Public Alerting Options Recommendations for Waiheke and Great Barrier Islands

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CONTENTS

FIGURES

TABLES

APPENDICES

ABSTRACT

Auckland Council Civil Defence Emergency Management (CDEM) Group have requested assistance from GNS Science toon determine the most effective public alerting options for Waiheke and Great Barrier Islands. In 2008, GNS Science developed a public notification decision support tool for the Ministry of Civil Defence and Emergency Management (MCDEM), able to be applied for specific communities at a range of scales. Here the tool has been applied incorporating demographic information about the Waiheke and Great Barrier Island communities, considering a wide range of alerting options for a range of hazards.

The Waiheke and Great Barrier Island communities have distinct differences which influence the effectiveness of varying alerting options. Population demographics and community information, such as telephone access, were entered into the decision support tool to determine the most effective options for multi-hazard alerting. Auckland CDEM Group indicated that no budgets had been set at this stage so all systems were considered to be within budget, though setting of a default budget and cost benefit analyses of options were also undertaken.

The following recommendations are made (these are expanded considerably in Section 5.0).

- The implementation of a suite of systems for both communities is recommended to create redundancy and mitigate one or more systems failing or underperforming
- A public education campaign describing all selected systems should be delivered including the how, what, where and when of message systems and content. Public education should continue to promote understanding of natural warnings for hazard events and the role of television and radio for emergency messaging.
- Telephone-based systems such as auto-diallers for Waiheke and Great Barrier Islands and telephone trees for Great Barrier are the most cost-effective systems investigated. It is recommended these be trialled, and if effective, implemented.
- Fixed, voice-capable siren/PA systems are an effective but costly option for the high density population of Waiheke Island. Voice-capable or tone-only systems are not recommended for low-density populations.
- Tone-only systems of any kind for high-density areas are not recommended due to the high numbers of visitors on Waiheke Island.
- SMS messaging systems can be delivered via auto-dialler systems for Waiheke. The use of a system such as Readynet for institutions and the business community should also be investigated.
- Social networking including the use of Twitter for emergency SMS messaging has been successful in Wellington; Auckland CDEM Group is encouraged to liaise with Wellington Emergency Management Office (WEMO) for further information on the use of social networking.
- Auckland CDEM Group should ensure all warnings planning includes how messaging specific to Auckland can be included in national radio and television broadcasts under existing MOU arrangements.

Definitive quotes for various systems are not included in this report. However, responses from providers which include basic cost guides are provided in Appendix 2.

KEYWORDS

Auckland, Waiheke Island, Great Barrier Island, alerting, notification, warning, hazards.

1.0 INTRODUCTION

Auckland Civil Defence Emergency Management (CDEM) Group has requested advice on assessing and selecting public alerting options for Waiheke and Great Barrier Islands. These two communities are potentially at highest risk from tsunami inundation in the Auckland Council jurisdiction. The Islands are also at risk from a range of other hazards including but not limited to: cyclonic storms, aircraft crashes, rural or urban fire, earthquakes, loss of utility services (Waiheke), landslides and volcanic activity. The Islands have the potential to be isolated during hazard events which interrupt aviation and ferry services.

GNS Science, in work commissioned by the Ministry of Emergency Management and Civil Defence (MCDEM), developed a decision support tool for assessing the various public notification systems available and potentially available to the CDEM sector. Auckland Council requested GNS Science's assistance in applying the tool and providing recommendations for alerting options for the citizens of Waiheke and Great Barrier Islands. This report provides a brief summary of the people and environment (hazardscape) of Waiheke and Great Barrier Islands, the theory and use of the decision support tool, and provides recommendations for Auckland CDEM Group to consider when making planning decisions for public alerting in these locations. The information used in this report to define the communities under consideration has been sourced from Auckland CDEM group, GIS analysis of census data and visits by the principal researcher (including attendance at community meetings) to Waiheke and Great Barrier Islands.

1.1 Population

The resident populations of Waiheke and Great Barrier Islands are approximately 8,600 and 850 people respectively [1,2]. Waiheke Island has distinct, high-density urban population clusters (~6,900 of the normally resident population) and a low-density distributed population (~1,700), whereas Great Barrier Island's population is sparsely distributed (average population density of 3 ppl/ km², with small clusters of houses in some locations.

Waiheke Island is very popular with visitors and holiday makers. Its proximity to Auckland City and frequent ferry service allows for many day-trippers, as well as the longer-stay visitors who utilise holiday homes (approximately 3,400 residences) or commercial accommodation providers (hotels, short-term rental homes, campgrounds etc.). Visitor numbers fluctuate seasonally, however in peak times up to 35,000 visitors may be present on the Island [1]. Day trippers who will have no contact with local accommodation providers are potentially the least contactable people on the Island during events which require warnings and response actions. Those staying overnight could be provided with information on hazards and warnings, and accommodation should be within range of one or more public alerting systems.

1.2 Geography

Both Great Barrier and Waiheke Islands contain relatively little flat land, with steep hills and secluded bays the main geographic features. Waiheke Island also contains rolling hill country, which is generally more densely settled. Much of Great Barrier Island is under the administration of the Department of Conservation and therefore forested [1,2]. The topographic environments of both Islands, and their impact on settlement patterns, create challenges for public alerting, particularly for systems which utilise airborne broadcasting

technology (e.g. PA or siren broadcasts, and FM radio, which requires line of sight). The rugged topography and dearth of mobile telecommunications towers in Great Barrier Island means that mobile phone reception is patchy at best, and in general non-existent.

2.0 EFFECTIVE WARNINGS

Research into a wide range of hazard types for which warnings have been provided to the public underpins a large body of international and national research into what constitutes an effective warning. The key components of an effective warning have been identified by many researchers into peoples' receipt, understanding and response to warnings [3-9] and can be summarised as follows:

> *An effective warning is one which, in a timely manner, reaches those at-risk regardless of what they are doing or where they are located, is recognised as authentic, and provides the information necessary for recipients to respond appropriately in the timeframe available*

Note that "respond appropriately" may include such actions as evacuating a hazardous location, sheltering indoors, protecting property or other such activities. The response required will be determined by the hazard being warned for, and what hazard effects will be experienced (e.g. tsunami wave inundation, ashfall, extreme winds, chemical leaks).

Based on research of effective warning dissemination [3], a warning can be deemed to reach a sufficient proportion of the population if it is reached initially by 66% of the population. As a default, GNS Science recommends that at least one method of public notification in use by officials should reach at least 70% of the population (to allow for uncertainty) to ensure the best possible distribution to the public [6]. This is because the process of informal warnings (person-to-person via a range of media – telephone, email etc.) always occurs with significant events. The research indicates [3] that for first receipt of a warning where widespread official warnings are issued, one third of the population will receive the warning informally **before** receiving or accessing official warnings. The primary research for these calculations was conducted in 2008, and it is likely that the spread of social networking tools such as Twitter and Facebook, as well as the rise in smartphone ownership have made potential access to informal warnings more widespread. However, we have not re-evaluated the 70% figure as there is not sufficient research to determine the effectiveness of social networking as an informal warning tool at this stage.

3.0 PUBLIC NOTIFICATION DECISION SUPPORT TOOL

A generic spreadsheet decision-making support tool, based on effectiveness criteria, was designed to assist emergency managers at a regional and local level to select a combination of warning systems that best suit their hazardscape and communities [6]. This tool:

- Can be used across CDEM groups
- Assesses the effectiveness of each alerting mechanism, implemented for the Group, against agreed criteria
- Produces an individual effectiveness score for each of the alerting mechanisms
- Allows these scores to be summed

- Assesses against the target percentage (below)
- Scores the robustness/resilience of each factor
- Compares cost effectiveness.

Criteria for evaluating the effectiveness of warning systems include:

- Whether a system is effective in delivering to residents, transients (tourists) and institutions;
- The time required to activate the system and to deliver a warning;
- The effectiveness of a system in varying population densities and terrains;
- The robustness or resilience of a system;
- Ongoing effectiveness of the system throughout the hazard event;
- The cost of a system both for set-up and ongoing expenses; and
- The level of public education required for warnings delivered by each system to be meaningful to the public.

3.1 Decision Support Tool Inputs

The tool is designed so that some options can be selected or deselected depending on user requirements.

The decision tool considers a wide range of alerting mechanisms which can be classified into four groups:

1. Natural Warnings (e.g. strong or prolonged ground shaking in coastal areas as a warning for possible tsunami);
2. Independently self-maintained networks (e.g. surf clubs, park rangers, that have no legislative duty to provide CDEM functions but do engage with the public in an organised and official capacity);
3. Systems reliant on third party hardware or staff (e.g. television or radio broadcasts, mobile phone SMS messaging, emails, pagers, telephone trees, police or fire service mobile PA or fixed sirens);
4. Dedicated hardware: purpose built and activated by CDEM officers, such as fixed or mobile PA/sirens, tone alert radio (common in the US).

The tool also breaks hazards down into four specific groups. Users can select which group or groups are to be included when considering alerting options. The groups are:

- Slower onset, localised hazards (e.g. coastal erosion)
- Slower onset, widespread (e.g. drought, distant source tsunami)
- Faster onset, localised (e.g. aircraft crash, urban fire)

Faster onset, widespread (e.g. regional and local source tsunami, catastrophic wildfire)

The default is that CDEM groups typically want primarily to consider faster onset hazards. However, for this study distant source tsunami is a concern and therefore this group will also be selected for inclusion.

To operate the decision support tool the following demographic or budgetary inputs are also required:

- High and low density populations for the area under consideration, with high density defined as zones with a population of ≥200 ppl/km²;
- The average salary of a full time equivalent (FTE) emergency management officer, as each alerting system considered will require a varying amount of time for the following activities: public education, maintenance, activation, exercising,
- Telephone access/ownership of the populations in the areas considered: both landline and mobile phone coverage. Several types of systems are reliant on telephone access; and,
- The allocated budget: for establishment or installation of new systems and a yearly maintenance cost (for hardware checks, database maintenance etc...).

Optional inputs for the tool include:

- Consideration of increasing importance for any special sectors of the population (transient populations including tourists and visitors, those with hearing or mobility impairments, English as a second language, those in institutional care);
- Ruling in or out any specific alerting options, or hazard groups (as discussed above);
- Updating the cost (actual cost per unit or system) or cost basis (i.e. is it priced per unit or must purchase for all of Auckland) for any system. This is not recommended unless specific cost information has been sought and provided from suppliers.

Island populations are faced with additional costs when purchasing and installing any hardware-based systems. Based on the estimates provided (which cannot be considered official quotes) the cost basis and cost per thousand population for some systems have been updated from the default values provided in the 2008 report.

The inputs for the Waiheke and Great Barrier Island runs are therefore:

Table 1 Decision Tool Inputs

	Waiheke		Great Barrier Island	
Population	High	6,900	High	0
	Low	1,700	Low	850
FTE Salary	$60,000		$60,000	
No telephone access (from 2006 census data)	No access at all	10%	No access at all	8%
	No mobile access	30%	No mobile access	80%
Budget*	Direct costs	Not specified	Direct cost	Not specified
	Annual	Not specified	Annual	Not specified
Hazard groups not included	Slower onset localised		Slower onset localised	
Systems not included**	Break-in broadcasting GPS receivers ***Mobile device broadcasting Radio data systems Tone-activated alert radio		Break-in broadcasting GPS receivers ***Mobile device broadcasting Radio data systems Tone-activated alert radio	

*The researchers have been informed that Auckland CDEM Group have made no decisions about budget; rather that they would like to know the most effective options and then consider budget allocation based on the results. As the tool conducts and displays results from a cost benefit analysis, a default budget will be entered (of $1M start-up and $100,000 annual costs will be entered for each Island).

**These systems are de-selected in the tool as they are not currently available in New Zealand.

***Mobile device broadcasting consistently scores as highly effective in the decision support tool. However, negotiations to enable this capability on New Zealand's mobile phone network are still being undertaken by MCDEM. It is likely the first use of this system for public notification will be in Auckland.

4.0 RESULTS

Auckland CDEM Group have indicated that they will consider effectiveness factors before ruling any systems in or out on a cost basis. When considering effectiveness, the population density in particular results in geographic broadcast systems (e.g. PA systems, sirens) less efficient than systems that can be delivered into homes and directly to individuals (e.g. telephone calls via auto-dialler or telephone tree). Effectiveness scores are based on the wide range of indicators employed in the decision support tool. Some systems are considered to be effective, however there is not the infrastructure to support them (e.g. power mains messaging is not possible on Great Barrier Island as there is no reticulated electricity network, SMS messaging could work well for Great Barrier Island, however mobile phone reception is limited at this time).

Table 2 Effectiveness score for systems derived from the MCDEM decision support tool

Waiheke island		**Great Barrier Island**	
Radio and Television announcements	81%	Radio and Television announcements	83%
Telephone auto-dialler	70%	Power mains messaging	72%
Power mains messaging	72%	Website banners	70%
*Website banners	68%	Telephone auto-dialler	66%
Mobile PA announcements	67%	Independent self-maintained networks	64%
Route alert (door-to-door)	64%	Telephone trees	64%
Fixed PA loud-speakers	64%	Fixed PA loud-speakers	64%
Independent self-maintained networks	62%	SMS-PP text messaging	63%
Pagers	62%	Natural warnings	61%
Telephone trees	62%	Pagers	60%
Natural warnings	61%	Mobile PA announcements	60%
SMS-PP text messaging	61%	Mobile PA loud speaker (Police / Fire)	59%
E-mails	58%	E-mails	58%
Mobile PA loud speaker (Police / Fire)	57%	Websites/WAP	58%
Websites/WAP	56%	Marine radio	57%
Radio (UHF, VHF or HF)	56%	Route alert (door-to-door)	55%
Sirens	50%	Radio (UHF, VHF or HF)	54%
Aircraft PA loudspeaker or siren	47%	Sirens	50%
Marine radio	46%	Aircraft PA loudspeaker or siren	48%
Call-in telephone line	44%	Call-in telephone line	46%
Billboards	39%	Billboards	39%
Tourist radio	39%	Aircraft banners	38%
Aircraft banners	38%	Tourist radio	37%
Flares, explosives	37%	Flares, explosives	37%

Entries in red are not expected to reach 70% of the at-risk population and therefore should only be considered as an additional back-up to at least one other system. Some entries in

red are not possible at this point due to infrastructure limitations. Scores show high and low density population effectiveness combined.

4.1 Cost Benefit Analysis

As mentioned earlier, Auckland CDEM Group is interested in the most effective public alerting systems, and budgets for public alerting at this stage have not been set. Default budgets for start-up and annual activities have been created to allow cost-benefit comparison. The budgets are set to exceed the “all maximum” start-up and almost all of the annual costs for high and low density populations to allow all options to be considered equally. (The call-in phone line system has high annual costs).

The tool provides output graphs for start-up and annual costs high and low density populations. For Great Barrier Island the population is considered to be low density only, therefore only one graph is presented.

4.1.1 Limitations of the tool

Census data used in the tool is from 2006; the 2011 census was not conducted due to the disruption caused by the 2010/11 Canterbury earthquake sequence.

Social networking options are not included in the tool. Wellington Emergency Management Office (WEMO) has had considerable success using Twitter to distribute instantaneous SMS messages to citizens who opt in to “follow WEMO”. This system is used for emergency alerts and biannual tests. Anecdotal evidence suggests that encouraging citizens to opt in to “follow” an organisation is a dynamic method to engage younger citizens in the alerting network. However, the decision support tool does not include social networking as an option at this point. It is becoming more obvious that the tool requires updating to include social networking systems.

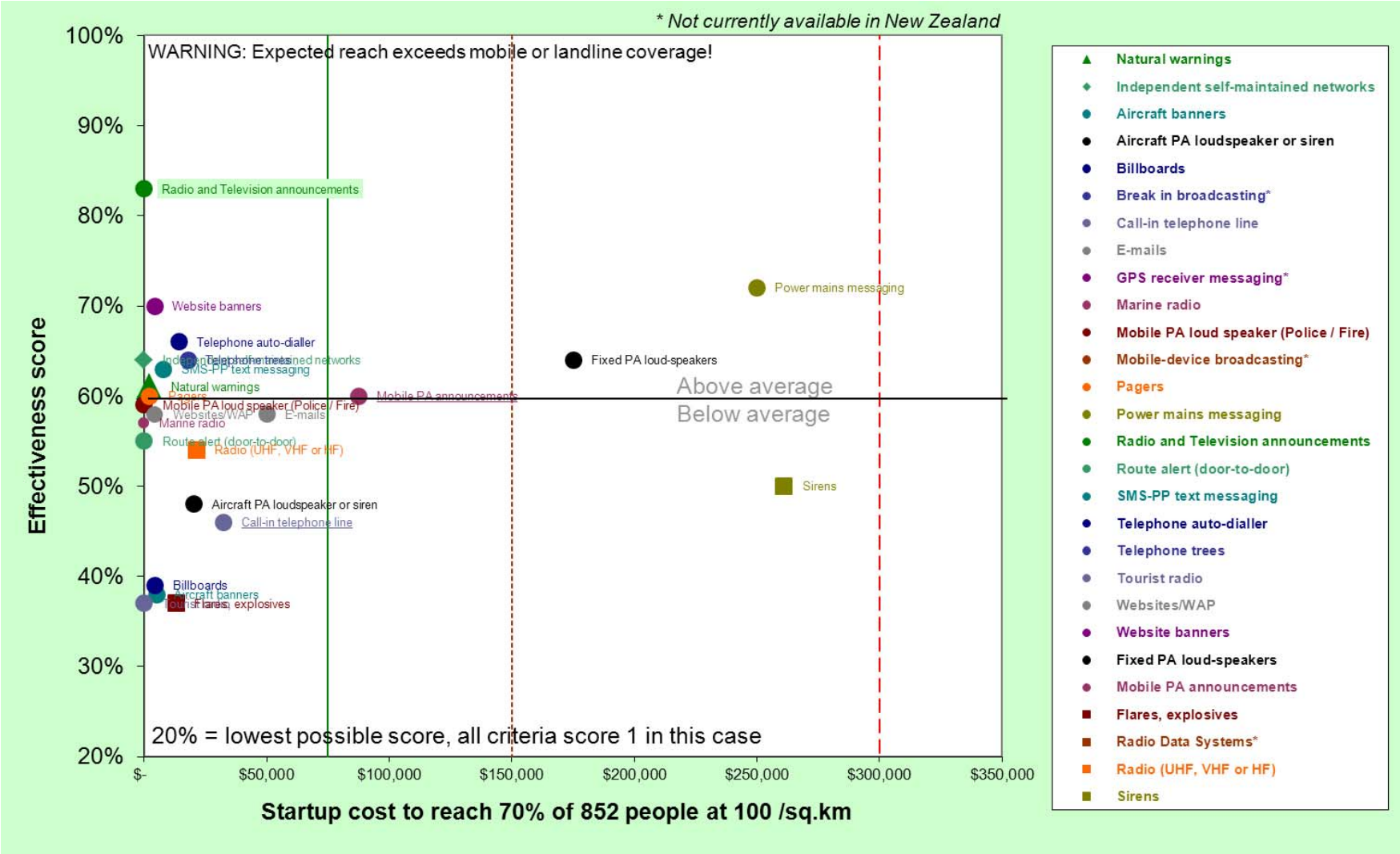

Figure 1 Start-up cost benefit analysis for Great Barrier Island

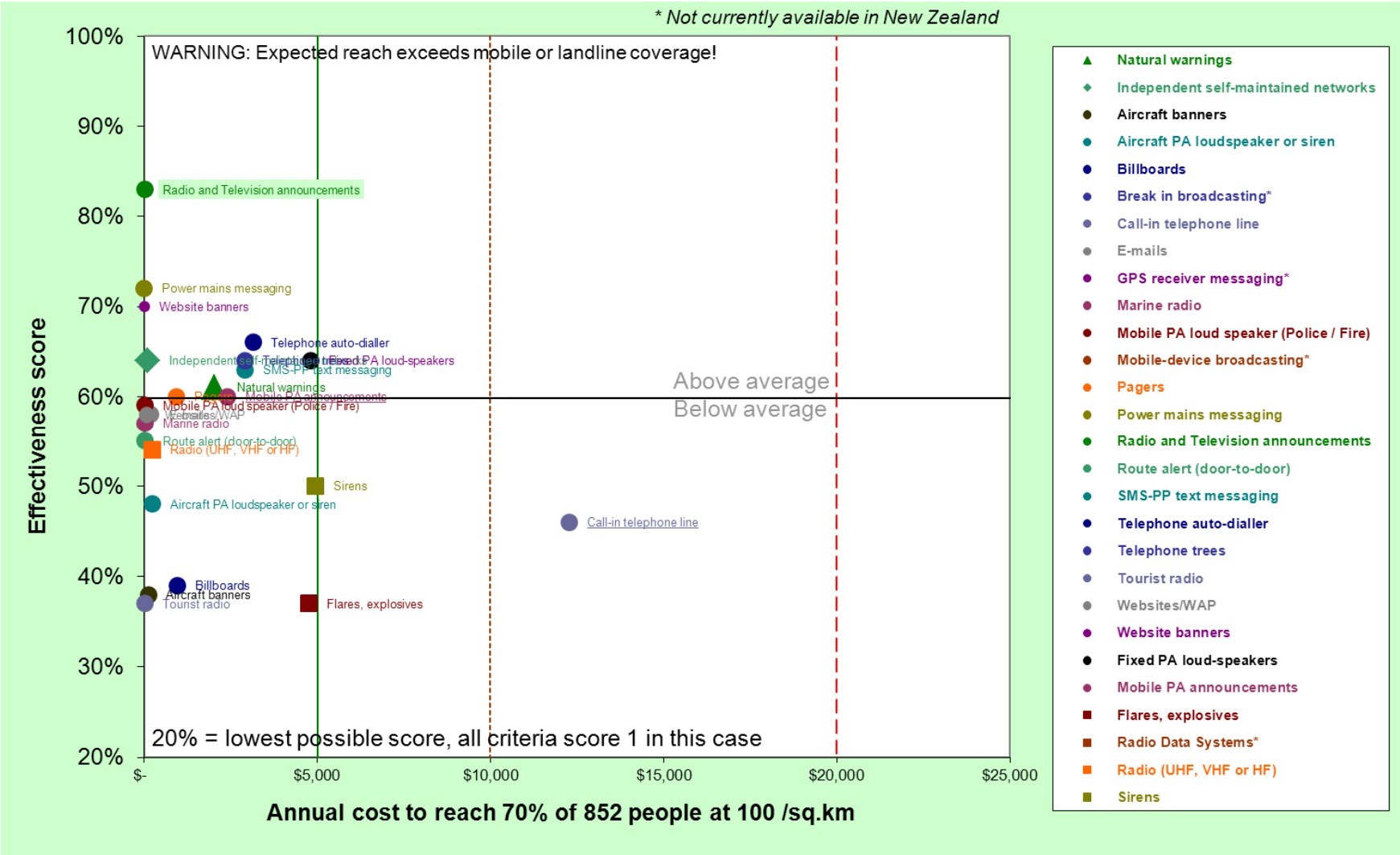

Figure 2 Annual costs for Great Barrier Island

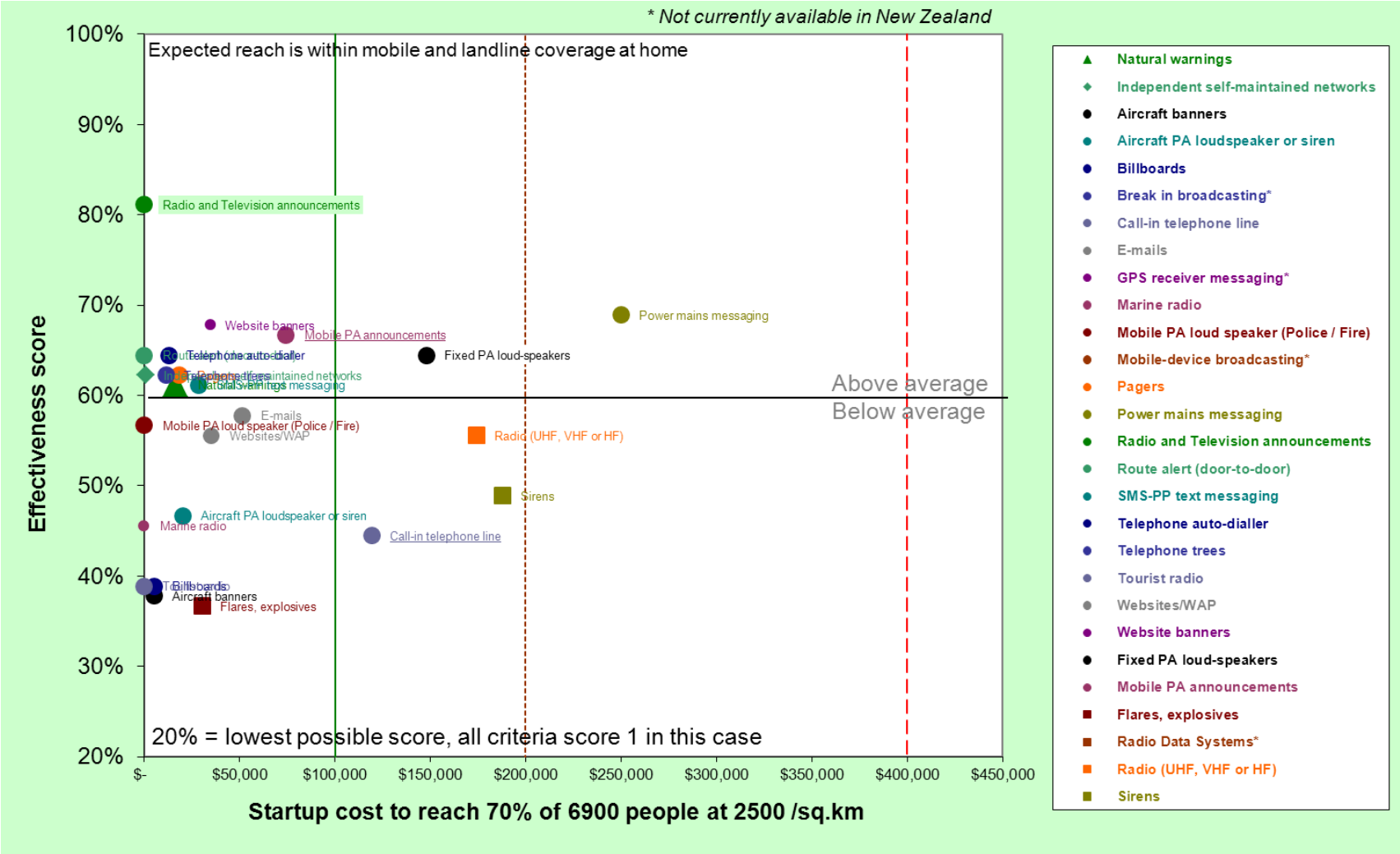

Figure 3 Start-up high density costs for Waiheke Island

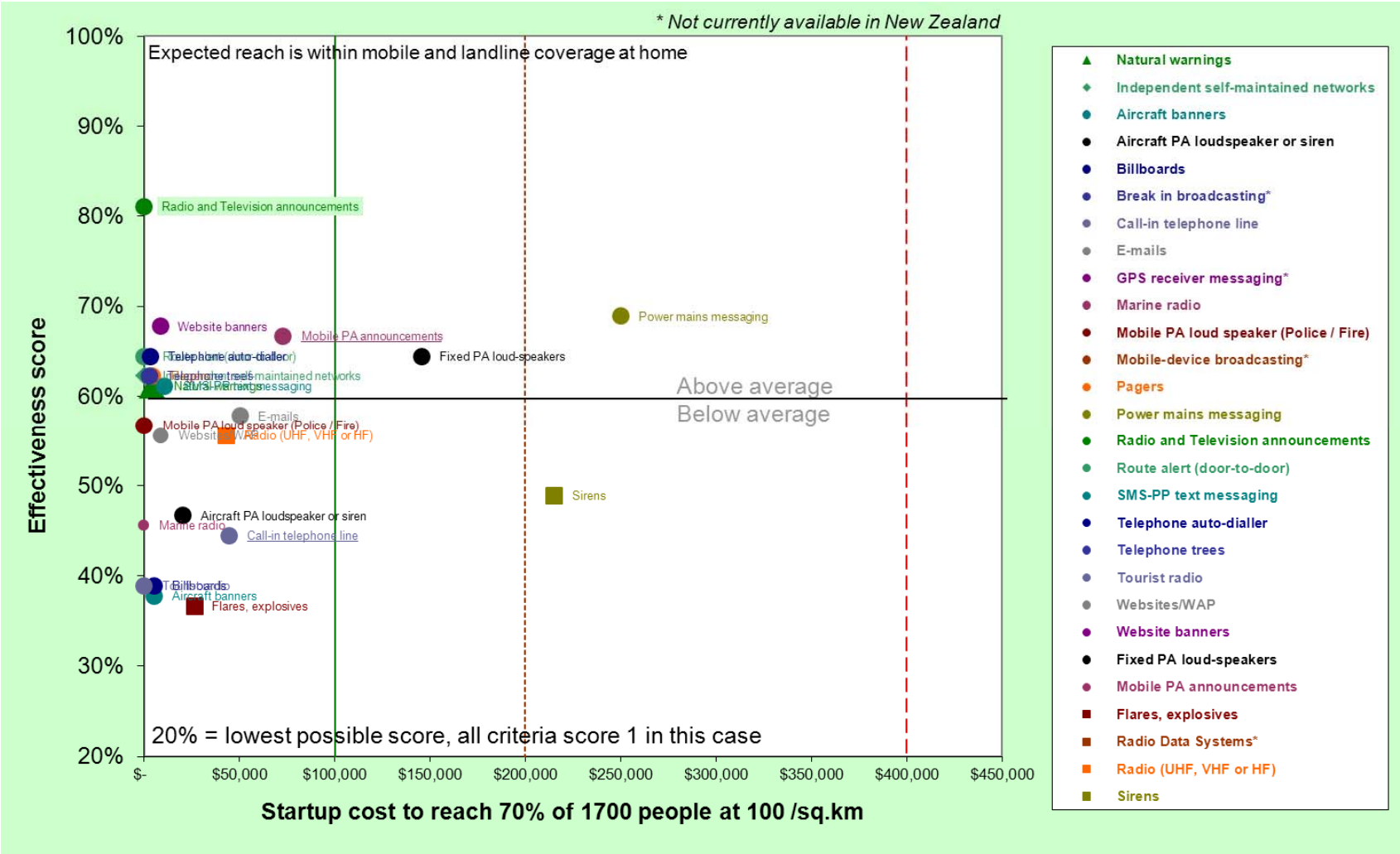

Figure 4 Start-up low density costs for Waiheke Island

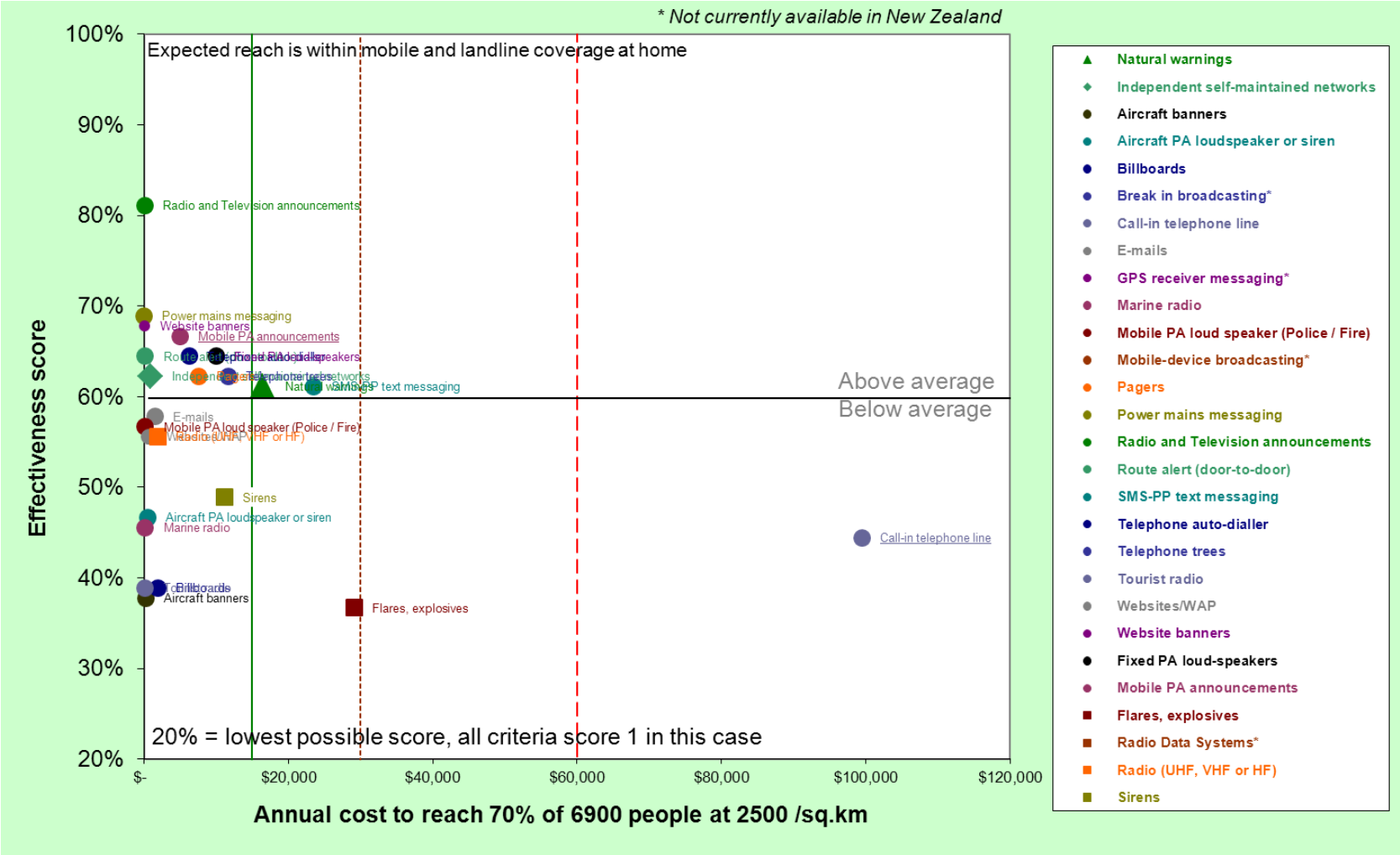

Figure 5 Annual costs (low density) for Waiheke Island

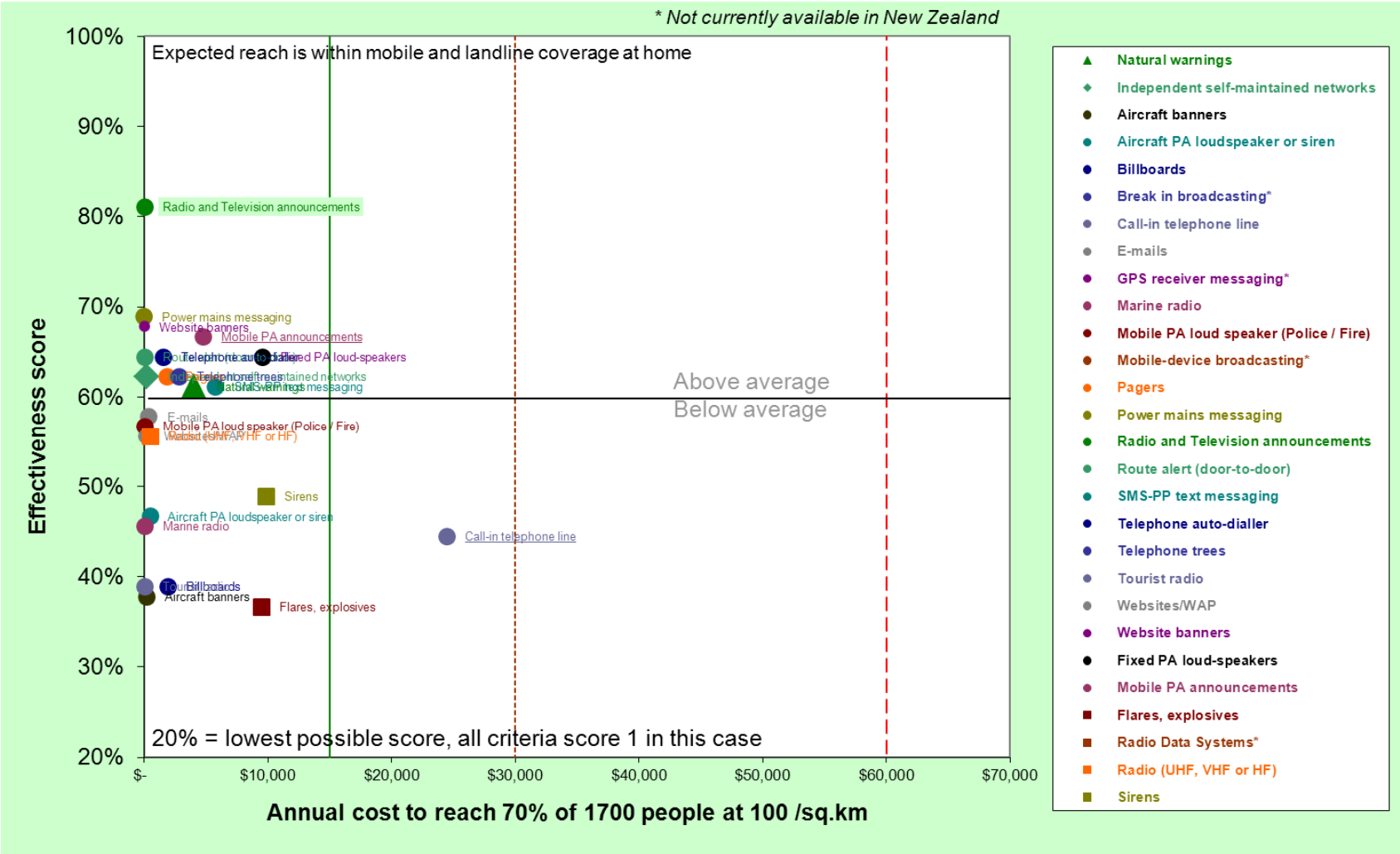

Figure 6 Annual costs (low density) for Great Barrier Island

5.0 RECOMMENDATIONS

5.1 Waiheke and Great Barrier Islands

1. A suite of alerting methods is recommended to avoid reliance on one form of communication. This will provide redundancy in case of outage or interruption to one alerting method and provide for demographic differences in how people typically access information.

2. Alerting methods should be able to be applied for a range of hazards: this means that the flexibility to vary the messages concerning hazard and appropriate actions will be maintained.

3. Regardless of the suite of systems selected by Auckland CDEM Group, a comprehensive public education and exercising campaign should be developed to ensure citizens are provided with all information necessary regarding how, where and what content they can expect for emergency messaging.

4. Television and radio messaging consistently score highly in the tool. The ability to rapidly update images and information, as well as almost universal coverage and zero cost to CDEM agencies (apart from staff time for creating and distributing messages, and public education) support continued use of radio and television for messaging. This is typically done at the national level; however, area specific information will be broadcast during declared events if provided to broadcasting agencies under the existing MOU. Auckland CDEM Group should continue to promote television and radio to the public as a familiar and authoritative medium for public warnings.

5.2 Waiheke Island

1. The decision tool results indicate that most cost-effective and ubiquitous system available for Waiheke Island is a **telephone auto-dialling system**. A basic estimate of costs from one provider (TNZ Group) is included in the appendices of this report, with figures provided of 1,000 calls per minute possible. The primary cost associated with this type of system is creating the database of residents' numbers. These systems can be used to contact landline and mobile telephones. Considerable staff time and a publicity campaign to collect all relevant numbers would be required. Conversations should be undertaken with potential providers to determine what happens if a call is unanswered or the line is engaged (e.g. does the system repeat a call). It is recommended that a test of this type of system with the provider, to verify call per minute rates, be undertaken before Auckland CDEM Group implements such a system for the whole Island.

2. For **high density urban areas**, fixed **sirens/PAs with voice capability** will provide an effective method of alerting large percentages of the population. These types of systems provide the "heads-up" and instruction that are critical to effective all-hazards warning systems. However, these systems are potentially the most costly system available.

3. This project has provided a range of cost estimates for various voice-capable siren systems. These are shown to be the highest-cost systems under consideration. However, these costs are based on a preliminary estimate from Meerkat and can in no way be considered as quotes from the system providers without direct engagement over

specific details. It is recommended that should Auckland Council seek tenders for off-the-shelf systems, the following commercial providers should be considered: Meerkat and Federal Alert Systems. These two providers are suggested because Meerkat is a well-known provider of systems within New Zealand and Federal Alert Systems are widely used throughout the US and Asia. However, the appendix to this report lists a range of other off-the-shelf providers the Auckland Council may wish to approach for a quote. More information on Meerkat, Federal Alert Systems and other providers are provided in the Appendix.

4. An alternative to off-the-shelf voice-capable systems could be sought by including Hastings District Council and their respective siren/PA providers in the tender process. These providers will most likely produce a lower-cost option but have a shorter track record in providing public alerting on a large scale.

5. Tone-only systems of any sort are not recommended for Waiheke Island, due to the high visitor numbers and the very high levels of public education that must accompany them. They are also not conducive to providing different action messages for different hazard types. Fixed or mobile voice-capable siren systems are not recommended for the low density population areas of Waiheke Island.

6. A system incorporating website information and SMS messaging to groups/institutions such as Readynet would provide a useful addition for engaging with the business community and schools/medical centres, etc., on Waiheke Island. SMS systems have the potential to become congested and developing databases of mobile numbers is difficult, therefore SMS-based systems should ideally be used for organisations that are likely to keep the same mobile number for a number of years.

7. The use of a Twitter SMS alerting system for reaching visitors and locals should be investigated. Information on ferries and high traffic locations could encourage people to “follow” Auckland Emergency Management removing the need to create and maintain a database. It is recommended that Auckland CDEM Group staff contact WEMO (contact Dan Neely) for further information on costs and logistics if this is an option Auckland CDEM Group wish to consider.

8. Mobile cell broadcasting systems are not available for emergency use in New Zealand currently. However, they score highly using the decision support tool (over 80%) and Auckland CDEM Group is investigating a test of these systems with MCDEM and the NZ telecommunications providers. The authors recommend that Auckland CDEM Group maintains dialogue and negotiations with all parties as a priority to investigate this alerting option, as its potential application for the wider Auckland area is worthy of consideration and negotiations have been on-going for some years.

5.3 Great Barrier Island

In the report authors’ opinion, Great Barrier Island is currently well served by existing systems in place, due to the tight-knit community structure. Plans are currently underway to establish an all-of-Island phone tree system and considerable work has been undertaken to create the database at this point. The establishment of a comprehensive and robust phone tree system to formalise the current informal “grapevine” phone tree system will further add to alerting effectiveness. The recommendations for Great Barrier Island are therefore:

1. Auckland Council supports, through funding, staff time, monitoring and exercising the phone tree designed by Great Barrier Island Service Centre staff. Regular testing and resources for maintaining an up-to-date database are critical for the success of this system. Exercising should identify any gaps in the system and record the time taken for messages to filter through each step of the phone tree.

2. An alternative to the phone tree system would be to trial the telephone auto-dialling system for Great Barrier Island, using the valuable database information already collected by Service Centre staff.

3. A trial of both telephone-based systems measuring time of distribution and receipt should be undertaken if the two systems are to be weighed against each other. Any deterioration of message quality or delivery rate (content, audibility, what happens when no-one is home or phone engaged etc.) should be included in comparison tests. **Following trials of both systems** they should be discussed with residents to determine which option is deemed to be more effective by locals and CDEM/Service Centre officers: phone tree or auto-dialler.

4. Rapidly-deployable signs with changeable messaging (to allow for a range of hazards and responses) should be purchased and housed at key locations with nominated residents able to deploy them rapidly on main roads throughout the Island.

5. To avoid miscommunication, warning apathy or loss of trust in warning systems, all Auckland Council Service Centre staff (and others who may receive warning messages from Auckland Council) should undertake regular (6 month to yearly) exercises on receipt, interpretation and distribution of messages. Anecdotally there have been “false alarms” (in reality, a misinterpretation of the event’s possible impacts) in the past due to messages being passed on by those who were not familiar with protocols.

6. The Great Barrier Island local radio station will soon have over 90% coverage of the Island; however it does not operate 24/7. Regardless, the station is a valuable community communications resource. A partnership or MOU arrangement should be established with the local Great Barrier Island radio station outlining a Standard Operating Procedure (SOP) for supplying public warnings to the station, and the responsibility of the station operator to broadcast the information.

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APPENDIX 1 PROVIDER SURVEY

GNS Science – Auckland CDEM Group Public Alerting Options Assessment for Waiheke and Great Barrier Islands Project	
1. Name of Provider	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler, SMS messaging system	
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	
5. What is the product's expected lifetime? Warranty period?	
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers, who makes the database and how is it updated, can it ring mobile phones)	
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	
8. Can it be pre-programmed e.g. recorded messages	
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	
10. Is the provider able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	
11. Additional comments	

APPENDIX 2 PROVIDER SURVEY RESULTS

Note prefacing survey response: "BOP Regional Council CDEM Group minutes- Northland CDEM Group has recently partnered with NorthPower in the production of external sirens and internal alarm systems at a greatly reduced cost than the Meerkat systems.

Significant disquiet has been expressed by Western Bay of Plenty and Tauranga City CEG members regarding the exclusion of the Meerkat sirens from the recommended option."

1. Name of provider: Azeotech – Meerkat Alert Systems and DAQFactory (SCADA Software package)	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Fixed electronic horn-speaker
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	~ $15,000 excl gst Additional costs if reqd – Siren pole - $5000, solar power options - $6500, Radio repeater - $15,000 - $20,000 plus ferry freight costs Project management cost additional Economies of scale if all work completed as one project
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	Meerkat Triton 800W siren (4 horns) audible range 65dBa at ~ 600m radius. Sirens are multi-range. Audible range is flexible depending on number of speakers – 250m – 1500m determined by target area conditions PA effective over half distance of tones – limited to 500m in still conditions.
5. What is the products expected lifetime? Warranty period?	20-25 years with recommended maintenance Warranties for components are from suppliers and range from 1 – 3 years.
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers, who makes the database and how is it updated, can it ring mobile phones)	Use existing infrastructure – power/lighting poles, surf clubs, council buildings for mounting. Mains supply or solar power
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	Activated either remotely, by radio, SMS or manually. Activation time instantaneous – ~3 seconds from the signal being sent.
8. Can it be pre-programmed e.g. recorded messages	Siren, live PA or pre-recorded messages
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.)?	Ferry freight costs

10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	Pre-project survey recommended - $10,000 for both islands Based on 35 siren locations – see below – Estimated cost of ~$750,000 excl gst
11. Additional comments	

Our company, Meerkat Alert Systems, has already installed two siren systems for the former Waitakere City Council and former Rodney District Council (both now part of the Auckland Council) – comprising a total of 43 sirens.

Siren installations in the Rodney district are ongoing, with the Waiwera siren project underway and further sirens planned for Orewa/Whangaparaoa.

Other existing installations include Northland (Taupo Bay), Hurunui (Leithfield and Amberley) and Timaru (Rangitata and Caroline Bay).

A system of 70+ sirens has been planned for the Christchurch City Council coastal areas including Banks Peninsula.

1) Construction

Meerkat sirens are of the fixed electronic horn-speaker type and are constructed in modules to allow multiple configuration options to accommodate customer preferences and requirements.

Existing infrastructure, such as power/lighting poles and public/private utilities (Council owned buildings, surf clubs, etc.) are generally used for siren mounting, if available.

Mains supply or solar power (if mains power is not available) is used to charge batteries which drive the siren.

Sirens are constructed of materials to withstand severe coastal weather conditions.

2) Sound output

Sirens currently installed for the Auckland Council, generate three distinct tones, viz: ALERT – EVACUATE – ALL CLEAR.

Sirens are also capable of PA – either live or by pre-recorded message. Sirens installed on surf club buildings are often equipped with PA capability, to allow lifeguards to communicate with persons on the beach.

Meerkat sirens are multi-range depending on the number of horns/amplifiers installed. Audible range is therefore flexible (from 250m - 1500m radius configurable in 70° segments) and is determined by target area conditions, topography, etc.

It must be noted that PA is effective over short distances only (about half that of tones) due to distortion and should be limited to less than 500m in still conditions. We suggest that every PA message is preceded by an alert tone, to attract attention.

3) Activation

Meerkat sirens can be remotely activated by computer (SCADA), VHF/UHF radio, SMS (not recommended due to congestion) or manually (button press at the siren).

Auckland Council sirens are currently SCADA-controlled by a 'Meerkat Messenger' activation and diagnostic system, which has ample capacity to be expanded.

Existing radio repeaters on the Whangaparaoa Peninsula and at Cape Rodney are well placed to communicate with sirens on Waiheke and Great Barrier Islands.

Activation time is virtually instantaneous – about 3 seconds from the moment the signal is sent.

4) Life expectancy

Given the robustness of siren construction, sirens are expected to last 20-25 years if the prescribed maintenance programme is adhered to.

Warranties for individual components are based on warranties received by the respective supplier and range from 1-3 years.

5) Unit Costs

We generally quote on a project basis, as there are too many variables to take into consideration as far as siren construction and communications are concerned.

The installed unit price on an existing mounting structure for a radio-controlled Meerkat Triton 800W siren (4 horns), with audible range to 65dBA at about 600m radius, is currently about $15,000 (excl GST).

Additional costs, if required: Siren pole - $5000, Solar power option - $6,500, Radio repeater - $15 - 20,000.

An allowance would also have to be made for freight by ferry, which run daily from the mainland to these islands.

Project management, if provided by Meerkat would be additional and would depend on the project size/duration.

If work was completed as one project, there would economies of scale.

6) Project Cost

Based on 35 siren locations listed below and assuming that there are no extraordinary exceptions, I would estimate a turn-key cost for the system of about $750,000 plus GST.

7) Maintenance

Sirens are automatically polled vis SCADA every 10 minutes and any malfunctions immediately reported via email and SMS.

Visual inspections are conducted every two years and batteries need to be replaced every 5 years.

Maintenance costs, including battery replacement but excluding call-outs for faults, are estimated at an average annual cost of about $8,000 for a 35-siren system on the two islands.

8) Survey

It would be advisable to conduct a project survey beforehand, to assess requirements – which would cost about $10,000 comprising both islands.

A survey would determine availability of local infrastructure, owner consents, optimum siren configuration, radio communications paths and resource consent requirements (if any) and provide a costed ‘blueprint’ for the Council to assess.

I have done a cursory desktop study of each island via satellite imagery and have identified the following target areas for possible siren deployment:

WAIHEKE ISLAND
Matiatia Bay (1)
Oneroa Bay (1)
Hekerua/Sandy Bay (1)
Enclosure Bay (1)
Palm Beach (1)
Onetangi Bay (2)

Piemelon Bay (1)
Man O'War Bay (1)
Waikopou Bay (1)
Cowes Bay (1)
Silver Bay to Patio Bay (2)
Omaru Bay (1)
Orapiu Bay (1)
Otakawhe Bay (1)
Omiha Bay/Kauharu Bay (1)
Anzac Bay/Putaki Bay (2-3)
Huruhi Bay (2)

Radio Repeater (2)

GREAT BARRIER ISLAND
Tryphena Harbour (3)
Blind Bay/Okupu Bay (1)
Whangaparapara Harbour (1)
Port Fitzroy (1)
Karaka Bay (1)
Kawa (1)
Motairehe (1)
Kaitoke Beach (1)
Medlands Beach (1)

Radio Repeaters (1-2)
There may be beaches/camping grounds, etc. which are seasonally populated and may need to be added to the target areas.

Radio Repeater (2)

1. Name of provider: Federal Signal Corporation	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler, SMS messaging system	Federal Signal's Modulator Series Siren, a family of electronic sirens, produces high intensity warning signals over a large area. A Modulator siren consists of an omni-directional speaker array and a siren control unit/battery cabinet (purchased separately - see the UltraVoice Electronic Siren Controller). A highly efficient design enables the siren to produce a high sound level, while making moderate demands on the battery power source. The innovative Modulator Siren Series speaker array consists of modules that utilize four (4) 100-watt drivers per module. The Modulator is available in several models rated from 106 to 125 dBC at 100ft/30m. Features • Multiple warning signals, Live and Digital voice messaging, and continued emergency operation regardless of primary power outages • Excellent frequency response for crystal clear voice reproduction • High intensity warning signals • 360-degree coverage with no sound variation in the horizontal plane • Industry standard 100 watt drivers • Easy servicing through convenient access panels • Aerodynamic design reduces wind loading concerns • Fully tested in Federal Signal's certified anechoic chamber Controller The Federal Signal UltraVoice® controller combines micro-processor based system control with highly efficient amplifiers to deliver optimized tones and voice capability for electronic sirens. The UltraVoice controller can generate and amplify single or dual frequency warning tones and comes with seven pre-set warning signals. In addition, the controller has been designed specifically to reproduce high quality live or pre-recorded-voice capability. The controller includes a NEMA 4X cabinet housing the control module, up to eight 400 watt amplifiers, and a NEMA 3R battery cabinet. The unit may be equipped with a plug-in programmable receiver module, utilizing DTMF or two-tone sequential activation protocols. A digital voice option can be added by plugging in a single mini SD card which can store up to 250 messages. Smart Message SmartMsg is an advanced suite of applications specifically developed to promote secure, reliable, cost-effective communication solutions for:

	• Mass Alerting and Notification • Interoperable Communications • Incident Scenario Management • Multi-agency Coordination and Data Sharing This open system, software-centric solution supports operational continuity through a user-friendly dashboard that integrates a full range of communication software tools. SmartMsg addresses virtually any critical communications requirement by taking advantage of an organization's existing communication devices and infrastructure, and strengthening and supplementing emergency systems already in place. The end result: a comprehensive communications solution for municipal public safety, enterprise and industrial applications that promises a return on investment that is clearly justifiable. More details can be found at http://www.alertnotification.com/SmartMsg_9451.aspx
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	Yes, economy of scale can be achieved in two ways. 1. Multiple sirens sharing central control activation and software. 2. Federal Signal will apply a discount for large siren purchases.
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	The MOD6048 siren can achieve 125dB at 30 metres with effective 70dB sound pressure level at 1,370metres. PA cannot be verified at this stage (always a little less coverage than tones and dependent on voice intelligibility).
5. What is the products expected lifetime? Warranty period?	Alerting and Notification Systems, Federal Signal Corporation (Federal) warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of two years on parts replacement and factory-performed labor (one year for Informer, EAS, and Federal software products) from the date of delivery to the first user-purchaser. Federal Warning Systems warrants every 2001 & Eclipse Siren (Top of pole only) to be free from defects in material, per our standard warranty, under normal use and service for a period of five years on parts replacement. During this warranty period, the obligation of Federal is limited to repairing or replacing, as Federal may elect, any part or parts of such product which after examination by Federal discloses to be defective in material and/or workmanship. Federal will provide warranty for any unit which is delivered, transported prepaid, to the Federal factory or designated authorized warranty service center for examination and such examination reveals a defect in material and/or workmanship. This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor changes for removal and re-installation of the product. The

	Federal Signal Corporation warranty shall not apply to components or accessories that have a separate warranty by the original manufacturer, such as, but not limited to, radios and batteries. Federal will provide on-site warranty service during the first 60-days after the completion of the installation, when Federal has provided a turn-key installation including optimization and/or commissioning services. This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation or which has been inadequately maintained, nor to units which have problems related to service or modification at any facility other than Federal factory or authorized warranty service centers. Moreover, Federal shall have no liability with respect to defects arising in Products through any cause other than ordinary use (such as, for example, accident, fire, lightning, water damage, or other remaining acts of God). LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL WORKMANSHIP.
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers, who makes the database and how is it updated, can it ring mobile phones)	Electrical input – 240VAC. Wooden or steel pole of suitable strength to support each siren and controller. If RF is desirable for activation then licences would be required. Federal Signals range of options for Alerting and Notification are expansive and therefore more specific detail on desired deployment model is required to provide an accurate answer to this question.
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	A few seconds.
8. Can it be pre-programmed e.g. recorded messages	Yes
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	This question is unclear. Does this question relate to logistics with regards to installation and maintenance post installation?
10. Is the provider able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	Yes but more information is required i.e. coverage map showing terrain, what type of implementation ,RF, IP, local activation?
11. Additional comments	See additional attachments. Also please visit http://www.alertnotification.com/Home_2.aspx

1. Name of provider: Delis Tools Delis Tools Ltd, 25c Peraki Street Kaiapoi, Ph 03 327 5103, Fax 03 327 7676, Mob 021 472 853 http://www.delis.co.nz/fullfeature-dash-mount-siren-xidp308074.html	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Full-Feature Dash Mount Siren Siren speaker, Siren unit with PA mic Siren with a 100w noise-cancelling P.A system and microphone
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	10% discount for 10 or more units. Freight free
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	Siren speakers are 100 watt output, normal audible range is 500 – 600 metres
5. What is the products expected lifetime? Warranty period?	Normal expect life would 10 – 15 years, environments such as sea spray etc. may reduce the life, warranty is 2 years (normal use)
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	Product operates on 12 volt power supply, if you have mains supply you would need a 230 to 12 volt transformer.
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	N/A
8. Can it be pre-programmed e.g. recorded messages	N/A
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	N/A
10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	Yes, see below
11. Additional comments	Web links to our products Full feature siren http://www.delis.co.nz/fullfeature-dash-mount-siren-xidp308074.html Speaker http://www.delis.co.nz/standard-100w-speaker-xidp334124.html

Delis Tools (2007) Ltd
25c Peraki Street, Kaiapoi 7630
Ph 03 327 5103 Fax 03 327 7676
Mob 021 472 853 Email paul@delis.co.nz
Quote
Tax Invoice 00001572
Maureen Coomer
Risk and Society
Natural Hazards Group
GNS Science
DATE 31/10/2011

1	30.2100	30.2100 Full Feature Siren	$696.00	$696.00
1	30.0210	30.0210 Standard Speaker 100 Watt	$366.00	$366.00

Sale Amt	$1062.00
Freight	$0.00
GST	$159.30
Total Amt	$1221.30
Balance	$1221.30

Name of provider: Carrel-Electrade Ltd http://www.carrel-electrade.co.nz/alarms/pdf/siren.pdf	
1. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Emergency Wide Area Siren – single ended hazard-warning siren - fixed
2. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	
3. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	Up to 4 km in still air
4. What is the products expected lifetime? Warranty period?	
5. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	Electricity main
6. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	
7. Can it be pre-programmed e.g. recorded messages	Air raid siren sound
8. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	
9. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	
10. Additional comments	

1. Name of provider: Audio Communications Ltd, NZ http://www.audiocomms.co.nz/warning%20system.htm	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Fixed wide area evacuation system - siren with optional p.a.
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	Cost is dependent on what features are required. Refer to supplementary information
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	~one km over flat ground with 60dB SPL 360° coverage using constant directivity speakers for even sound distribution Siren with optional activation switch and public address microphone for local operation
5. What is the products expected lifetime? Warranty period?	Expected lifetime 10+ years. Warranty 12 months.
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	The audible alert units are self-contained and operate from an internal 12 volt battery. The battery can be charged either from a mains supply or from a solar panel. Both options are available.
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	Less than five seconds.
8. Can it be pre-programmed e.g. recorded messages	At present, pre-recorded messages are not standard, however this feature could be added if required.
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	The product is ideal for use in these locations. The solar powered option provides total flexibility with regard to location. Solar power is particularly applicable to Great Barrier Island due to the unavailability of power there.
10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	There are too many factors to be considered in order to provide such a figure. Further discussion is required before this can be done.
11. Additional comments	Refer attached documentation below

AUDIO COMMUNICATIONS LTD
P O BOX 15437 NEW LYNN AUCKLAND NEW ZEALAND
PHONE 64-9-8277667 FAX 64-9-8270123

EVACUATION EARLY WARNING SYSTEM

SYSTEM DESCRIPTION

Overview

The system comprises a network of audible alert units sited at strategic locations. It provides a warning function using an electronic siren and also incorporates a wide area broadcast public address facility.

The units are totally self-contained and stand alone. They are not dependent upon the availability of mains power or connection to the public switched telephone network.

The system is controlled by radio from a central location, such as a Civil Defence headquarters, with the option of additional secondary control locations.

Local equipment

Each audible alert unit comprises the following items

- Electronic siren with two or three 100 watt outputs
- Two or three 100 watt high efficiency horn speakers, each with a dispersion angle of 120 degrees
- Sealed lead acid battery with capacity to operate the siren for at least 30 minutes
- Solar panel and regulator to charge the battery and maintain that charge
- Radio transceiver and antenna with lightning protection
- Controller providing activation, remote test, timing, and monitoring functions
- Optional “break glass” or other secure switch to operate siren
- Option secure local public address facility

The siren, radio, controller and battery are installed in a secure weatherproof enclosure, mounted on a wooden pole. The enclosure is mounted approximately 2.5 metres above ground level so that it is accessible only by means of a ladder or similar access equipment.

The radio antenna, solar panel and speakers are mounted at the top of the pole.

The units are controlled by signals transmitted from a base unit at Civil Defence headquarters or other chosen location. They can optionally also be activated by a local “break glass” call point and have a local p.a. microphone.

The following functions can be controlled from the base console at headquarters.

- Activate – siren will operate for a pre-programmed period of time, e.g. 10 – 15 minutes
- Test – siren will operate for a short pre-programmed period of time, e.g. 20 seconds
- Reset – siren will stop
- Remote public address - operator at headquarters can activate system and speak into radio. This will be broadcast over the speakers.

The units monitor battery condition and system security and transmit any off normal conditions to the base equipment via the radio.

The radio link can be automatically polled on a regular basis to ensure its integrity.

The siren sound is similar to that of a double ended three phase mechanical siren, with optional rise and fall.

The audible alerting units have an effective range of about one kilometre over flat ground.

The units are self-contained and, being solar powered and radio controlled, do not require a connection to either the mains power grid or the public switched telephone network. They may therefore be strategically located for maximum geographic coverage without consideration of the availability of power or telephone lines or the requirement that they be installed in a building.

Installation within an existing building is, of course, an option. However they are still solar/battery powered to maintain their operability in the event of a power failure.

Capacity of the solar panel and the battery is sufficient for the siren to operate for its specified time based on historic weather data in the geographic area in which it is installed.

The security system monitors unauthorised access to the equipment cabinet.

System control and activation

The system is activated using dedicated software on a computer at headquarters. This is connected to a radio which communicates with the remote units. If necessary due to topographic considerations, a radio repeater (or repeaters) can be included to provide the necessary geographic coverage.

The system is configured in such a way that units can be activated individually or in groups, or the whole system can be activated with one signal.

Provision can also be made for activation using a secondary controller in, for example, the Civil Defence controller's vehicle. This is useful in the event that he does not have time to respond or is unable to respond to the location of the main control equipment. Limited functionality is available but in case of emergency the system can be activated in this way.

System monitoring

As noted above, each alerting unit monitors its own battery status and security alarm. This information is transmitted over the radio channel to the base equipment. The information is available for transmission to external devices carried by off duty personnel.

Company background and experience

Audio Communications Ltd is based in Auckland, New Zealand and has been trading since 1979. We specialise in the manufacture and supply of communications and warning systems for emergency services and public safety organisations and have over thirty years of experience in this field.

Further information on our products and services can be found at www.audiocomms.co.nz 1. Name of provider: Audio Communications Ltd	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Mobile (vehicle mounted) siren with p.a.
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	Basic siren with p.a. – approximately $1000 +GST
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	Audible range is dependent on location.
5. What is the products expected lifetime? Warranty period?	Expected lifetime 10+ years. Warranty 12 months.
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	They are normally installed in a vehicle.
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	Immediate – after deployment
8. Can it be pre-programmed e.g. recorded messages	No, it is simply a siren and p.a. system. Other models are available with an audio input which could be connected to an external device with pre-recorded audio.
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	No.
10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	Not applicable.
11. Additional comments	Refer attached documentation above.

1. Name of provider Hastings District Council	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Mobile siren and loudspeaker system
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	~$6000 - ~$7000 for initial unit ~$2500 - $3000 per unit when production is set up
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	99dB
5. What is the products expected lifetime? Warranty period?	System devised by HDC so not an issue
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	Battery powered - doesn't need electricity. Needs vehicle and driver
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	• Minutes from MCDEM to Council to public pager network up and running • Plenty of time to get message, drive to coast, warn people and then for evacuation
8. Can it be pre-programmed e.g. recorded messages	Yes
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.).	No
10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	Depends on How many settlements each mobile unit can cover in the time allowed. Depends on how many units the Council wants to purchase.
11. Additional comments	

Notes taken during phone call with Warren Meldrum

Types of alert/warnings methods used:

- Napier has e-text alerts and some residents of Hastings have hooked into Napier system so Hastings will have to institute the system too.
- Facebook, Twitter, auto-dialler

- Mobile alerting system – self developed on WEMO lines (WEMO 1m³ sits on roof of vehicle, heavy and requires 2 people to mount, huge size, 115 dB). Hastings model weighs 8kg, range 500m plus for siren, 300m for voice message.

1. Good for highly localized event.
2. Doesn't need electricity
3. Need to choose areas to use it in
4. Can have siren and voice message
5. 500m range for siren, 300m for voice message
6. Voice message good for visitors – not bilingual
7. 7 mobile sirens at present – want 10 on coast and another 5 in town eventually
8. Will deploy 4 along coastal band when they are ready – Haumoana etc., other 3 in Waimarama, Clive and Whirinaki
9. Activation time – minutes from MCDEM to Council to public – pager network up and running
10. Plenty of time to get message, drive to coast, warn people and then for evacuation
11. Can have pre-recorded messages
12. Mobile is useful for all-hazard warnings
13. Downside – reliance on humans – error???
14. Seven mobile sirens tested along coast in late November 2011
15. For info on mobile sirens they used MCDEM 'Directors Guidelines', reading heaps and trial and error

- Investigated Meerkat – negative
- Fixed siren cost = ~$16000 each, mobile = ~$2500 - $3000
- Every time the sirens are tested a questionnaire survey is done for public response
- All fixed sirens have been removed and had maintenance done and are sitting in a warehouse to probably be used for rural fire warnings as theirs need replacing – tone only
- May look at fixed sirens for smaller communities, but some e.g. 30 residents or just a couple of houses would be more efficient to telephone them
- Hard to educate community about the advantages/disadvantages of fixed sirens
- There is a holdup with getting messages on radio stations because they are syndicated and would need to get the local DJs back in the office to give local messages
- Fixed siren tone doesn't work successfully on coastal areas
- Plan for 10m tsunami with 2000 year return period
- Plan for ~20 min for wave to reach coast from Hikurangi Trench (near source tsunami)
- Sirens are best for warning pre-event
- Fixed sirens generally work on mains power, some bigger sirens on 3 phase power (6-8km range)

1. Name of provider: Hutt City Council	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto dialler	Carter fixed siren – Gents Honeywell (formerly Gents of Leicester)
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	N/A
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	Don't know but HCC aims for overlap of sound from sirens
5. What is the products expected lifetime? Warranty period?	No known because HCC have had several of the sirens since WWII and are buying the same brand to add to siren numbers
6. What other requirements are needed for this product to operate? E.g. electricity mains, telephone lines, database of phone numbers (for autodiallers who makes the database and how is it updated, can it ring mobile phones)	Mains electricity
7. What is the activation time (from when the owner first wants to send a message to when the first person will receive a warning – this will vary with mobile units as they need to be deployed)	A few minutes only from MCDEM to Council to activation – takes ~20secs for sirens to 'sound up'
8. Can it be pre-programmed e.g. recorded messages	No. Siren only
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.)?	Range around islands
10. Is the provider (not the CDEM officers) able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	N/A
11. Additional comments	

#Notes taken during phone conversation with Peter Walker

- 11 sirens throughout LH plus 4 at fire stations that double up as EM sirens
- May get another siren in Seaview Marina area
- All HCC sirens have the same sound – many are ex-WWII air raid sirens – HCC has purchased the updated WWII siren to extend coverage
- Trialling fluctuating the sound up and down so that the tone can be heard by majority and so that people don't hear a monotone and ignore it.

- HCC investigating siren volume so more can be heard with less sirens
- Northernmost siren at Manor Park, northernmost fire siren at Stokes Valley fire station
- Testing early November 2011 to test audible range
- Mobile sirens around Eastbourne bays – units work off car battery and are based around bays
- Sirens activated from HCC office – individually or en masse
- Built to last – low maintenance
- Regular maintenance done and tested annually
- HCC use SMS, email, web alerts as well

1. Name of provider: TNZ Group Limited	
2. Hardware Type: what is the product e.g. siren, siren/PA, auto-dialler	Auto Dialler Messaging System
3. Cost per unit: Is there an economy of scale saving e.g. buy 10 they are cheaper	Monthly rental and usage costs
4. What is the range of the product e.g. audible range for sirens/PAs, number of calls per minute for auto-diallers	1000 phone calls per minute 600 TXT's per minute 1000 facsimiles per minute
5. What is the products expected lifetime? Warranty period?	10-15 years lifetime & warranty
6. What other requirements are needed for this product to operate? e.g. electricity mains, telephone lines, database of phone numbers (for auto-diallers who makes the database and how is it updated, can it ring mobile phones)	Electricity, telephone lines, cell towers. You would supply the database of numbers and keep this updated.
7. What is the activation time - from when the owner first wants to send a message to when the first person will receive a warning (this will vary with mobile units as they need to be deployed)	Activation is 60 seconds from loading the request.
8. Can it be pre-programmed e.g. recorded messages	Yes
9. Are there any particular issues for this product that could arise due to the location being Waiheke and Great Barrier Island (shipping of heavy parts, maintenance, need to be within a certain distance to activate etc.)?	None
10. Is the provider able to provide a ballpark quote for covering coastal Waiheke Island and coastal Great Barrier Island.	A software system that is accessed as required. $100 per month plus 20c per minute mobile call, 20c mobile TXT, 8c per minute land line call, 10c per fax page. Prices NZD and exclude GST.
11. Additional comments	As no hardware is required, all regions should have access and use this type of service.

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