

Report 12.585
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Committee Council
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Emergency water supply

1. Purpose

To inform the Council of the requirements and options for emergency water supply for metropolitan Wellington after a major earthquake.

To obtain approval to carry out a feasibility study for an emergency water reservoir near Takapu Road, Porirua and the potential negotiation of an option to purchase land for the reservoir.

2. The decision-making process and significance

The matters requiring decision in this report have been considered by officers against the requirements of Part 6 of the Local Government Act 2002 (the Act). Part 6 sets out the obligations of local authorities in relation to the making of decisions.

Officers recognise that the matters referenced in this report may have a high degree of importance to affected or interested parties.

2.1 Significance of the decision

Part 6 requires Greater Wellington Regional Council (GWRC) to consider the significance of the decision. The term 'significance' has a statutory definition set out in the Act.

Officers have considered the significance of the matter, taking the Council's significance policy and decision-making guidelines into account. Officers recommend that the matter be considered to have low significance.

The decision to carry out a feasibility study and potentially to negotiate an option to purchase land, does not commit the Council to purchasing land or building a reservoir. However the Council may be requested in the future to make a decision on both issues, depending on the outcome of the feasibility study.

Officers do not consider that a formal record outlining consideration of the decision-making process is required in this instance.

3. Background

Emergency water provision can range from a personal supply of a few litres in a container to significant quantities in city or regional council owned reservoirs. Even at relatively low levels of consumption the demand for water in an emergency will be substantial. This report covers a range of emergency water sources and identifies options for regional bulk water emergency supply.

While most Wellingtonians are probably aware of the possible impact of a movement on the Wellington Fault, there are other events that can cause less, but still significant damage, for example, a movement on the South Island alpine fault. On a smaller scale, a fire at a water treatment plant could take some time to repair before the plant becomes operational again.

Historically, GWRC had access to 340 ML of treated water stored in the upper and lower Karori reservoirs. This was rechlorinated before being pumped or gravity fed into the system. The water was stored for operational and emergency supply purposes. In 1997 the lower Karori dam, then 119 years old, was decommissioned in part because it is located directly on the Wellington Fault. The upper reservoir was decommissioned earlier because of seismic risk.

A Wellington Fault movement is likely to have the greatest impact on the bulk water supply system compared with other events, so planning is based on this event. GWRC has spent in excess of \$20M over the last 20 years making the water supply system more robust in a seismic sense. Even so, the forces associated with a movement on the Wellington Fault are so huge that almost 100 breaks are expected in the bulk water pipelines (based on similar events overseas) and many more in the city reticulation networks.

The public's tolerance to lack of a reticulated water supply may be exhausted after a few days, as occurred following the Christchurch earthquake in February 2011. Emergency water distribution systems were set up quickly in Christchurch as many roads were still accessible and electricity was restored fairly quickly. In Wellington, the restoration of utility services will take much longer, as explained in the Wellington Lifelines Group report on utility restoration times, published in November 2012 and presented to the Civil Defence Emergency Management Group meeting on 16 November 2012.

Public frustration at having to carry heavy containers of water for household use is understandable, and the limited volume of stored water in service reservoirs also creates uncertainty. Therefore the bulk water supply needs to be able to be restored as quickly as practical, and this will be more achievable with large volumes of stored water or water sources closer to consumers.

In previous work comparing the benefits of the Whakatikei Dam and the Kaitoke Storage Lake it was recognised that the former had emergency supply benefits from its location on the western side of the Wellington Fault and closer to Porirua and Wellington cities than Kaitoke. However if the suggested

incremental approach to new source development outlined in report 12.584 is adopted, it could be several decades before the Whakatikei Dam is constructed, and these benefits made available. Therefore to redress this shortcoming, a preliminary investigation of a number of sites within Wellington and Porirua city boundaries has been conducted (see section 12).

4. Responsibility for the supply of emergency water

In the New Zealand context the Wellington situation is unique, with one water wholesaler and four city retailers. GWRC's obligation to supply water to the four city councils is contained in the Wellington Regional Water Board Act 1972. Clause 38 of this Act provides an obligation to supply water "when water is available under the operation of this Act". Having agreed a 2% probability of shortfall standard with the customers (sometime referred to as a 1 in 50 years drought), the city councils are therefore not in a position to offer the end users a security of supply standard any better than this during normal circumstances.

When it comes to emergency water supply there are obligations under other acts, for example the Civil Defence Emergency Management Act 2002. This act requires a local authority to ensure it is able to function to the fullest possible extent even though this may be at a reduced level during and after an emergency

From a metropolitan perspective it largely comes down to which components of an emergency water supply system should be provided by the four cities and which components should be provided by GWRC.

At present GWRC's expertise is in lakes, dams, water treatment plants and larger scale water supply infrastructure. It is proposed that GWRC focuses its efforts on larger scale supply of emergency water and the four cities focus on the distribution of local storage/sources and supply to consumers. This proposal will be discussed further with the customer cities before formalising.

5. Emergency water requirements

5.1 Minimum level for survival

The Ministry of Civil Defence and Emergency Management advise each household to store at least 3 litres per person per day for 3 days supply of emergency drinking water, and additional amounts for cooking, hygiene and pets. The Wellington Regional Emergency Management Office (WREMO) recommendation is to allow at least 18 to 20 litres of additional water.

Around 20 litres per person per day of water is also recommended as a minimum for survival by international aid agencies and humanitarian guidelines. However experience overseas has shown that communities expect a greater volume of water after about two weeks, and this was also evident following the Christchurch earthquake.

An emergency water supply of 20 litres per person per day has been used by GWRC to determine the minimum volume of water needed until the bulk water supply is restored and to evaluate the amount required from alternative sources.

A BERL Consultants report assessed that at least 100 litres per person per day will be necessary for commercial activities to resume, and this was not likely to occur in most locations until the bulk water supply and the city reticulation systems were substantially restored.

5.2 Water stored in service reservoirs

In 2010, a group was established to plan and coordinate water services emergency preparedness for metropolitan Wellington (the WSEPG). The group comprised of the water supply and emergency management staff from the four cities, GWRC and Capacity Infrastructure Services (Capacity). The WSEPG commissioned MWH NZ Ltd to review the options for emergency water supply for each city following a major earthquake.

The MWH report considered the amount of water likely to be stored in each city reservoir following a major earthquake and how many days the stored water could supply the local community at 20 litres per person per day. Only reservoirs with automatic seismic shutoff valves on the outlet were included in the analysis and reservoirs were assumed to be 80% full. Some small older reservoirs may suffer serious loss of water following a major seismic event and these were not included.

The length of time each reservoir could provide 20 litres/person/day varied by city and the community served by the reservoir. In many areas water could be supplied for 30 days or more, but in a few locations (particularly Porirua western and northern suburbs, and Wellington's eastern and southern suburbs) the supply would only last 11 to 17 days at the restricted rate.

During the first three days after the emergency the water supply team for each city plans to mobilise water distribution points and distribute water stored in reservoirs to the community at the rate of 20 litres per person per day.

Distribution points are planned to be placed at accessible locations, but will still require people to walk (or drive if possible) some distance to collect water in containers. The Christchurch experience showed that travelling to distribution points, queuing and carrying the heavy containers home was time-consuming and tiring. It was only a few days before the community became unhappy with the restricted quantity of water and frustrated with having to collect it.

6. Repair of the water supply infrastructure

6.1 Restoring the bulk water supply

A team of GWRC water supply staff considered a practical and systematic approach to restore the bulk water supply following a Wellington Fault earthquake (the worst case scenario based on an analysis of the likely number of breaks by GNS Science). Because of expected fault dislocation at Thorndon and Korokoro, and liquefaction prone areas in Petone, first priority was given to the Kaitoke to Karori pipeline providing a partial supply to Upper Hutt, Wellington and Porirua. A separate and simultaneous plan was developed for the Hutt Valley and Wainuiomata, but given a lower priority in the allocation

of the limited resources expected to be available, at least in the first few days after an event.

Pipeline repair would largely be a sequential and a progressive process from the point of supply. As a result, reservoirs closest to the source (such as Upper Hutt, Lower Hutt and Wainuiomata) are expected to receive a partial supply of bulk water first. Restoring a partial supply to Wellington and remote reservoirs such as Pukerua Bay is expected to take many weeks. This assessment of repair times was used by MWH to assess the shortfall of water stored in reservoirs.

Following the initial assessment of repair times, and in light of the level of resources made available for repair work following the Christchurch earthquake, GWRC reviewed the repair plan assuming a higher level of resources. This review resulted in reduced repair times to some areas, but only a minor reduction for Wellington. These improved times to restore the bulk water supply have been used in the supply shortfall calculation in section 7.

6.2 Repairing the local water reticulation

With the exception of obvious breaks, repair of the local reticulation network for each city cannot commence in earnest until a water supply is available to allow leaks to be identified, repaired and tested. Repair is likely to be delayed until the bulk water supply has been at least partially restored. At that stage the priority between water for consumption and water for testing and repairs will need to be decided.

GNS Science modelling for the Hutt Valley and Wellington indicated many thousands of breaks should be expected from a major earthquake. An estimate of repair times by Capacity shows most local reticulation would be operational within 20 days after water is restored to reservoirs, but subject to intermittent outages for continuing repairs over an extended period. Porirua west and Wellington's eastern and southern suburbs will take longer for water to be restored because the city mains to those reservoirs will first need to be repaired.

7. The supply shortfall

The MWH report showed a varying number of days between individual reservoirs emptying (based on the 20 litres per person per day) and a partial supply of bulk water likely to be restored to the reservoir. Subsequent re-evaluation of bulk water restoration time by GWRC showed that some areas may have no supply shortfall, or only a few days.

However for Porirua western and northern suburbs, and Wellington's CBD, western, eastern and southern suburbs the supply shortfall was substantial. The shortfall for Porirua was around 33 days, which equates to a shortfall of approximately 24 million litres (ML). The shortfall for Wellington varied between 17 and 52 days, equating to around 90 ML. Both of these volumes exclude any water required by hospitals and other uses (e.g. fire fighting).

A separate study of repair times by GNS showed a supply shortfall for Wellington of approximately 110 ML. Despite the difference in shortfall

identified, both analyses show that a large quantity of water will need to be provided from other sources for these two cities.

8. Emergency water storage tanks

8.1 Domestic storage tanks

A household emergency water storage tank provides better resilience for a family by avoiding the need to manually collect water from distribution points and (depending on the volume stored) allowing greater consumption than the restricted amount of 20 litres per person per day.

A household of three people would need access to 2,400 litres of water in order to avoid having to collect 20 litres per person each day from the distribution centre for 40 days. However, since it rains at reasonably frequent intervals in Wellington (even during an average summer) stored water could be replenished by diverting rainfall into a tank connected to a roof downpipe. In that way a relatively small tank of about 1,000 litres could provide a continuing supply of emergency water for the household.

Residents should be encouraged to consider self-reliance by installing a rainwater tank for emergency water and connecting it permanently to their house roof downpipe, or at least having the materials available to make the connection following an emergency. The GWRC website has information on the benefit of rainwater tanks for emergency use, and further information is planned on components needed to connect it to the roof drainage system.

One of the learnings from the Christchurch earthquakes has been a better understanding of the impact on the community of manually collecting water from distribution points in containers. In addition, some individuals are not able to collect water, particularly single parent families with young children, the elderly, or the sick and injured, which places a greater burden on others.

8.2 Community storage tanks

Emergency water storage tanks have been installed in each of the four cities, predominantly at schools. The installation of further tanks is planned at proposed emergency distribution points, welfare centres and civil defence centres over the next five years. These tanks may not be connected to the public supply, but filled by tanker and have provision for rainwater collection where possible. Wellington City Council plans to install a further 50 tanks. The table below shows tanks installed to date by each city.

	Tanks installed	Tank capacity
Wellington	12	Mostly 25,000L
Lower Hutt	22	5,500L
Upper Hutt	12	5,500L
Porirua	55	Mostly 25,000L

While these tanks will provide a useful emergency supply of water at schools, welfare and civil defence centres, the volume stored will not meet the domestic demand for emergency water. Porirua City Council has installed over one million litres of emergency water capacity, but this would only provide emergency water for Porirua residents for up to two days.

9. Local water sources

The MWH report reviewed options for other local sources of water for each city to cover the supply shortfall and/or increase the total quantity of water available in an emergency. Options reviewed include the use of streams, springs, groundwater (including existing bores), tunnel drainage water, lakes and old storage dams (such as the Kenepuru and Korokoro dams).

The Hutt Valley has reasonable access to local sources of water in an emergency, having a number of surface water sources and public and private bores into the Waiwhetu and Upper Hutt aquifers. However, Porirua and Wellington were found to have few options for local sources of water and what is available would not be sufficient to bridge the shortfall in the emergency water supply and would probably need some form of basic water treatment.

There are very few existing bores in Wellington although there is the potential of some groundwater from fractured bedrock. Capacity has investigated the potential for groundwater in the Miramar area and found the groundwater to be unsuitable for an emergency supply in both quality and quantity. Investigations in other parts of Wellington are being considered.

Drainage water from the Tawa railway tunnel has also been investigated by Capacity and found to consistently produce around 1.3 ML per day of reasonable quality water. This could supply about one-third of Wellington city residents at 20 litres per person per day when treated and distributed.

10. Externally sourced water

The supply of externally sourced water into the region has severe logistical difficulties. Landslides are expected to close rail access and road access on State Highways 1, 2 and 58, preventing road and rail access north and to the Wairarapa. Road access is also very likely to be difficult between Porirua, Wellington and the Hutt Valley. The Transmission Gully motorway on SH 1 will improve the situation but this is still 10 years or so from completion. The transport of goods and people by road and rail will be restricted for many weeks.

Wellington airport should resume activity within a week or so, but is likely to be restricted largely to the transport of people and equipment and some critical supplies. The quantity of water that could be airlifted into Wellington is relatively small and would only make a minor contribution to the emergency water shortfall. The most likely contribution would be bottled water for rescue and recovery workers, medical purposes and special emergency uses.

Bulk water supply by sea may be a practical alternative. Ships (such as HMNZS Canterbury and cruise ships), ferries and barges carrying full road

tankers could be used to bring bulk water into Wellington harbour. Access into Porirua harbour will be more problematic due to the sand bar restricting access at the harbour entrance. It is possible that ferries carrying loaded tankers from the South Island could provide some water within a few days.

The MWH report identified a number of alternatives for water tankers of different sizes. These are held by contractors in the Wellington area and the North Island and, in particular, Fonterra (with a fleet of over 500 milk tankers of typically 27,000 litres capacity). Some of these tankers may be available for water distribution and could be barged into Wellington from a port close to their current location. However, there is a serious shortage of barges in Wellington and barges available will also be in demand for the transportation and delivery of other critical supplies. If either of the roll-on roll-off ferry links is operational it would provide an alternative means of transporting tankers from Picton.

Assuming a fleet of tankers is able to be delivered to Wellington; they could be used to transfer water from a ship or ferry to the community distribution points for collection by residents. Their use would be dependent on road access being available as well as an adequate supply of diesel for the ongoing use of the tankers. From MWH calculations it appears that over 200 tanker loads per day would be needed to bridge the emergency water shortfall.

Once the Waiwhetu aquifer and pipework to Seaview has been restored, there is the opportunity, if practical, of barging tankers full of aquifer water from the Seaview wharf to a Wellington wharf for distribution. It would require a full time commitment to transporting the tankers and distributing the water to meet demand.

11. Sea water desalination

A pre-feasibility study into the development of a seawater desalination plant to provide an emergency water supply for Wellington has been completed by SKM consultants. The study looked at the possibility of also using the plant to provide water supply in peak summer demand periods. A plant of 10 million litres nominal daily capacity was chosen for the study.

A number of locations along the inner harbour, on the coastline of the Miramar peninsular and the south coast were examined against a range of criteria, including water quality, impact on the environment and the community, exposure to hazards and emergency access. Two areas on the south coast were found to be worthy of further consideration - Moa Point and Owhiro Bay. Both locations would be useful in providing emergency water to the southern suburbs and Miramar/Seatoun area that are likely to have very long water supply restoration times.

The desalination plant will need an ocean intake and a brine outfall pipeline (up to 700 mm diameter), although use of the existing Moa Point wastewater plant outfall may be a possibility for the brine return from a desalination plant located in that area. The desalination process requires a high level of pre-treatment to make the water suitable for the reverse osmosis process that

removes the salt. Desalinated water is acidic and requires post-treatment to provide water that is potable and not corrosive to the delivery pipework. The membranes need to be backwashed at regular intervals to clean and flush out removed solids, and chemically cleaned periodically to prevent/remove any biological fouling. These processes use a variety of chemicals that need to be stored and replenished and produce a waste stream that must be disposed of.

Desalination plants have normally been used overseas for base load water supply but recent plants in Australia have been mothballed for drought response. This is a complex process and it still requires monthly operation of specific equipment including the diesel generators. Bringing a plant back into service requires complete re-commissioning that may take weeks. The alternative is “hot standby” mode where the plant is operated at part load for perhaps six hours a week, which would allow the plant to resume full production within days.

A 10 million litre/day desalination plant at full load is estimated to use 30MWh of electricity per day and consume around 10,000 litres of diesel using standby generators. In “hot standby” mode, the on-site storage of diesel for seven days emergency use would take over four years to fully turnover. This could create potential problems with water and algal contamination of the diesel. The daily volume of diesel consumed in emergency use would be likely to result in refuelling difficulties.

The very preliminary capital cost of a 10 ML desalination plant is between \$70M and \$125M depending on the pre-treatment process required and inlet/outlet arrangements. Operational costs for desalination plants are typically several times the cost for conventional water supply and require trained operators and specialist maintenance due to their complexity.

GWRC would use staff with additional training from the existing water treatment plants to operate a desalination plant. In an emergency this would create an immediate conflict in allocating resources between repairing and operating other water treatment plants and operating the desalination plant. Overseas operators could be called in to operate the desalination plant, if they were trained in its operation and available. Ongoing training and regular operation in ‘hot standby’ would be additional costs on the normal water supply.

The New Zealand Army holds three small water treatment units; two containerised desalination units are held in Rotorua for UNICEF; and the New Zealand Navy ships produce desalinated water. These sources could be utilised if available at the time. Operation depends on sufficient fuel being available.

12. Emergency water reservoirs

A preliminary review has identified nine potential sites in Wellington city and one site in Porirua city (close to the Wellington boundary) for an emergency water reservoir. The review studied the following aspects at a desktop level:

- Topography

- Geology
- Cost
- Environmental and social impact
- Planning issues
- Land ownership

12.1 Wellington sites

The nine Wellington sites have potential storage volumes ranging from 25 ML to 180 ML and individual costs from approximately \$5M to \$32M. Most sites are located near the southern and eastern suburbs where the water supply will take the longest time to restore.

It is envisaged the reservoirs, in the form of a pond or dam, would have floating covers to help preserve water quality and reduce the hazard they might present if left uncovered. It is expected that the water would require some form of treatment before use.

12.2 Takapu Road site

A site near Takapu Road close to the boundary of Porirua and Wellington cities has been identified as possibly being suitable for a covered storage reservoir holding about 500 ML, the maximum physical size of a reservoir that could be accommodated on the site. It is envisaged that the reservoir would be formed by excavation of a hollow on the hill top and construction of an earth embankment on the south side. The internal faces would be lined with a geomembrane. The very preliminary cost of a 500 ML storage reservoir and associated infrastructure is \$19M.

Attachment 1 shows the location of this possible storage reservoir. The land is farmed by Landcorp Farming Ltd and owned by Landcorp Holdings Ltd. Landcorp has been approached and is investigating whether or not the land can be made available.

This particular site has a number of emergency and operational supply benefits that its potential volume, location and elevation would provide:

- Water to assist in determining the location of breaks in the Kaitoke to Karori pipeline in the section between Haywards and Karori
- Emergency water by gravity flow for Porirua City, the northern and western suburbs of Wellington City and the CBD, and other supplied areas if needed
- Limited reticulated water to Porirua and parts of Wellington City to enable their distribution systems to be repaired after the bulk supply pipelines are restored to these cities following a major seismic event
- Supplementary water for a few days in normal operation if either the Te Marua or Waterloo water treatment plant (WTP) is not available and the Wainuiomata WTP is not available, usually a late summer situation

12.3 Comparison of emergency repair times

With a Whakatikei dam the estimated pipeline repair time for a supply to Porirua City is 21 days (35 to supply from Te Marua). A Takapu Road reservoir will enable this time to be reduced to just a few days using water from the reservoir.

For Wellington City the pipeline from the Whakatikei dam could be repaired in about 28 days (40 days supply from for Te Marua). A Takapu Road reservoir could allow a supply to Tawa, Linden and Johnsonville within a few days, followed by supply to Northland and Karori and the rest of the city. Additional work is needed to model these restoration times more accurately.

13. Community views and preferences

Building emergency water reservoirs was not specifically mentioned when the Council consulted on the 2012-22 Long Term Plan (LTP). However running through the summary and main documents, there are general themes of preparedness, emergency management, seismic response, regional leadership and commitment to provide long term infrastructure for the region. These themes were well supported by the public responses.

At present, the concept of significant bulk water storage for an emergency is only at the pre-feasibility phase. The concept has been developed because cheaper alternatives to the Whakatikei Dam, with less environmental impact, lack the resilience benefits of the Whakatikei Dam. Once a proposal is developed, it can be consulted on through a future annual or long term plan.

Preliminary discussions have already been held with water supply/infrastructure managers of the four city councils about developments for the bulk water supply system in the Te Marua/Kaitoke area and the possibility of building one or more water emergency reservoirs. They are in support of the investigation work so far. Discussions with Wellington and Porirua City managers have been more detailed given the location of the reservoirs investigated.

14. Risks

There is a risk the Takapu Road site may be unsuitable as a result of geological and other investigations, or not available for development. If this is the case, then a series of smaller emergency water reservoirs could be built if suitable sites are available.

Most of the sites within Wellington City are on central or local government owned land, often with planning difficulties. Topography within Wellington City makes it difficult to locate suitable sites.

15. Discussion

The shortfall of water in an emergency is essentially a problem for Porirua and Wellington cities. Upper Hutt and Lower Hutt are closer to the sources of supply so that a limited bulk water supply would be restored before the

rationed water held in the city reservoirs is depleted. In addition they also have options for supply from local surface water and groundwater.

One of the reasons for choosing the Whakatikei site for a dam in an earlier strategy was its location on the western side of the Wellington Fault, and it is closer to Porirua and Wellington cities compared with the Te Marua water supply facilities. This meant that after a Wellington Fault movement, the time to repair the water supply pipeline from the Whakatikei Dam to Porirua and central Wellington was reduced by up to three weeks compared with repairing the supply from Te Marua.

If the incremental approach to water supply development is adopted as recommended in report 12.584 then it may be decades before building the Whakatikei dam is considered.

Following a Wellington Fault movement event, and without the Whakatikei Dam, the water shortfall prior to a limited bulk water supply being restored is estimated at about 100 ML in Wellington city and around 24 ML in Porirua city. This is a large quantity of water, even though it is based on the modest allocation of only 20 litres per person per day.

In Wellington and Porirua, local sources of water, domestic and community emergency storage tanks can all assist in reducing the shortfall, but are unlikely to be sufficient to eliminate it. Tankered water could be distributed when roads are re-opened, which could take several weeks. Even then it will be difficult to meet demand and highly dependent on an adequate supply of tankers, drivers and fuel.

One of the ways to meet this shortfall is with desalinated water. However a desalination plant is very expensive to construct and operate, technically complex and there may also be difficult planning and environmental issues to resolve. There are a number of logistical issues in an emergency, such as the time needed to get a plant operational, having experienced operators available, and getting sufficient chemicals for production and diesel fuel for the standby generators.

As roads are re-opened following a major event, small containerised water treatment plants can be brought in to help with the emergency requirements by producing some potable water from local sources.

A more reliable and cost effective option is to construct one or more reservoirs to hold an emergency water supply, as outlined in section 12. From a bulk water supplier perspective a storage reservoir of up to 500 ML near Takapu Road at an estimated cost of \$19 million is the most promising of the sites evaluated so far. This site has the ability to provide a limited supply of water to the northern suburbs of Wellington City and part of Porirua City once the pipelines to the south and north of the storage site are repaired. The limited supply of water can be rationed to the community and also used to enable the two cities to start repairing their local distribution networks. If pipelines are intact, water from this reservoir could reach all four cities.

A 500 ML storage reservoir near Takapu Road means the strategic location of the Whakatikei dam is less important from an emergency water supply point of view compared with sites near Te Marua.

A number of other sites have been identified for smaller reservoirs and these could be useful for providing limited water supply to the southern and eastern suburbs of Wellington city

Following a major seismic event the region cannot function, even in a limited way, until a reticulated water supply and electricity systems are restored. Hence, any development that is likely to substantially reduce the restoration times is of benefit. These benefits can be quantified in economic terms as part of a feasibility study.

Development of an emergency water reservoir close to Takapu Road would be GWRC's contribution to a wider metropolitan emergency water supply strategy. The Water Services Emergency Preparedness group is believed to be an appropriate forum to reach agreement on this strategy at officer level and integrate it into a wider emergency water strategy. There is a need for example to continue to promote domestic emergency water supply tanks to reduce dependence on water carried from local emergency distribution centres. Wellington Region Emergency Management Office also has a role in this promotional work.

Information about the smaller potential emergency reservoir sites in Wellington city can be explored in more detail with Wellington City Council officers to identify which sites may be viable and opportunities for the city and GWRC to work jointly on the developments.

16. Communications

The four city water supply customers will be advised of the Council's decisions following the meeting. It is proposed that a media release is issued following completion of the feasibility study, and subject to land owner agreement.

17. Recommendations

It is recommended that Council:

- 1 **Receives** the report.
- 2 **Notes** the content of the report.
- 3 **Approves** carrying out a feasibility study for a possible emergency water reservoir on Landcorp land near Takapu Road, Porirua.
- 4 **Authorises** officers to negotiate an option to purchase the Landcorp land if the feasibility study shows the proposed reservoir to be a viable and cost effective option for emergency water.
- 5 **Notes** that officers will discuss the Wellington sites identified for emergency water storage and the opportunities to work jointly on development with Wellington City Council officers.

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Attachment 1 – Takapu Road site