 per call and so onMessages to individuals from LERT cost is included in the \$19.95 registration
4. What is the capacity of the product in terms of number of messages per minute or hour? Any evidence to support this claim?
 - 1000's per hour – no known limit – Aussie supplier
5. Estimated time to call 1000 numbers? 10,000 numbers? 5000 = 10 secs then next 5000
 - 3 secs average delivery time
6. Is the provider (not the CDEM officers) able to provide a ballpark quote for 1000 calls? 10,000 calls?
 - See Q4.
7. Who provides the telephone numbers?
 - Individuals
 - Councils
8. How is the database updated?
 - Users update themselves
9. What other requirements are needed for this product to operate? e.g., electricity mains, internet connection?
 - Smartphone allows for reply facility
10. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning)
 - 3-5 secs and an email if there is one

11. Can it be pre-programmed e.g., recorded messages? Typed messages?
 - Yes
12. How is the service activated?
 - By message generator facilitating this
 - Can have system open all the time so it works immediately
 - Can be devolved to several operators to send out messages
13. How do you know messages have been received?
 - Don't unless received on Smartphone
14. What happens if a message fails (e.g., number engaged, incorrect email address, no such phone number etc.)
 - Nothing – we would not know

Comment – only provider in NZ allowed to send emergency alerts – IP issues.

Can geo-locate txts

Can send message to just one suburb or two or five.

LERT or clients (councils) can send messages.

Can message travelling clients for hazards in the area they are travelling in.

Looking at phone messaging at present.

Ring Stuart for more info.

A3.4.2 BULLETIN

1. What communications methods does this product use to distribute messages
 - Txt messages only
2. Any start-up or registration cost?
 - \$199.00 messenger setup cost
 - Monthly hosting fee \$45.00
3. Cost per call: set rate or cheaper if higher numbers (e.g., over 1000)

Councils:

 - \$0.13 cents per call whether one or 10,000 calls
4. What is the capacity of the product in terms of number of messages per minute or hour? Any evidence to support this claim?
 - 2000-3000 per second
5. Estimated time to call 1000 numbers? 10,000 numbers? 5000 = 10 secs then next 5000
 - 2–3 secs average delivery time, 10,000 calls – 10–15 seconds
6. Is the provider (not the CDEM officers) able to provide a ballpark quote for 1000 calls? 10,000 calls?
 - See Q3.

7. Who provides the telephone numbers?
 - Councils must have their own database of phone numbers
8. How is the database updated?
 - Councils update themselves
9. What other requirements are needed for this product to operate? e.g., electricity mains, internet connection?
 - Electricity, internet connection, mobile phone towers
10. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning)
 - Council sends out the message so it depends on how they do it and on the ability of the transmitter e.g., Spark
11. Can it be pre-programmed e.g., recorded messages? Typed messages?
 - Yes can have pre-recorded templates
 - Yes can manually type messages
 - Messages can be scheduled for future events etc.
12. How is the service activated?
 - By Council activating the system and then Spark, Vodafone, or 2degrees transmitting the message
13. How do you know messages have been received?
 - System generates a report of numbers not connected with – can supply individual numbers
14. What happens if a message fails (e.g., number engaged, incorrect email address, no such phone number etc.)
 - Report generated back to Council immediately

A3.5 MOBILE PA

Taupo CDEM have successfully deployed mobile PA systems during emergency events. Their units are purpose-built, vehicle mounted systems at a cost of \$1000 per unit. Taupo DC has used a Wellington supplier to provide mobile PA units for all CDEM vehicles. They report that the units are imported from the US as second hand units and are reliable and reasonably priced. The units are voice capable and have three tones. Price per unit is approximately \$1000 NZ. The supplier, Emergency Lighting Services www.eve.co.nz is based in Wellington.

Taupo CDEM reports that cheaper suppliers of amps and speakers can be sourced. Depending on reported NZ user group reliability, warranties, parts, back up service etc and where the closest service agent is.

A3.6 VHF AND HF RADIO

Gisborne Unitary Authority used VHF radio to reach isolated communities when reviewed by Leonard et al. (2007). The cost is roughly projected from the experience of Gisborne to reach groups of 200 people including the effort to coordinate response groups and exercise. The reality will vary depending on the scale and system architecture chosen. The cost could be substantial depending on hardware (EOC, repeaters and receivers), training, and upkeep, particularly if radio is not being used by the EOC.



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