

## 7.0 Assessment of Drinking Water Supply Services

### 7.1 Council Water Supply Networks

#### 7.1.1 Description

The Hauraki District Council owns and operates eight water supply networks, to which there are approximately 7,050 water connections.

#### 7.1.2 How is Drinking Water Obtained

The supplies service the communities of Paeroa, Karangahake, Ohinemuri, Kaimanawa, Mackaytown, Waihi, Waikino, Ngatea, Kerepehi and Turua, and the rural area of the Hauraki Plains. The supplies have varying degrees of treatment and water quality as indicated below.

#### 7.1.3 Quality and Adequacy of Drinking Water

Community	Water Supply Grading		Length of Reticulation (Km)	Number of Connections	Annual Water Production	Production per Connection	Average Daily Demand
	Current Grade	Future Target			M <sup>3</sup> (02~03)	M <sup>3</sup> /year (02~03)	M <sup>3</sup> /day (02~03)
Kaimanawa	u	Db	16.9	88	212,033	2,409	500
Karangahake	Dd	Cb	4.1	66	29,533	447	55
Mackaytown	De	Cb	1.7	74	29,820	403	100
Ohinemuri	Ed	Cb	42.1	341	608,262	1,784	1,700
Paeroa	Cb	Cb	39.3	1,774	529,515	298	2,000
Plains							
- West Supply Plant/Source	Db D	Db D	344.7	2,493	3,828,131	1,536	12,200
- East Supply Plant/Source	Dc C	Dc C					
- Kerepehi Plant/Source	Db C	Db C					
Waihi	Ba	Ba	57.6	2,069	524,483	253	1,950
Waikino	Dd	Bb	7.3	145	47,129	325	170
TOTAL			513.7	7,050	5,808,906	932 (average)	2,334 (average)

##### 7.1.3.1 Water Supply Grading

The Register of Community Drinking-Water Supplies in New Zealand provides health professionals, drinking-water professionals and the general public with an authoritative summary of the health-risk status of all community drinking-water supplies known to the Ministry of Health. Supplies for 500 or more people should have a Public Health Grading. This consists of a single grading for each treatment plant (eg B) and a combined grading for each distribution zone (eg Ba). A Distribution Zone is all or part of the town or community that receives water from the same source or sources under similar conditions, implying similar quality water throughout the zone so that a grading would consistently apply to

the whole zone. A Treatment Plant supplies water into one or more zones and may receive water from one or more water sources (rivers, lakes, groundwater, etc.) If no physical treatment takes place, as for example with some groundwaters, a nominal treatment plant is still defined for record and grading purposes.

### 7.1.3.2 Distribution Zone Grading

Zone grading (a to e) is based on the microbiological and chemical quality of the water and an assessment of the condition of the reticulation system and the quality of its care. The zone grading is considered in conjunction with the associated plant and source grading.

- a - Completely satisfactory, negligible level of risk, demonstrably high quality
- b - Satisfactory, low level of risk
- c -Marginal, moderate level of risk, may be acceptable in some small communities
- d - Unsatisfactory, high level of risk
- e - Completely unsatisfactory, very high level of risk
- u - Not yet graded (Not yet required if less than 500 people)

### 7.1.3.3 Source and Plant Grading

Plant and source grading is based on an assessment of likely health risks to the community from bacteria, protozoa and chemical substances in the source water combined with an assessment of how effectively the treatment plant can prevent such contaminants passing through to the reticulation. Gradings are A1 (best), followed by A to E. The grading of each plant carries through to each zone, which inherits the grading of the lowest graded plant providing it with water.

- A1 Completely satisfactory, negligible level of risk, demonstrably high quality
- A Completely satisfactory, very low level of risk
- B Satisfactory, low level of risk
- C Marginal, moderate level of risk, may be acceptable in some small communities
- D Unsatisfactory, high level of risk
- E Completely unsatisfactory, very high level of risk
- U Ungraded

#### Current Level of Service Treatment

Community	Level of Treatment		Treated Water Storage		Replacement Value	Depreciated Replacement Value
	Type of Treatment	Quality Measured	Volume M <sup>3</sup>	Location	(\$000)	(\$000)
Kaimanawa	Filtration, Chlorination	Bacteria, Chlorine	Nil	-	1,428	470
Karangahake	Chlorination, pH Adjusted	Bacteria, Chlorine, pH	20	Dominion Drive	518 <sup>1</sup>	200
Mackaytown	Filtration, Chlorination	Bacteria, Chlorine	Nil	-	776	298
Ohinemuri	Filtration, Chlorination	Bacteria, Chlorine	Nil	-	4,193	1,379
Paeroa	pH Adjusted, Filtration, Chlorination	Bacteria, Chlorine, pH	9,000	Bennett St	12,762	4,753

<sup>1</sup> HDC Budgets are setup with Karangahake and Mackaytown being included as one item, for the benefit of this table assume a 40:60 split respectively. Budget total for Karangahake is \$1,294K.

Community	Level of Treatment		Treated Water Storage		Replacement Value	Depreciated Replacement Value
	Type of Treatment	Quality Measured	Volume M <sup>3</sup>	Location	(\$000)	(\$000)
Plains West Plains East Plains Kerepehi	Clarification, Filtration, pH Adjusted, Chlorination	Bacteria, Chlorine, pH	3,490	Main Rd, Kerepehi & SH25, Waitakaruru	43,889	15,084
Waihi	pH Adjusted, Filtration, Chlorination	Bacteria, Chlorine, pH	6,000	Bulltown Rd	13,841	5,235
Waikino	Filtration, Chlorination	Bacteria, Chlorine	90	Farrelly Rd	1,431	484
TOTAL			18,580		78,839	27,903

This table illustrates the issues:

- The increased level of risk associated with the Ohinemuri, Karangahake, Mackaytown, Waikino and Plains water supplies, and
- The ungraded supply of Kaimanawa.

The long term plan for the smaller supplies is to provide the water for their requirements from the larger plants that can produce a higher quality treated water with consequent lower risk to public health. Ohinemuri, Karangahake and Mackaytown will be supplied from the Paeroa plant. Waikino Township will be supplied from the Waihi supply.

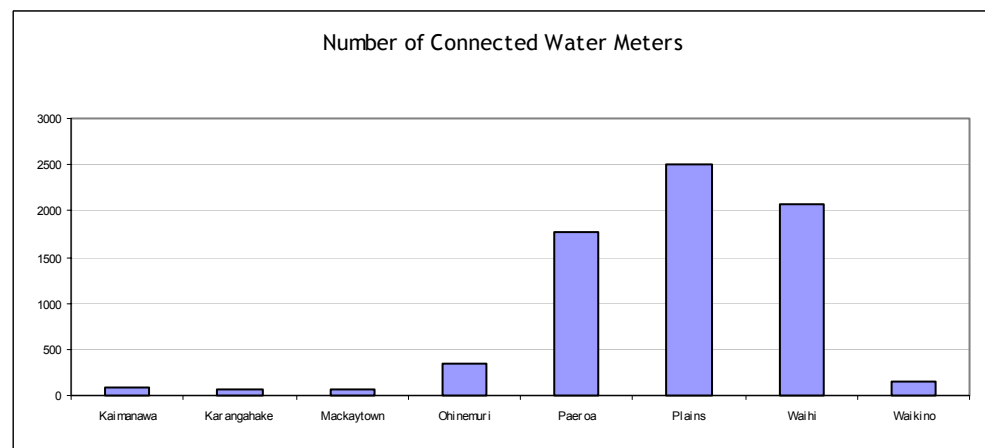
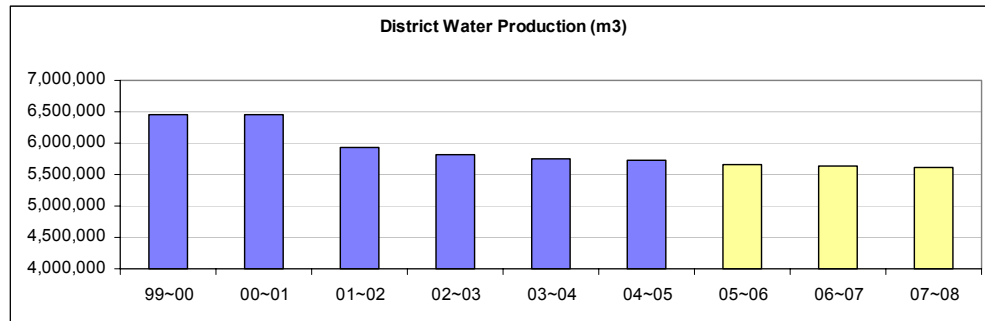
Kaimanawa water supply is in the process of being graded, but the result is expected to be similar to that of Waikino. It is therefore the Councils plan to supply Kaimanawa from either Paeroa or the Plains supply (see table 7.1.6.1).

The levels of service for the water supply systems can be categorised into issues relating to public health, system performance, customer demand and service delivery. The drivers for determining the appropriate levels of service are legislative requirements, public health considerations, customer expectations, effects on the environment and affordability.

The drivers listed above can be categorised as quality and quantity. The quality issues are clear in most instances and relate to water supply standards set by the Department of Health for each supply. The quantity issues relate to a balance between customer expectation and affordability. Customer satisfaction with water supplies is measured on a regular basis through surveys and the HCP/Annual Plan process.

The Waihi, Waikino, Paeroa, Karangahake and Mackaytown supplies are on-demand supplies where it is expected that water will be continually supplied at a reasonable pressure. The Plains supply provides the 24 hour water requirement over 24 hours but not necessarily on-demand and all consumers are required to have 24-hour on-site storage. The level of service for Ohinemuri and Kaimanawa has not been determined. Council is not intending to provide on demand storage to Ohinemuri and Kaimanawa. These supplies are predominantly rural supplies and have historically been developed to support agricultural production. Within the urban areas there is a need to provide fire fighting capability for the protection of public safety. There are some isolated areas in Waihi, Paeroa and the other urban areas where the targets of the NZ Fire Service Code of Practice are not met. The Hauraki District Council has programmed these areas into the Capital Works Programme for water mains replacement to allow for these issues to be resolved.

To ensure the quality and safety of the drinking water is maintained, all the water supplies are monitored regularly for the detection of bacteria, chlorine levels and pH by Council staff and independent contractors. The four main water treatment plants, Paeroa, Waihi, Kerepehi and Waitakaruru are monitored continuously via radio telemetry.



### 7.1.3.4 Risk Management

The Hauraki District Council has a number of risk management practices to minimize the risks associated with the water supply activity. To comply with the likely changes to the Health Act, Hauraki District Council has developed Public Health Risk Management Plans (PHRMP) for all of the major water supplies. The PHRMP's identify and rank the risks associated to the potability of the supply in terms of the health of the customers drinking the water. These plans are incorporated into the Asset Management Plans and Plant Manuals to assist with the daily security and operation of the districts water supplies.

The PHRMP's cover issues including backflow prevention, risk of non-compliance with DWSNZ, water supply security, power failures, land use planning, catchment activities, and natural hazards. They also contain contingency plans for dealing with specific events for which a risk of occurrence has been identified.

### 7.1.4 Current and Future Demands for Water Supply

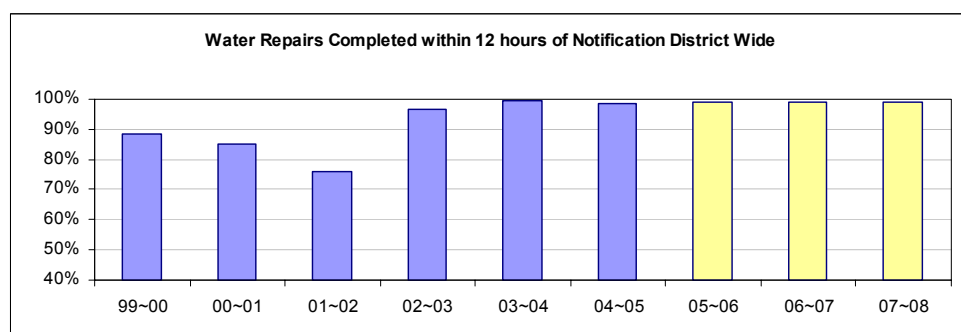
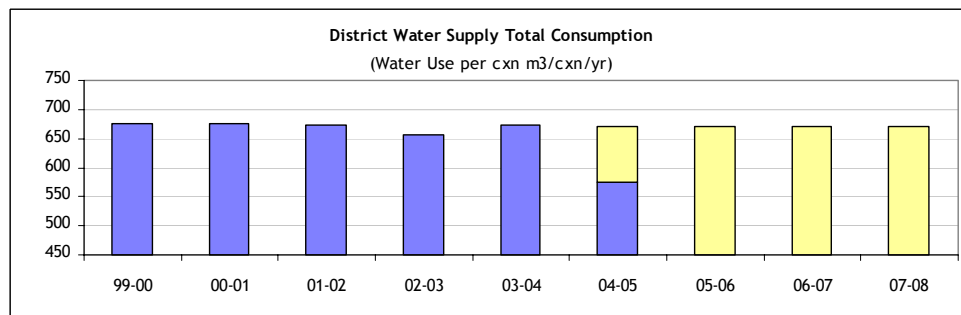
Competing demands from domestic, industrial, agricultural, power and other users mean that the Regional Council (Environment Waikato) is reaching the point where they are reviewing their policies on water allocation and management. The documents and regulations that will be developed from this

process will bring about demands that will need to be accommodated for in the future growth of the Hauraki

District Council’s water supply networks. The following four points capture the main issues for water allocation in the Waikato Region.

- There is an incomplete picture of how much water is currently taken, creating a risk of either over, or under-allocating the resource.
- Competing demands exist for the resource, and there is little policy to guide prioritisation when allocating water or restricting water use at low flows.
- Inefficient use of water reduces the amount available for competing uses, and may create other environmental effects.
- A projected long-term increase in groundwater use indicates a risk of saltwater intrusion to coastal aquifers, long-term aquifer decline and impacts on the level of surface water features fed by groundwater.

The following tables illustrate the extent to which the council predicts the current levels of demand for water supplies is likely to change over the next three years.



### 7.1.5 Options Available to Meet the Demands and their Suitability

- Council has sufficient access to source water for current demand, but not necessarily convenient to the areas requiring it. Storage of treated water will be needed to ensure that demands can be met.
- Extensions to water supplies will be considered where there is proven demand, and they are economically viable.
- The long term strategy for smaller supplies is to provide the water for their requirements from water treatment plants that can produce a higher quality treated water. Ohinemuri, Karangahake and Mackaytown will be serviced by the Paeroa plant. Waikino Township will be supplied from the Waihi supply.
- Kaimanawa water supply is in the process of being graded, but the result is expected to be similar to that of Waikino. It is therefore the Council's plan to supply Kaimanawa from either the Paeroa or Kerepehi supply.
- Plains water supply is programmed for an improved treatment process with the inclusion of upgraded treatment and raw water storage.
- Improvements to water supply services to meet the improved standards will be undertaken. A renewal strategy has been developed. This strategy will involve the short term renewal of some resource consents and a commitment to the completion of the capital upgrading programme proposed.

### 7.1.6 Hauraki District Council's Involvement in Meeting the Demands

Under the community outcomes documented in the LTCCP for the water supply activity there are a number of objectives that Hauraki District Council is endeavouring to achieve:

Community Outcomes	How Water Supply contributes
Safe and healthy environment	<ul style="list-style-type: none"> <li>• Provide adequate public water supply systems that meet the Ministry of Health's drinking water standards.</li> <li>• Provide adequate located and pressured connections for fire fighting purposes within the urban areas of the district.</li> </ul>
Affordable services and facilities	<ul style="list-style-type: none"> <li>• Ensure that adequate public water supplies are provided and that they are efficiently maintained and affordable.</li> </ul>

The following 10 year capital works program details works involved with trying to achieve these outcomes.

#### 7.1.6.1 Major Capital Expenditure Planned for the Next 10 Years

Priority	Project	Year to be completed	Estimated Cost \$
Plains	Bulk Treated Water Mains	2005/2013	5,000,000
	Raw Water Off-stream storage at the Hikutaia Cut.	2007/08	1,600,000
	Treated Water Storage at Kerepehi.	2005-2007	1,000,000

Priority	Project	Year to be completed	Estimated Cost \$
	Treated Water Storage at Waitakaruru.	2007-2009	650,000
	Raw water Storage at Waitakaruru.	2007/08	2,150,000
	Kerepehi Treatment Plant Upgrade to meet NZ Drinking Water Standards.	2004-2006	700,000
	Waitakaruru Treatment Plant Upgrade to meet NZ Drinking Water Standards.	2008/09	700,000
<b>Waihi</b>	Raw water Storage.	2005-2007	1,500,000
	Treatment Plant Upgrade to meet NZ Drinking Water Standards.	2006/07	650,000
<b>Paeroa</b>	Treatment Plant Upgrade to provide for the extended reticulation and the new drinking water standards.	2006-2008	1,200,000
	Raw water main replacement to replace the Asbestos Cement pipe that currently exists.	2006-2008	750,000
<b>Kaimanawa</b>	New Water Reservoir.	2009/10	400,000
	Reticulation to connect to Paeroa/Kerepehi.		400,000
<b>Karangahake/ Mackaytown</b>	New Water Storage.	2007/08	92,000
	Reticulation to connect to Paeroa/Kerepehi.	2009/10	300,000
<b>Waikino</b>	Reticulation to connect to Waihi.	2006/07	360,000
<b>Ohinemuri</b>	Decommissioning the Dams.	2004-2014	205,000

## 7.2 Marae

### 7.2.1 Description

The following marae are located in the Hauraki District;

- Tirohia Te Kotahitanga Marae  
Tukaki Road  
Tirohia
- Te Pae o Hauraki Marae  
Papaturoa Avenue  
Paeroa
- Taharua Marae  
Rotokohu Road  
Paeroa
- Ngahutoitoi Marae  
Te Moananui Flats Road  
Paeroa
- Kerepehi Marae  
McGowan Avenue  
Kerepehi
- Waihi Community Marae  
Cnr. Victoria/Consol Streets  
Waihi

The marae communities have been grouped together due to the nature of how the facilities are used for their respective communities. The risks associated with these facilities are moderate to high due to the large number of people that can be present at any one event and the demand that this can have on the installed infrastructure.

### 7.2.2 How is Drinking Water Obtained

All of the marae are supplied drinking water from Council Water Supply Networks.

Tirohia Te Kotahitanga, Te Pae o Hauraki, Taharua and Ngahutoitoi Marae are all supplied by the Ohinemuri Water Supply.

The Kerepehi Marae is supplied by the Plains Kerepehi Water Supply.

The Waihi Community Marae is supplied by the Waihi Water Supply.

### **7.2.3 Quality and Adequacy of Drinking Water**

Refer to section 7.1.3.3 for relevant supply information.

### **7.2.4 Current and Future Demands for Water Supply**

At this stage there is insufficient information until individual marae are consulted properly to assess all of the individual needs and future demands.

### **7.2.5 Options Available to Meet the Demands and their Suitability**

Refer to section 7.1.4 for relevant supply information.

Future options for the individual marae will be more apparent once consultation has been completed.

### **7.2.6 Hauraki District Council's Involvement in Meeting the Demands**

The Hauraki District Council will continue to involve the communities in strategic direction and future developments through the Water & Waste Consultative Committee<sup>2</sup> and Iwi consultation.

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<sup>2</sup> The Water & Waste Consultative Committee is made up of representatives from local Iwi, Federated Farmers, Royal Forest & Bird Society, and elected members.

## 7.3 Schools & Camp Facilities

### 7.3.1 Description

The Hauraki District has a total of 34 Schools, Kindergartens, Play Centres, Kohunga Reo and Childcare facilities within the district, 2 of which are not on a Council water supply. There are also two camp facilities in the district and only one has been identified as not being on a council water supply. These three facilities responded to a council survey and are all located in a rural environment (see 8.2.1).

### 7.3.2 How is Drinking Water Obtained

Each facility sources its water differently. One facility's water is sourced from a roof supply directly into a 10,000 litre tank. Another's is sourced from a local bore directly into a tank. The last site collects its water from a surface water source into two tanks, where one of them is an old unused swimming pool.

### 7.3.3 Risks Attributable to the Absence of a Reticulated Water Supply

Water sources need to provide enough water to meet requirements (normally 200 litres per person per day). The supply also needs to be of a suitable standard for consumption or good enough to simply treat it to a good quality standard.

The table below shows water sources and compares their general quality<sup>3</sup>.

RAW WATER SOURCE	BIOLOGICAL QUALITY	CHEMICAL QUALITY	AESTHETIC QUALITY
Mains Supply	Usually good	Usually good	Usually good
Roof Water	Usually poor	Usually good	Corrosive
Shallow Bore or shingle aquifer	Often poor	Can be high in nitrates, iron etc	Variable – can be Turbid & Discoloured
Deep Bore	Usually good	Often high in Iron/ Carbon Dioxide, Manganese and Ammonium	Hard/Corrosive
River	Usually poor	Variable	Can be Turbid & Discoloured
Stream	Variable	Usually good	Can be Turbid & Discoloured
Lake	Variable	Usually good	Usually good

Small drinking water supplies can be at increased risk from contaminants. Contaminants, their sources and the potential problems they may cause are listed in the table below<sup>4</sup>.

<sup>3</sup> Household Water Supplies, Department of Health, 1992.

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CONTAMINANT	SOURCE	PROBLEMS
Bacteria	Septic tanks, bird and animal faeces back flushing from incorrectly connected W.C. bowls, sewage discharges	Diarrhoea Gastroenteritis Other waterborne disease
Carbon Dioxide	Atmosphere and decaying vegetation	Corrosion
Colour	Decaying vegetation	Appearance
Hardness	Dissolved rocks	Soap demand Scale formation in kettles and hot water tanks
Iron	Dissolved rocks, especially in bore water	Taste Staining Clogging of pipes and valves
Manganese	Dissolved rocks	Taste Staining
Nitrates	Fertilisers, Clover, Septic tank soakage	Can cause health problems for bottle fed babies
Protozoan Cysts	Septic tanks Bird and animal faeces Sewage discharges	Diarrhoea Protozoan Infestation
Taste and Odour	Algae	Unpleasant to drink Can be toxic
Turbidity	Dirt	Appearance (usually biologically contaminated as well)
Viruses	Sewage Bird and animal faeces	Gastroenteritis Other waterborne diseases

Irrespective of the supply there is potential risk in taking and storing water. Maintenance of these small supplies often falls upon the most practical person available, usually a caretaker or neighbouring farmer. From the survey results the tanks and equipment are usually cleaned and maintained on an as needed basis, creating the risk of allowing the tank to build up a population of microbiological organisms within the tank that are potentially harmful.

General layout and process of the water supply can also create increased level of risk exposure.

Roof water collection systems should have first flush systems installed which allow for the first portion of a rain event to wash the dust and leaves from the roof and gutters to waste before the rest of the rain water is diverted into the storage tank. This will reduce the amount of suspended solid material in the bottom of the tank which creates a food source for the microbiological organisms.

Risks associated with the Groundwater supply are dependent upon the bore depth and surrounding catchment. A bore that is in use is of an unknown depth and is situated in a neighbouring farm paddock. Attendant risks need to be evaluated.

Surface water supplies are also susceptible to the rain events washing stock effluent into the streams from where they enter the water supply. The site that uses this source type for its drinking water has fitted a water filter and UV system to treat its water prior to use. The filter is used to reduce the dirt and suspended

solids before the UV light disinfects the supply protecting the users from microbiological organisms.

### **7.3.4 Quality and Adequacy of Drinking Water**

The two supplies using groundwater and the surface water sources have sufficient amounts of water all throughout the year but of an unknown quality. Both supplies have no complaints of taste or odour issues and there have been none recorded in council records regarding this.

The rain water collection system has complaints of insufficient water quality and quantity. The tank is often topped up by tanker during the summer months to offset the lack of rainfall.

### **7.3.5 Current and Future Demands for Water Supply**

The current demands are for a cleaner and healthier supply at one of the schools. Owners of the other two facilities hold the view that there is no such requirement on their part and do not see any in the near future.

### **7.3.6 Options Available to Meet the Demands and their Suitability**

Currently there is interest in replacing the rain water catchment supply with one of the council supplies. At the present moment the supply is approximately 5km away from the school and could have some delivery issues with its current system. The cost of this could be considerable for just the one connection to pay for.

Alternately the school could install another tank to increase the storage capacity and fit a first flush system to reduce the leaf litter and dust entering the system. There would also be a requirement to upgrade the current treatment system to offer a great level of security to the users. Installation costs for treatment would be approximately \$2,500 with an annual operating cost of \$1,000. Cost for the extra 22,500 litre tank would be \$3,000 including installation. A first flush system would be approximately \$1,000.

### **7.3.7 Hauraki District Council's Involvement in Meeting the Demands**

The Hauraki District Council will be investigating the practicalities and costs of extending the existing council water supplies and/or the development of new treatment plants into the non-serviced areas during the next reporting period.

With the information gathered from the surveys particular sites will be involved in an education programme raising the awareness of drinking water safety and efficient use of the water resource.

## 7.4 Hospitality Industry

### 7.4.1 Description

The Hospitality Industry is identified as a community due to the likeness of the needs and requirements of like services such as cafés, restaurants, and general food outlets.

There was only one instance in the Hauraki District identified as not being connected to council water reticulation and it is located in a rural area (see 8.2.2). All other facilities are connected and supplied by a council water supply.

### 7.4.2 How is Drinking Water Obtained

Water is obtained from a joint supply of rain water collection and a surface water catchment. The water is then collected in a tank of an unknown volume before it is treated by the use of a filter and then disinfected by a joint UV light and Ozone dose unit.

### 7.4.3 Risks Attributable to the Absence of a Reticulated Water Supply

Water sources need to provide enough water to meet requirements (normally 200 litres per person per day). The supply also needs to be of a suitable standard for consumption or good enough to simply treat it to a good quality standard.

The table below shows water sources and compares their general quality<sup>5</sup>.

RAW WATER SOURCE	BIOLOGICAL QUALITY	CHEMICAL QUALITY	AESTHETIC QUALITY
Mains Supply	Usually good	Usually good	Usually good
Roof Water	Usually poor	Usually good	Corrosive
Shallow Bore or shingle aquifer	Often poor	Can be high in nitrates, iron etc	Variable – can be Turbid & Discoloured
Deep Bore	Usually good	Often high in Iron/ Carbon Dioxide, Manganese and Ammonium	Hard/Corrosive
River	Usually poor	Variable	Can be Turbid & Discoloured
Stream	Variable	Usually good	Can be Turbid & Discoloured
Lake	Variable	Usually good	Usually good

Small drinking water supplies can be at increased risk from contaminants. Contaminants, their sources and the potential problems they may cause are listed in the table below<sup>6</sup>.

<sup>5</sup> Household Water Supplies, Department of Health, 1992.

<sup>6</sup> Household Water Supplies, Department of Health, 1992.

CONTAMINANT	SOURCE	PROBLEMS
Bacteria	Septic tanks, bird and animal faeces back flushing from incorrectly connected W.C. bowls, sewage discharges	Diarrhoea Gastroenteritis Other waterborne disease
Carbon Dioxide	Atmosphere and decaying vegetation	Corrosion
Colour	Decaying vegetation	Appearance
Hardness	Dissolved rocks	Soap demand Scale formation in kettles and hot water tanks
Iron	Dissolved rocks, especially in bore water	Taste Staining Clogging of pipes and valves
Manganese	Dissolved rocks	Taste Staining
Nitrates	Fertilisers, Clover, Septic tank soakage	Can cause health problems for bottle fed babies
Protozoan Cysts	Septic tanks Bird and animal faeces Sewage discharges	Diarrhoea Protozoan Infestation
Taste and Odour	Algae	Unpleasant to drink Can be toxic
Turbidity	Dirt	Appearance (usually biologically contaminated as well)
Viruses	Sewage Bird and animal faeces	Gastroenteritis Other waterborne diseases

Location on a busy road with large volumes of traffic, involves a high risk of dust and road debris contaminating the roof supply. There are also risks from the use of wood burners associated with the collection of roof water supplies.

This water system also utilises a small stream to supplement the roof catchment. The stream supply is sourced from a native bush catchment located on the property.

#### 7.4.4 Quality and Adequacy of Drinking Water

The quality of the water is not known but a sampling and testing programme is planned. The treatment system in place currently is sufficient to remove any major risks to the end users. Given the nature of the source waters and the associated risks it would be advisable to include the water tank in the maintenance schedule along with the UV and Ozone systems. This would reduce the reliance upon the treatment system and provide a lower level of risk.

#### 7.4.5 Current and Future Demands for Water Supply

Current demand is being met by both sources. Interest has been expressed in a council water supply connection dependent upon the cost.

#### **7.4.6 Options Available to Meet the Demands and their Suitability**

Recommendation for this supply would be look also at the ongoing maintenance of the water tank and the installation of a first flush system.

#### **7.4.7 Hauraki District Council's Involvement in Meeting the Demands**

The Hauraki District Council will be investigating the practicalities and costs of extending the existing council water supplies and/or the development of new treatment plants into the non-serviced areas during the next reporting period.

## 7.5 Sports Facilities, Halls & Churches

### 7.5.1 Description

These facilities were grouped due to the frequency and concentration of people using them, which is intermittent and often catering for a large number of people. The Hauraki District Council has 27 Sporting facilities and clubs, 8 Halls and 21 Churches. Eight of the sports clubs were identified as not being on council water reticulation, and 4 country halls. All of the Churches are on a council water supply. Surveys were sent out to all the facilities identified and in total five responses were received (see 8.2.3).

### 7.5.2 How is Drinking Water Obtained

Two of the respondents have rain water collection systems which collect and store their drinking water. Neither of these supplies have a treatment system that they knew of.

The other three used groundwater sources with all of them set in a farmland catchment with all of them being fenced off from the grazing stock. Two of these supplies feed their source water into a tank, the third uses water directly from the source bore.

### 7.5.3 Risks Attributable to the Absence of a Reticulated Water Supply

Water sources need to provide enough water to meet requirements (normally 200 litres per person per day). The supply also needs to be of a suitable standard for consumption or good enough to need only simple treatment to achieve a good quality standard.

The table below shows water sources and compares their general quality<sup>7</sup>.

RAW WATER SOURCE	BIOLOGICAL QUALITY	CHEMICAL QUALITY	AESTHETIC QUALITY
Mains Supply	Usually good	Usually good	Usually good
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<sup>7</sup> Household Water Supplies, Department of Health, 1992.

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Manganese	Dissolved rocks	Taste Staining
Nitrates	Fertilisers, Clover, Septic tank soakage	Can cause health problems for bottle fed babies
Protozoan Cysts	Septic tanks Bird and animal faeces Sewage discharges	Diarrhoea Protozoan Infestation
Taste and Odour	Algae	Unpleasant to drink Can be toxic
Turbidity	Dirt	Appearance (usually biologically contaminated as well)
Viruses	Sewage Bird and animal faeces	Gastroenteritis Other waterborne diseases

Generally there did not appear to be good understanding of what was involved in the water supply systems or good tank cleaning practice. Tanks will only be cleaned on a when required basis and for one site this appears never to have been done. The lack of treatment with some of these supplies increases the risk exposure of the end users. With the current inadequate cleaning regime for the tanks and the lack of water treatment together with scant knowledge of the systems there is a high level of risk associated with these supplies.

#### 7.5.4 Quality and Adequacy of Drinking Water

The quality of the water is yet unknown, however four of the respondents are willing to have their water supply sampled and tested. Given the nature of the source waters and the risks that they have it would be in their interest to install a water treatment system.

Also installing a first flush system on the roof water supplies allows for the first portion of a rain event to wash the dust and leaves from the roof and gutters to waste before the rest of the rain water is diverted into the storage tank. This will reduce the quantity of suspended solid material in the bottom of the tank which creates a food source for microbiological organisms.

<sup>8</sup> Household Water Supplies, Department of Health, 1992.

Risks associated with the Groundwater supply is dependent upon the bore depth and the surrounding catchment. The bores that are use for these sites are of an unknown depth and are situated in farmland. The risk to this supply would be that the bore is shallow or has an unprotected well head and there could be rain water runoff from the farm land contaminating the supply with microbiological organisms from the stock effluent. All of these sites do have the bore area fenced off from the grazing stock to reduce this risk.

### **7.5.5 Current and Future Demands for Water Supply**

The three supplies using groundwater sources have sufficient amounts of water of an unknown quality all throughout the year. All supplies have no complaints of taste or odour issues and there have been none recorded in council records regarding this.

The rain water collection systems have complaints of insufficient water quality but have none regarding any taste and odour issues. The tanks are often topped up by tanker during the summer months to compensate meagre rainfall.

### **7.5.6 Options Available to Meet the Demands and their Suitability**

Recommendations for these supplies would be to look at the ongoing maintenance of the water tanks and the installation of both a water treatment system and a first flush system for the roof supplies.

### **7.5.7 Hauraki District Council's Involvement in Meeting the Demands**

The Hauraki District Council will be investigating the practicalities and costs of extending the existing council water supplies and/or the development of new treatment plants into the non-serviced areas during the next reporting period.

With the information gathered from the surveys particular sites will be involved in an education programme raising the awareness of drinking water safety and efficient use the water resource.

## 7.6 Tramping Huts (DoC)

### 7.6.1 Description

Huts are owned and maintained by the Department of Conservation. These huts are not accessible by the majority of residents but do serve groups of people at a time therefore have been grouped as a separate community. There have been two huts identified within the Hauraki District.

Locality <sup>9</sup>	Hut	Sleeping capacity	Category	Fee	Bookings/ Notes
Kaimai–Mamaku	Daly's Clearing Hut	16	Basic/bivvy	–	
Forest Park	Waitawheta Hut	26	Serviced	\$10	The new Waitawheta Hut is at the Old Mill 30 mins past the old site (now a camping ground).

### 7.6.2 How is Drinking Water Obtained

Both huts use roof water supplies which feed into storage tanks which are above ground installations. Waitawheta hut's tank is 600-800L in size, staff at DoC were unsure of the size of Daly's hut's tank.

### 7.6.3 Risks Attributable to the Absence of a Reticulated Water Supply

Neither of the huts has a first flush systems installed, nor do they have any water treatment system in place. Both tanks are securely covered to reduce the risks of vermin and birds contaminating the water supply.

### 7.6.4 Quality and Adequacy of Drinking Water

Neither hut had reported any taste or odour problems with their drinking water, but had not had the quality of their drinking water tested. The limited number of people using these facilities reduces the risks associated with these supplies similar to other roof supplies.

### 7.6.5 Current and Future Demands for Water Supply

Both Huts have enough water all year round to meet the frequency of occupation. The Waitawheta Hut is less than a year old and therefore the system has no history to fully answer this question. However the hut has been relocated from another site and the water system sized accordingly.

### 7.6.6 Options Available to Meet the Demands and their Suitability

The options available are limited to the low tech solutions due to the location of the huts and the lack of electricity to run UV/Ozone treatment options. Also to

<sup>9</sup> Table sourced from the Department of Conservation website, [www.doc.govt.nz](http://www.doc.govt.nz)

install a filter would create a risk to public health by creating a growth media for the microbiological organisms due to the length of time that a filter would hold stagnant water. The best option for these sites would be the status quo, with notification stating that the water is not treated and that all drinking water should be boiled.

### **7.6.7 Hauraki District Council's Involvement in Meeting the Demands**

With the information gathered from the surveys particular sites will be involved in an education programme raising the awareness of drinking water safety and efficient use the water resource.

## 7.7 Travelling Public

### 7.7.1 Description

The travelling public is described as non residential or residential public travelling through the Hauraki District utilising the district services.

Due to the nature of the travelling public, this community has not been assessed in this document and will be highlighted as something to address in the forthcoming assessments.