

Living By Water

A history of Barwon Water
and its predecessors

Leigh Edmonds



FRONT COVER IMAGE

Lower Stony Creek Reservoir (1873)



Leigh Edmonds

Leigh Edmonds is a practising consulting historian of many years experience. He has studied, taught and written in a wide range of historical areas including Australian, European, technological, transport, communications and local history. He has been an International Scholar of the Society for the History of Technology. His particular interest is in how the development of modern technologies, industry, business and politics has shaped our world. This is his first major work in Victoria after having lived in Western Australia for many years.

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1921

Salus populi suprema lex esto

(Motto of the Geelong Waterworks and Sewerage Trust)

2003

'Through excellence in customer service, environmental care and business efficiency, we will be a leading provider of sustainable water and sewerage services.'

(Vision of the Barwon Region Water Authority)

FOREWORD

Several months ago, the Victorian Government launched the *Our Water Our Future* strategy that will revolutionise water use in Victoria. It sets out what we must do to ensure our valuable water resources are protected. I believe it is a necessary change and the key to a sustainable water future for us all.

How fortuitous then that Barwon Water has commissioned a history that looks back over more than a century and a half of water use in Victoria. While it focuses on developments in the Barwon region, it also says much about water use across the entire state and explains the historical background to our new water policy.

I am not surprised Barwon Water commissioned this comprehensive history because the authority has long been at the forefront of innovation in Victoria's water industry. *Living By Water* helps us understand how and why events unfolded in the past and shows the environmental perspective that has always been present in the water industry. It also reminds us that the water services we take for granted are provided by people, many of whom have dedicated their lives to serving us. It tells of their efforts and achievements against the background of wider political, social, economic and environmental change over more than a century.

This history also reminds us of the power of symbols. In the past, Barwon Water used the symbols of Hygieia and Aquarius, the ancient Greek goddess of health and the water carrier, to explain its role in the community. This history concludes by invoking the powerful symbol of Gaia, the living earth, to explain the vital necessity of ensuring a sustainable future for our water supply. Gaia is a large concept and so is the challenge that lies ahead of us. *Living By Water* helps us look back to understand the world in which we live. This history also reminds us we must learn from the past rather than be bound by it, so it will help us face the future with greater wisdom.

John Thwaites

Minister for Water
October, 2004.

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PREFACE

Writing the history of Barwon Water and its predecessors has been an extremely interesting and challenging project. Through it I have learned much and met some wonderful people. I hope this history goes some way toward repaying the help everyone has given me while I've been working on it and meets some of the expectations of those who entrusted me with the history of their authority.

There are many people who have been very helpful during my work on *Living By Water* and it seems odious to have to select a few for special mention. Everyone I have had contact with at Barwon Water has been unfailingly helpful and I thank each and every one for their assistance and encouragement. Without that help this book would not have been what it is.

There are, however, some people I would like to especially thank for their direct involvement in this project. Without some of them, this book would have been impossible to write; without the assistance of some others, it would be a different and poorer work than it is.

First are Stephen Vaughan (Chairman of Barwon Water) and Dennis Brockenshire (Chief Executive) who saw the need for this history and made it possible. Both have been very supportive, encouraging and helpful and their direct involvement toward the end of the writing helped make much of the text far more interesting, lively and thoughtful than it otherwise would have been.

Mike McCoy (an ex-Executive Manager of Barwon Water) has been my Virgil at Barwon Water (though the authority is far too pleasant for that analogy to work well). He has been an inexhaustible source of information and ideas for this history, has read all the drafts carefully and made a valuable contribution to the final result. I really cannot thank him enough for his support in this project.

Joe Adamski, Rachel Olney and Pauline McPherson have provided endless support in countless little ways, and some big ones. They have contributed a great deal to the ease with which this project has been carried out. Thanks also goes to Damian O'Doherty (the survivor of many amalgamations) who, although he has not been directly involved, has passed on many encouraging comments and a wealth of experience in the wider Victorian water industry. In fact, everyone on the fourth floor has made me feel right at home and been encouraging and helpful.

Others who have made a valuable contribution are Margaret Jellett on the first floor, Janice Dart, Robert Barber and everyone in Corporate Communications, Michael Malecki and Jim Fogarty in Administrative Services, Mary Humphries, who helped with photographs, and Karen Taylor of the Social Club. My reception at South Geelong has been equally helpful and I'd particularly like to thank Peter Ashton, Peter Burns, David Sutherland, Carl Bicknell and Andrew Edmiston.

My great thanks also goes to all those who allowed me to interview them for this project. The range of memories, perspectives and ideas was fascinating and very useful. In addition, there were others who helped me with a passing comment here or there and on more than one occasion a casual comment from someone in a lift or corridor sparked a whole line of inquiry.

I have enjoyed my year and a half in the company of the people at Barwon Water and I wish them as much enjoyment, success and sense of achievement from their work in the future as the organisation has provided its people in the past.

L.E.

THE BARWON REGION SHOWING
BARWON WATER'S AREA OF RESPONSIBILITY (2003)



INTRODUCTION

Water is one of the great forces of nature. It can be as gentle as a brook or pond in spring, or as powerful as a flooding river or a storm-lashed lake. It can fall like mist or as a torrent. It can refresh, it can overwhelm, it can cause delight or fear. It can run gently through your hands, but it can demolish great structures with its weight and tenacity. Its cycle from the surface of the planet to the sky, to clouds, to rain and back to the surface is unending and one of the fundamental natural processes on which we depend absolutely.

Water is a fluid and difficult to contain. It flows downhill under the influence of gravity, which is one of the properties that makes it easy to use, but it also causes many problems when it finds ways of escaping. It is incompressible so it cannot be easily stored or transported. It evaporates into the air, it is easily polluted. People take it for granted until it isn't there or there is something wrong with it.

Water is life. Without water we cannot live. It is in every cell of our bodies, it is in everything we eat and drink. It is the solvent in our bodies without which the chemistry of life could not take place and it is about 60 per cent of our bodily mass. It cleanses and heals us. Where there is no water there is no life.

Water is disease. As vital as water is to human life, it is also one of the greatest threats to human health and life. The whole biosphere of our planet relies on water and in it live uncountable micro-organisms, invisible to sight but dangerous enough to make people ill or kill them. Water also can dissolve many substances, some of them poisonous and just as able to sicken or kill. Salt in water makes it undrinkable and so, despite the vastness of the oceans, we have to rely on sources of uncontaminated water for our health and well-being. We neglect the threat of water at the peril of our lives.

Water is civilisation. Access to good supplies of water was the foundation of all civilisations, stretching back as far as human records exist. In the Middle East, Egypt, China and the Americas, the first great civilisations were established on great rivers where the water was plentiful and could support the populations of the first cities. In Australia, the Aboriginal

civilisation depended just as much on water. People congregated around rivers and lakes and valued the knowledge of the location of every source of potable water in drier regions. Rivers also became the first highways. For thousands of years, transport by water was so much easier than any other form of travel that great trading cultures grew where there was fresh water for living and for transport and on the edges of oceans from which the whole globe could be reached. The settlement of the Barwon region occurred as it did because of the water people found there.

Water is conflict. Water is worth fighting and even dying for because without it people cannot live. Wherever there is a scarcity of water, the desperate need people have for it forces them to fight for it. Some people claim that in the future water will be so precious wars will be fought over it. Conflict is not always violent. It occurs in the routine negotiations between organisations about what will be done with water. It is the contest in courts of law over water rights and access and water has been the cause of political conflict for as long as politics has existed. In Australia, the demands of environmentalists, agriculturalists and urban water suppliers have already led to political and legal conflict.

Water is delight. Go to a river or a lake, or to the seaside, and relax. Take a book, a fishing rod or a picnic hamper. Try to catch the experience in a painting or a photograph. Watch creatures that live in the water or the birds that fly above it. Go alone or go with friends or family. Go swimming, speed over the water on skis or a surfboard, fly high over it under a parachute. Play games, join in water sports like rowing. Only the bounds of the human imagination limit how people enjoy water.

Water is work. Wherever people congregate they rely on others to take care of their need for water. Water has to be harvested, stored, transported to where it is needed and distributed. To do all this, people need knowledge, experience and skill. Generations of people have dedicated their working lives to providing satisfactory supplies of water to their



communities. Water workers and water carriers are carriers of life. This has been so since antiquity and the sign of Aquarius, the water carrier, is one of the 12 signs of the zodiac that govern, some people claim, the destinies of our lives.

Water is the power of nature. Storms, tidal waves and floods are demonstrations of water's power. Its weight can wash away almost anything standing before it, and what sudden surges do not destroy water's patience can erode. Water creates entire landscapes over thousands and millions of years, creating chasms, river valleys and the vast areas of rich soil that became the sources of our food. We are made humble by the force of water and attempts to harness and harvest it can only succeed when we learn how to work with it, not fight it.

Water is a mirror. In water we can see nature and we can see ourselves, literally and metaphorically. Look across still water and what can you see? Almost a true reflection of the world and everything in it. Lean out a little further and look straight down into the water and there you are, looking back. In still water, you can see what you look like and you can see the world around you the same way. In running water, with currents and ripples, you can still see yourself but now the image is different, mobile and

The Geelong and District Water Board entry in the Barwon River race, November, 1985.



The pipe head basin at Anakie around the 1910s. The stillness of the water reflects the landscape beyond with mirror-like clarity.

flashing with sparkles of light. The image has new highlights and new meanings. The more agitated the water becomes the more distorted the image, until nothing is left. Water flows like time and just as water carries away images of the world and people, so does time.

This history is a reflection on water and how people have used it across the flow of time. It has been written to bring back images of the people and the things they did in earlier times, to show you what they saw, what they did and the reasons they acted as they did. The flow of time now hides much of what they were like and what they hoped for, but there is enough detail surviving to give at least some insight into how water changed the world of people in the Barwon region and how they shaped water in all its varieties to meet their needs. When you look into this reflection, you should remember that what you are seeing is not what happened but a reflection of what happened. Someone else looking from a different perspective will see the same general outline of past events but observe different details or perceive the same details differently. This is a natural part of being individuals. No-one can stand in the same place as another and so the reflections they make and see also must be individual.

From where I stand to reflect on Barwon Water, there are many highlights and flashes of sparkling enlightenment in the eddies and ripples. There are many, many stories in those reflections but some patterns repeat themselves over and over again. I believe these are the most important elements of the image and the ones on which this reflection focuses.

One is the effort of people to provide themselves with a safe and secure water supply and to use water to protect themselves from disease and death. The intention is simple, but achieving it was not because as people's expectations and their numbers have grown, greater demands have been placed on the environment. Where once several hundred people used the water of the Barwon region, there are now a quarter of a million people. Where once the water from the river was sufficient for all needs, now people are more demanding. Some of the struggle is between people and nature in an attempt to force it to give up more water. Some of the struggle is between people about the resources necessary to meet their demands on nature. For this reason, politics at all levels is a significant part of this reflection.

People cannot harness water with their bare hands. We are toolmakers and users and we have used tools to make our water systems. Over the flow of time, some of these tools have changed significantly and others more subtly. When Geelong's first water storage was constructed, the work was done with pick, shovels, wheelbarrows and the aid of horses. Later, huge earthmoving machines did the work. When the first water pipes were laid, the trenches were dug by hand. Later, they were dug by specially designed machines. The first water pipes were cast iron. Later, they were replaced by a succession of different kinds of pipes, each offering improvements over those used previously. When people first began paying for water services, the amounts they paid were calculated manually using simple formulas. Later, they paid amounts calculated by computers to complex formulas using systems in which money rarely changed hands. The way organisations have functioned also has changed; new ways of organising staff have appeared, the nature

of management has moved on and the way in which money flows through the system has changed.

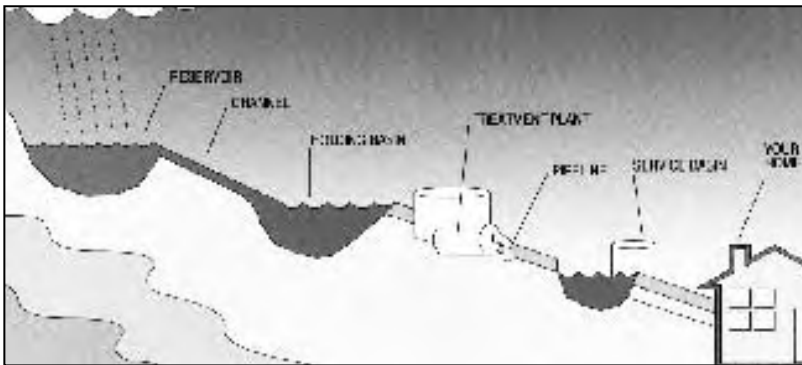
Another pattern is that many people who came to work for the organisation set up to supply water dedicated themselves to it. Not everyone did; many people did the work just to make a living, many came and went like brief eddies in flowing water. Others became caught up and remained. In this reflection, individuals are swept into focus for a while and their aspirations and contributions shown briefly before they are swept on by time, to be replaced by others.

Perhaps the most absorbing pattern of all is the relationship between people and water. People worked to tame water to meet their needs and water responded in its own ways and in its own time. At first people were limited by their technical capabilities to harvest, store and distribute water. But as technology advanced and it became possible to build bigger dams and longer transfer mains, cities became more demanding and needed more water. The only restraint on this growth was when the rains failed and supplies dried up. The usual response was to attempt even greater technical feats to bring more water under human control to stop the same thing happening again. But that threatened to create an endless escalating competition between people and nature, to cause even greater natural problems as water taken to meet human demands was no longer available to meet other needs and the long established natural order of things began to crumble under the stress. The only way to stop the cycle of growing demand and the increasingly stressed natural environment was to find a new way to relate to water.

This now seems to be happening. In 2004, the Victorian Government announced a new water policy that promised to bring people's use of water more into line with what nature is able to provide. Unplanned, this history has been prepared at a moment in the flow of time when centuries old ways of seeing the natural world and water might be about to change. Perhaps this reflection has become a summation of our previous understanding and working with water. And although it is

about what happened in one part of Victoria, it may have a wider relevance to all past water use in the state. Whether or not the proposed changes come about and whether they are successful is yet to be judged. That will be for another historian later in the stream of time.

Almost everything changes. People, cities, organisations, even landscapes over time. The one thing that never changes is the nature of water. Watch as everything else revolves around it.



The flow of water through the supply system, passing from nature through a series of processes and storages to your house, to industry and to every part of society.



CHAPTER ONE

SETTLING BY THE WATER TO 1860

Water and the land it flows over can make people what they are. People can use these resources for their own purposes and there is a continuing dialogue between people and their environment that shapes the water, the land and the inhabitants. This is the story of how that happened in one place, the Barwon region.

The Barwon River is a modest stream by any standards. It is 188 kilometres long and its major tributary, the Moorabool River, is only 153 kilometres long. Between them, their average annual flow is 128 million cubic metres of water, which is only about 1 per cent of all the water that flows in Victoria's rivers. Even so, the region through which the Barwon River travels is part of one of the most fertile and productive areas of Australia that was once called *Australia Felix* (fertile Australia). It was given that name by the explorer Major Thomas Mitchell in 1836 to, as he wrote: "Better distinguish it from the parched deserts of the interior country."

The Barwon River rises in the Otway Ranges and flows down onto the broad valley of the Western District. It then meanders east, taking in the Leigh River at Inverleigh and the Moorabool River further downstream, just outside Geelong on the shores of Corio Bay. Only a little way from the bay, its path is blocked by a high ridge so it turns south and meanders toward the sea through low land, feeding swamps and lakes. Mixing its fresh water with the salt water of Bass Strait, the river enters the sea at Barwon Heads. The Moorabool River begins on the modest slopes of the Central Highlands of Victoria, then flows south to the Western District before adding its waters to the Barwon River.

The geography of the Barwon region was created over the epic span of geological time, by violent bursts of volcanic activity and endless eons of ceaseless erosion by water and wind. Lake Corangamite marks the western boundary of the region, but the plains of the Western District stretch far to the west beyond the Barwon River, to rich land through which other rivers flow. The eastern boundary of the Barwon region is the sea where the Bellarine Peninsula separates the broad expanse

The junction of the Moorabool and Barwon Rivers from the Aberdeen Street Lookout some time late in the 19th Century.

of Port Phillip Bay from Bass Strait. To the north are the hills of the Central Highlands and to the south the Otway Ranges on the edge of the southern sea. The plains were created in two parts – the younger northern plains from volcanic lava flows and the older southern plains from layers of sedimentary deposits, which capture and store vast amounts of water in hidden aquifers, laid down slowly over eons.

The Barwon region's relatively mild temperatures rarely fall below 0°C or rise above 40°C. For Australia, the rains are relatively reliable; Geelong is on the edge of an area stretching far to the west that receives around 500 to 700 millimetres a year and areas closer to the south west coast and stretching inland as far as Colac receive 700 to 1,000 millimetres. Most of the Central Highlands receives about the same rainfall while areas to the east of Ballarat receive around 1,000 millimetres. Parts of the Otway Ranges receive an average annual rainfall of 1,400 millimetres. The Leigh and Moorabool Rivers begin in the wettest parts of the Central Highlands and the Barwon River in the Otway Ranges. The rains are seasonal and variable, so while the mean flow of the Barwon River is 58 million cubic metres of water a year, the maximum has been 102 million cubic metres and the minimum seven. The flow of the Moorabool River is even more variable, with an annual maximum of 212 million cubic metres and a minimum of one million. This means in some years the rivers can flood violently and, in others, be reduced to a chain of water holes or dry up entirely.

The Aboriginal people walked across these lands and used the water long before the arrival of white settlers (or invaders, depending on your point of view). The people spread out across the whole of Australia and in all its environments they found ways of living that matched the land. Where it was drier and harsher, their lives evolved to match the available resources. They treasured water and the food that grew around it and walked long distances to use but also conserve those resources. In less harsh environments, such as the land Mitchell called Australia Felix, the resources were more plentiful and Aborigines walked less and lived closer together.

There were 35 language groups or tribes in Victoria before the white arrival, each with its own land. The Wathaurong (the name means ‘people who belong to the water’) lived over most of the Barwon region, across the Bellarine Peninsula, from south of Geelong towards Cape Otway, north-west as far as Beaufort and Ballarat and west as far as the upper Barwon River. They were surrounded by other language groups. The Wurunjeri people lived on the west side of Port Phillip Bay as far south as Geelong, inland up the Moorabool River and across toward Ballarat. The Katubanut lived on the rainforest-covered plateau and rugged coastline of Cape Otway, probably centering on Apollo Bay, while the Kolakngat people lived on the land extending from Lake Colac and Lake Corangamite to the coast.

Wathaurong people on the water. Their relationship with the water was as close as it was with the land. The water did not belong to them; they belonged to it. Photo courtesy Geelong Heritage Centre.



A language group or tribe was not a single group. Rather, it comprised a number of bands or clans linked to each other by language and inter-clan marriages. An entire language group could comprise around 450 people and a band about 30 to 50, each living in a separate part of the overall group's area with bands only as large as the land could sustain. Because the people depended on the resources of their area, it was unlikely an entire group ever came together because of the immense drain so many would place on the environment. Meetings between bands within the group were more common because they were easier to sustain. But they only occurred when and where there was abundant food and water.

Water was one of the most important things in the lives of Aboriginal people. It created the rhythms of their culture, its daily activities and seasonal movements. Coastal people had access to a wide range of food, from the sea and coastal lands where they had to find fresh water. Further inland, people's lives revolved around the annual rise and fall of the river systems, living on higher ground when rain swelled the waterways and threatened floods and moving closer to the rivers during the drier season, to be closer to water and the life that also needed water. When the rivers shrank to water holes, life became more difficult as food sources became scarce. When rivers dried up, the people knew how and where to find water below ground. But in the severest droughts they faced tragedy.

Two hundred years after the arrival of white settlers in the region, we know little about the lives of the Aboriginal people. Even an estimate of how many lived in Victoria is guesswork, ranging from 5,000 or 7,000 to as many as 19,000. Even before white people began arriving, the scourge of smallpox had swept through the Aboriginal tribes, making it harder to estimate their earlier population. Some say the number was probably 15,000, but others say the land could only have supported that many in the best seasons and that inevitable droughts reduced the population significantly. The new arrivals paid little attention to the Aboriginal people because they considered themselves superior to the 'natives' and they were preoccupied with imposing

themselves on the land. Within a few years, the rapidly expanding white population far outnumbered the Aborigines and overpowered every attempt at resistance. The whites treated the Aboriginal people exceptionally poorly. A Chief Protector was appointed in 1839 to take responsibility for the Aboriginal people, but his failure was monumental. The Katubanut became extinct in only a few years and the last member of the Wodouro tribe, which formed part of the Wathaurong, was buried in 1885.

The rapid extinction of Aboriginal life and culture was partly because of the different ways in which they and the white arrivals used the land and water. Aboriginal people were modest in their use of natural resources and used what they found as efficiently as possible. The white arrivals, however, knew no bounds to their demands on the environment and their culture depended on the creation of towns and cities that took in and used the resources for long distances around them. By the time they arrived in Australia, the white settlers had the drive and technology to exploit any part of the world that produced the resources they wanted and to ship them across oceans to make profits.

Although the British occupation of Australia started at Sydney Cove in 1788, many years passed before it reached the Barwon region. The main reason was the initial colony lacked the people, resources or the need to spread quickly. This changed when the colonists found good profits could be made from selling wool to London. So the land that had been vast empty spaces became sources of wealth that were quickly occupied by small numbers of men running large flocks of sheep.

This inland expansion, however, was preceded by coastal exploration fuelled by British fears the French were interested in occupying parts of Australia. In 1802, Matthew Flinders, who became famous for his careful mapping of the Australian coastline, spent some time exploring Port Phillip Bay. A small party based at Indented Head on the Bellarine Peninsula explored part of Corio Bay, where Geelong would later be established, and travelled up the west coast of the bay. At the beginning of May, four men climbed the You Yangs and returned to the coast having “walked twenty miles without finding

a drop of water”. (In fact, they had passed close by an Aboriginal rock-well with a capacity of 200 gallons that had been created over centuries and hidden carefully under shards of rock and branches.)

White interest in the area was sporadic for the next 30 years. In October, 1803, two ships arrived from Britain to establish a penal colony in Port Phillip Bay. The settlement was based near Sorrento, but did not last long for several reasons, including the poor supply of fresh water that could not sustain 400 people. The settlement was abandoned in May, 1804, except for William Buckley, an escaped convict who found his way around the bay to live with the Wathaurong people. He did not see another white person for more than 30 years. In December, 1824, Hume and Hovell accidentally visited the western shores of Port Phillip Bay at Lara, north of the future settlement of Geelong, but nothing immediate came from their exploration.

By the 1830s, however, conditions were right for the white occupation of what became known as the Port Phillip District, including the Barwon region. The whole area was rapidly turned into a giant sheep run because wool had become a valuable export. In 1820, Australia had supplied just 8 per cent of Britain’s wool imports, but by 1840 it supplied almost 50 per cent. In 1836, settlers in Tasmania began looking at the area around Port Phillip Bay to expand their operations, Major Mitchell published a report of his exploration of Australia Felix and the government in Sydney relaxed its attempts to control the spread of occupation and made the Port Phillip District a separate administrative area. At the same time, a drought across much of New South Wales forced pastoralists south in search of new grazing land. The district was occupied from two directions, with New South Wales pastoralists driving their flocks south and the Tasmanians bringing theirs over Bass Strait to Port Phillip Bay.

In May, 1835, John Batman and his small party landed at Indented Head. There they met William Buckley, spent several days exploring around the area later known as Geelong and sailed to the head of the bay to establish Melbourne on the

Yarra River. White occupation of the Barwon region began with a small flock pastured on the banks of the Barwon River in April, 1839, and another flock pastured over the land where Geelong now stands a month later. More settlers arrived and quickly occupied the land around Geelong and the Bellarine Peninsula and spread as far as Colac by 1839. Between 1836 and 1840, they occupied virtually all of the Western District plains. There had been 117 white people in the Port Philip District in 1836; by 1840 there were more than 10,000.

The Western District was ideal for sheep. It was generally flat, there were streams and lakes with sufficient water for the vast flocks, its climate was suitable and the seasonal rainfall was sufficient for healthy pastures. The settlers required two kinds of water to make the Western District worth exploiting,

Geelong as it appeared in 1847 looking down over the town toward Corio Bay. The town is still very small and the landscape shows the open plains that were ideal for sheep grazing. A lithograph by John Skinner Prout, courtesy of the La Trobe Picture Collection, State Library of Victoria.



however. They needed fresh water for themselves and their flocks and ocean water so they could ship the produce of their flocks to markets halfway round the world. They established their bases near sources of fresh water and sent their produce to the nearest sea port; there were several anchorages along the south west coast, but they were not suitable for freight ships. The Otway Ranges were a barrier further east, but Corio Bay in Port Phillip Bay offered safe anchorage and Geelong became the sea port for the Western District. The first shipment of wool destined for London left Geelong in March, 1840, and by 1844 wool, tallow and hides from the Western District with a value of £150,000 passed through the settlement.

Pride in their new home and its undeniable beauty led some of the first settlers to believe Geelong was the better location for government in the Port Phillip District, but the government was established in Melbourne in October, 1836. When the Governor visited Geelong in March, 1837, he remarked that it "ought to be the capital of the province", supporting the rivalry that developed between Geelong and Melbourne and the tension surrounding Melbourne's control over Geelong.

Water was the most important factor in Geelong's establishment because it had to have ready access to fresh and sea water. Although the sea and the Barwon River were separated by a ridge at Geelong, the river was sometimes brackish as far upstream as Buckley Falls (one of Buckley's favourite places during his long stay with the Wathaurong) because sea water flowed upstream when the river was low. For a time, settlers collected supplies from a small dam built across Western Gully where water flowed into the bay near the foot of Moorabool Street. But that supply was soon fouled. As they built huts, people collected run-off from their roofs in tanks or sank wells. Settlers on the Bellarine Peninsula relied heavily on rainwater tanks and wells, but they also had to cart water in from other areas. In Geelong, people often used water collected in casks from above the falls or imported it from Melbourne. None of these supplies were abundant or pure enough to enable a permanent town to flourish, however.

DEATH BY DROWNING

On Monday last, a woman named Sarah Lorton was accidentally drowned in the Barwon. She went down to the river side for water, and it is supposed that she had lost her balance while stooping to fill her pitcher. Her husband missed her at dinner time, and grew alarmed for her safety. The cause of her disappearance was soon discovered and her body was found after a short search.

Water was so precious that people risked their lives to get it. From the Geelong Advertiser, December 5, 1840.

When Governor Bourke visited Geelong in March, 1837, he explored the area around it, accompanied by local men of importance, and rode some distance up the Barwon River beyond Buckley Falls, searching for an adequate supply for the new settlement. He wondered where the new town could be located, close to the coast or close to the river, and supposed one solution might be supplying fresh water in pipes from just above Buckley Falls.

Three months later, Governor Bourke received a petition from pastoralists around Geelong asking him to send a resident Police Magistrate to bring lawful government to the district. Bourke appointed Captain Foster Fyans, who arrived at Geelong in October, 1837. Following the Governor's instructions, Fyans explored the area for a suitable site for the new town, balancing the need to be near the coast with access to good supplies of fresh water. Locations to the east had excellent sea access but very poor supplies of fresh water while sites to the west on the Barwon and Moorabool Rivers had better supplies of fresh water but were too far from the coast. Eventually Fyans recommended the site where the river and sea were closest together despite two disadvantages; the Barwon River was brackish downstream from Buckley Falls for about four months of the year when the river was not flowing strongly and a high ridge separated the river and the sea, although it was not too steep for horse-drawn vehicles. The survey of the town began in 1837 and the completed plan went to Sydney for approval in August, 1838. The layout was designed to link the sea and the river with ends of the town facing each. Larger allotments were laid out to the western side of the town for small settlers. The Township of Geelong was gazetted at Sydney in November, 1838,

This aerial photograph taken of Geelong 90 years after the town was first laid out, showing how it was designed to link the fresh water of the Barwon River, in the foreground, with the sea of Corio Bay in the background. Photo courtesy the La Trobe Picture Collection, State Library of Victoria.



and the first sale of land around Geelong occurred there in February, 1839. Many settlers had not waited for the survey before erecting buildings; the first store had been opened and the first customs house erected in 1838.

Geelong could be laid out where it was because Fyans had devised a plan to dam the Barwon River a little downstream of the town site so the stored water would extend upstream to the settlement. Not only would the dam store supplies for times of natural shortage, it would prevent salt water from further down the river getting into the water stored behind the embankment. Fyans went to Sydney where he discussed this plan with Governor Gipps, who agreed and granted Fyans 50 convicts for the work.

The dam, commonly known as the 'Breakwater', was constructed over about 18 months and completed around the end of 1840. The structure comprised two large walls of stone with a clay filling between them, the stone giving the embankment its strength and durability and the clay, being impervious to water, preventing the leakage of water from one side to the other. It was also wide enough to provide a secure river crossing where drays could pass each other with space to spare. It was one of the first major public works in the Port Phillip District and considered at the time a "work of magnitude and merit".

FOSTER FYANS' DAM

I then introduced another plan, a hobby of my own, laying it before His Excellency, a sketch of the Barwon River, proposing to throw a dam on certain points. "A dam," he replied. "What do you mean, a dam for what?"

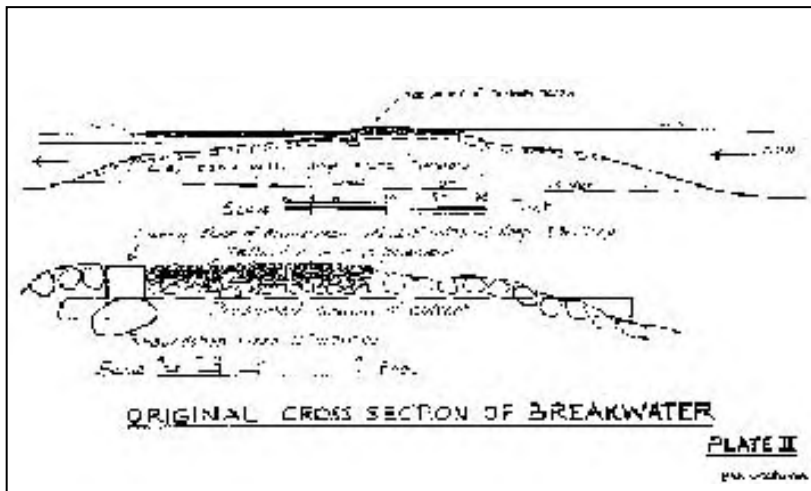
"To inundate the country," I said, calling to his attention that [when] the tide flowed into the river it caused our water to be sometimes almost salt, that the dam was to prevent occurrence, by keeping the salt water from being introduced. He kept the plan, desiring to see me on the following day when he fully approved of it. Particularly he approved of it, as the expenses here estimated nothing but convict labour. He granted me 50 convicts for this duty, ordering them to be shipped for Port Phillip, with a few needful pieces of machinery for the purpose of removing large blocks of stone of many tons weight.

The party on their arrival were set on this work, and succeeded more successfully than could be anticipated. The depth of water was from 20 to 25 feet, with several feet of muddy bottom. For five months I attended this beneficial work, when I was ordered on another duty. The progress these few men made in so short a time was very encouraging, a third of the span was completed by their hard labour, and finished all in 18 months. The result of this dam is by keeping the fresh water six metres higher than the rise of the tide, that the City of Geelong is supplied with good water, the reach of the river now kept as a reservoir is upward of four miles in length, and the water yearly becoming more fresh as the saline matter purges from the banks.

Foster Fyans, Geelong's first government administrator, describes how he gained approval to construct the town's first water supply around 1840. 'Reminiscences of Foster Fyans', pp.431-3.

Other settlements in the Port Phillip District faced the same problems as Geelong. Melbourne was located on the Yarra River where rapids usually prevented salt water from flowing further upstream, although later a dam similar to the one in Geelong was constructed to help protect the fresh water supply. In the country, all settlements had to be established close to fresh water, usually at river crossings or near a stream. At a place like Colac, inland from Geelong, fresh water was drawn from wells or from a nearby stream. Water was the necessary element in almost all settlements and was reflected in the names of towns around the region. Torquay was originally called Spring Creek, Anglesea was Swampy Creek, Breamlea was Bream Creek and Lara was Duck Ponds. No settlement had a water supply piped to people's homes. People either went to rivers or wells and collected it themselves or it was delivered by carters with large casks that were usually filled by bucket at the

A cross section drawing of Fyans' dam shows how it was constructed. Basically it was a large pile of soil with stones laid on the surface to help protect the embankment from erosion. The stones across the top form the road, made in the Telford style of the day. Drawing by Peter Alsop from the Investigator, May, 1968.



local water source. Because of this, fresh water was expensive, precious and used sparingly.

Fyans' dam at Geelong was soon tested. By February, 1841, a dry spell meant the bed of the river a few miles above the falls was nearly dry while below the Breakwater there was nothing but salt water. In between was an ample supply of fresh water. The following winter there were heavy rains, creeks ran full, fords were generally unpassable and the Barwon River rose 12 feet above its usual level. It seemed likely the Breakwater would be damaged or entirely washed away, but it survived. The next winter the rivers again reached high levels and the Breakwater was entirely covered, but again it survived. In 1848, it was repaired and it continued to be the source of Geelong's supply.

The Breakwater gave Geelong a secure source of water, but quality became a problem. When the river stopped flowing, as it had in the summer of 1841, the water became stagnant and unpalatable. It was made worse by stock drinking from the river, causing erosion of the banks, while sometimes animals fell in and drowned. Some of the town's first industries, such as a tallow works, also were located by the river and became a threat to water quality. Likewise, water collection for domestic use reduced quality because most carriers used buckets to fill their casks, stirring up the mud and fouling the water. In February, 1841, Joseph Griffen installed a pump just east of the end of

PURE WATER

The efficacy of the Breakwater has been put severely to the test this dry season. The bed of the river a few miles up (above the falls) is nearly dry – below the Breakwater it is quite salty – in the intervening space, forming the southern boundary of the township, there is fresh water enough to supply the city of London for twelve months. The only drawback hitherto has been that there is no current during very dry weather, the surface water gets heated and unpalatable; another grievance was that the water-carriers had no other means of filling their casks than by dipping-in buckets, which stirs up the mud. Both grievances are remedied by the erection of a very superior pump, which Mr Griffen has imported and set up at a very considerable expense. It is fixed at a depth of four feet below the surface of the water, and will save a deal of labour. No householder should now receive any water unless they are satisfied that it comes from the pump. Mr Griffen is determined to deserve the thanks of the tee-totallers, as well as lovers of good cheer.

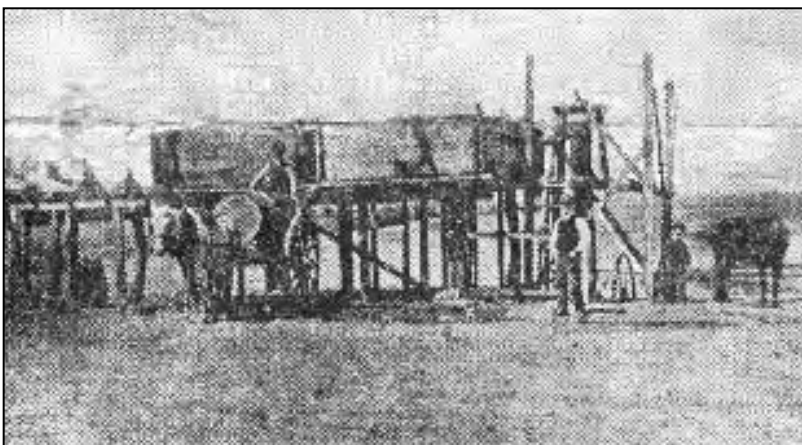
Almost immediately there were problems with the quality of the water stored at the Breakwater. Joseph Griffen provided a partial solution in 1841. From the *Geelong Advertiser*, February 13, 1841.

Moorabool Street that took water, which he claimed to be “cold and clear”, from four feet below the surface of the river. Later, William Jewell set up a tank and pump powered by a horse whim on the river bank at the foot of Yarra Street. At some time, now long forgotten, there was also a well in Market Square, 21 feet deep and 16 feet in diameter, from which water was sold at a cost of sixpence for two buckets. But while pumps could provide better water, it cost money. So many people had to use cheaper muddy water bucketed from the river or collect it themselves.

Despite these problems, the dam gave Geelong the secure supply it needed to develop steadily during the 1840s. The pastoral industry blossomed as the government gave pastoralists some security of tenure over the land on which they had ‘squatted’ and the growth of British markets encouraged more and more wool growing. Geelong became the location of a partnership between rural and urban economies by giving rural industries wool marketing and processing services, tallow production and grain handling and milling. The town also continued to develop as the port of the Western District. In 1841, the population of Geelong was 454 (Melbourne’s was 4,479), but by 1846 it had quadrupled to 1,911.

Around Geelong, roads were cleared and more buildings began to appear; houses, shops, churches, a Mechanics’

Jewell's tank was raised up on posts so water could flow from it into the wheeled casks of water carriers. The appliance on the right of the main tank is probably a pump.



Institute and a court. Increasing population created greater local demand and a brewery was opened in 1841 and two flour mills in 1844. A weekly mail service with Melbourne commenced in March, 1840, and a bay steamer started regular services in June, 1841, taking over the mail run in September because it was more regular. The town had its first horse cab service in 1849. The spirit of improvement and enterprise appeared all over the town and the bustle and animation grew daily. This spirit of enterprise was equalled by a growing civic pride in Geelong. Leaders appeared in the community with aspirations to improve the town even more by enhancing the quality of daily life with necessary facilities and services. The Geelong Benevolent Society was founded in March, 1843, to assist the helpless and poor and the first hospital was opened in August, 1848. Fire was a constant cause of fear and the town's first fire engine arrived in June, 1849, provided by insurance companies but to be used by a volunteer fire brigade formed by men in the town.

The greatest expressions of local self-confidence and aspiration were shown in attempts to form a local government so men in and around Geelong could have a say in what facilities the government provided, how they were provided and how they were to be paid. In 1842, the largest public meeting held in the town promoted the election of local Directors of Police and Public Works. The meeting's

chairman said he hoped a little direct taxation would bring people together and induce them to think and act for themselves. The meeting supported the principle of “self-government and taxation by representation” and the opinion that settlers could spend their own money “better than the government can do it for us”. When the proposal for a Geelong Board of Police and Public Works was put before the Legislative Council in Sydney, however, it was thrown out; Geelong was to have no say in its own development. In July, 1843, the government in Sydney established a broad form of local government in the Port Phillip District, including the County of Grant that incorporated Geelong but extended well beyond to Ballarat, Maryborough and Camperdown. The government gave the elected council no resources and little ability to do anything, so it had withered away almost unnoticed by the late 1840s. In 1848, public meetings led to a petition being sent to the Sydney government asking for the creation of local government for the town of Geelong. It resulted in the formation of the Corporation of Geelong in October, 1849, along the same lines as the Corporation of Melbourne, which had been established in 1842. The first elections were held on February 9, 1850, and the newly elected Geelong Town Council met for the first time the following day. It had much to do; it was responsible for almost all local amenities, such as roads, bridges and public health.

The newly elected council also might have been responsible for water supply, but it had been beaten by local private enterprise. In 1849, a store owner and miller, William Gray, gained government approval to erect a water supply system. It comprised pipes laid under roads from the river up to a holding tank, then down to a service in Market Square and on to the shipping jetty. The system was designed and its installation inspected by an engineer from Tasmania and demonstrated all the features of later and more extensive systems. Gray used the steam engine at his flour mill to pump water from the Barwon River up the hill, a height of 115 feet, in cast iron pipes made in Hobart to a large holding tank in

Moorabool Street, near the intersection of McKillop Street, on the ridge overlooking the town. This large underground brick-lined circular tank was capable of holding 60,000 gallons. From this tank, the water flowed down through more cast iron pipes to Market Square. The height of the water in the holding tank over the outlet in Market Square forced the water through the pipes without any further effort, expenditure or need for another pump on the top of the ridge. Another advantage of this system was that it was efficient. Gray only had one engine in his mill that he used to make flour by day and to pump water to his holding tank at night at the rate of 3,000 gallons an hour to replace the supply used during the day. Gray's costly investment was unlikely to make a profit for many years, so he probably installed it in the hope of making money in the future but also in the same spirit of civic development that led to many of the early improvements in Geelong.

Water flowed through this system along one and a quarter miles of pipe to a 'fountain' in Market Square for the first time on April 1, 1850, and Gray provided water free for the first three days. But there were some early problems; it took four to five minutes to fill one water cart and sometimes there were as many as 10 waiting their turn. Gray ordered improved equipment, including a big red metal tank that was erected in Market Square in early 1851. It was about 90 feet in circumference, six feet deep and supported on stone pillars. It could fill eight water carts with between 130 and 150 gallons of water in two minutes. As well as providing more water more quickly, the new tank meant it was not necessary to keep the pipe from the service basin up the hill flowing all the time, but only when the water level in the tank needed replenishing. This reduced the need for constant pressure in the pipes and meant they could be maintained without interrupting the supply in Market Square. Gray's tank and water supply became a familiar feature in the town, although not everyone used his service because water direct from the river was still free.



Like Jewell's tank on the banks of the Barwon River, Gray's tank in Market Square stood on pillars. This image was published in 1857, by which time Gray had removed his tank due to a dispute with the town council.

In the late 1840s, the government in London considered the future of its colonies in Australia and decided each of them (with the exception of Western Australia) should be given power to establish its own government based on the British parliamentary model. In addition, the Port Phillip District was separated from New South Wales and given its own government. News of the British Government's decision reached Melbourne on November 11, 1850, and Victoria's Legislative Council met for the first time on November 13, 1851, in Melbourne. Two representatives elected in Geelong attended that first meeting.

Previously the people of Geelong had been able to blame their troubles and the restrictions placed on them on the government in Sydney. Now they could blame Melbourne. There were also advantages in having the government in Melbourne because it was much easier to get to from Geelong. The bay steamer service made it possible to travel to Melbourne in a few hours and communication was improved further when a telegraph service commenced in December, 1854, and the railway line linking them was opened in June, 1857.

On July 5, 1851, the Geelong Advertiser announced the

discovery of gold near Ballarat. Over the following decade, huge finds drove Victoria's extraordinarily rapid development and, by 1860, 21 million gross ounces of gold worth £95,726,872 had been mined in Victoria. Gold drew people to Victoria from all over the world. In 1850, the colony's population was 77,000, in 1857 it had grown to 460,000 and by the end of the decade it was 540,000. Although there were no significant gold discoveries near Geelong, it became the gateway to the Ballarat fields because of the rugged terrain between Melbourne and Ballarat. In the first half of 1853, 113,926 ounces of Ballarat gold passed through Geelong under armed escort; in the first six months of the following year, a further 338,714 ounces passed through Geelong. The town's population grew from 8,921 in 1851 to 22,000 in 1853. In 1859, it had a population of 25,000 with seven banks and 125 hotels.

This rapid population explosion created a serious threat to public health and a report on sanitary conditions in Geelong in 1856 was scathing. From the beginning of settlement, people left their scraps lying around, simply tossing them out to rot and disappear into the grass and dirt. But as more people crowded together in the growing town, conditions became worse with increasing quantities of rubbish, slops and human waste having nowhere to go. The result was nauseous conditions that invited disease. One solution to the problem of rotting, stinking piles was a plentiful supply of water to wash it all away as well as give the population good water to drink and wash.

If sanitary conditions in Geelong were bad, they were worse in Melbourne where the population had grown more rapidly. A Melbourne Water Commission appointed in 1852 developed a plan to divert water from the Plenty River into a swamp at Yan Yean, to the north of the city, and then send supplies down to Melbourne. The plan was approved and the government borrowed

£800,000, with £600,000 to be spent on the project. The Plenty River was diverted into the storage at Yan Yean in April, 1855, and reticulated services began in Melbourne on December 31, 1857. The Yan Yean system was far from perfect and had serious problems with quality and pressure as well as poisonings from lead pipes. Despite these handicaps, it gave Melbourne a water supply that helped improve public living conditions and health.

By the 1850s, Geelong also needed a better supply than Fyans' dam. In July, 1852, the Mayor called a public meeting to form the Geelong Water Company to undertake the work necessary to bring water from the Barwon River to Geelong, either from Buckley Falls or further up river. A little later, the council appointed a committee to locate a dependable supply of pure water and appointed a civil engineer, John Henry, to report on what could be done. He proposed a dam about four feet high above the falls, where it was 55 feet higher than the Barwon River in the town. The water would be sent to Geelong through pipes at least two feet in diameter to a holding basin. From there, it would be distributed through pipes forming a reticulation system. Henry estimated the scheme would cost about £76,000 and provide an abundant supply of pure water. He suggested this service could cost between £2/10/- and £50 for each house. As there were 2,500 houses, annual revenue would total £19,350. At that time, water carters were charging around 6/- shillings a load that amounted to £140/8/- daily or £42,120 annually. So if the inhabitants of Geelong adopted the scheme, they would receive ample, quality supplies for less than half the cost of carted water. But people were not inclined to buy shares, which cost £20 each, in the Geelong Water Company. A further issue was the gold that had brought so much prosperity to Geelong made the water of the Barwon River anything but pure.

The vast deposits of alluvial gold in the Ballarat district were found in and near creeks and the miners used the water in them to separate the gold from washdirt in pans. This consumed significant quantities of water that quickly fouled those streams. Within years, the separation process was horse-powered and stirred up more river dirt further polluting the rivers. Miners also used high-pressure water hoses to wash away large volumes of dirt in search of gold and this also muddied downstream water. The miners' sewage and other wastes made the water quality even worse. From the diggings at Ballarat, the Yarrowee Creek, known as the Leigh River further downstream, flowed directly into the Barwon River and down to Geelong. As a result, the water stored in Fyans' dam that had only been stagnant and foul during dry periods became worse while the water at Buckley Falls, which had once been considered very pure, was now little better. The Barwon River was now only 'pure' upstream of Inverleigh where it was joined by the Leigh River. Chemical examinations of the water found it had unacceptably high levels of solids, chemicals and vegetable matter, but analysts could not measure or comment on the importance of 'animalculæ' in the water because these tiny organisms were difficult to see or measure and their significance was as yet unclear.

Gray also had plans to extend his supply system throughout Geelong with about 20 miles of piping that would service the whole community. He prepared a Bill for

People knew their water was impure, but they did not know some of the causes. These causes were a curiosity rather than a concern. From the Geelong Times, June 30, 1885.

BARWON WATER UNDER THE MICROSCOPE

The Barwon water was always considered filthy, so bad indeed that Professor Clunes use to exhibit a sample drop of it under the influence of the hydro-oxygen microscope. The quantity of animalculæ and infusoria in this minute quantity was surprising. The hobgoblins and dreadful dragons there shown used to frighten timid people out of his "show". The aforesaid "show" was a tent in the Market Square opposite the Victoria Hotel. It was said that the publicans subsidised the Professor, and induced him to palm off some dirty ditch water for the genuine Barwon article so as to prevent the public from drinking too much "Adam's ale".

Parliament giving him the authority to proceed, but he abandoned the plan when the government allocated £800,000 for water supplies – £600,000 for the Yan Yean scheme and £200,000 for a supply for Geelong. In December, 1855, the government told the Town of Geelong it proposed to set up the Geelong Water Commission to investigate the quality of water in the Barwon region and recommend a water supply scheme the government would provide. The board of appointed members, eminent men in the Geelong community, met for the first time in May, 1856, and set about finding accommodation, appointing staff and examining the water situation around the town. They quickly occupied a house in Corio Street and appointed an engineer, John Millar, and other surveying and office staff. The instructions the government gave the commission were rather general, allowing it much flexibility in reaching its recommendations. It also was told that when a water scheme was adopted, it would be given powers over it, similar to the Melbourne Water Commission. An initial fund of £1,000 was given to the commission to begin its work.

The commission's first task was to find the best source of pure water. It took samples from many locations in the region and had them examined. The results showed the Barwon River downstream of Inverleigh was not suitable. Millar and his staff scoured maps of the region about 30 miles around Geelong looking for locations with sufficient height and good water that could be sent relatively long distances to Geelong. They examined the existing rainfall records, which had not been kept long, and asked the opinions of people who had lived in the region for many years. The commission's staff worked for weeks in isolation as they carried out detailed surveys of possible locations, took samples of soil, examined the vegetation and wildlife and dug exploratory pits to study the ground's structure and suitability for a large water storage where a large embankment might be built.

At the time the commission began its work, it was distracted by a disagreement between the town council and Gray over his supply system. Although the government had given Gray approval to erect his system, including laying pipes under some streets, the council began involving itself in his enterprise. They could do little about his pipes laid in their roads – although, on one occasion, workmen fixing a broken pipe found themselves in the police watchhouse for a while. But they did have control over Market Square and used that to coerce Gray. At first the council charged Gray a nominal rental of £1 for the land his tank occupied on Market Square, but the next year they increased the rent to £10 and increased it again the following two years. In 1855, the council demanded £500 rental which, it said, was necessary to repair the road leading to the tank damaged by water carts. This was too much for Gray and, although he reached an agreement with the council for a reduction to £150 if he cut his charge from 2/- to 1/- a load (with free water for fire fighting), he said that did not give a fair return for his investment and work. The council said he would have to take away his tank if he would not meet their conditions and, unexpectedly, that is what he did in June, 1856.

Gray's action caused consternation and a public meeting of several hundred residents formed the Water Supply Committee to raise £400 to re-install the tank in Market Square. The committee approached the Geelong Water Commission to see if it could help because, as well as reporting on a long-term supply, it also had to consider an interim scheme. The committee suggested to the commission that putting the tank back would do that, but before talking had gone far Gray resolved the problem.

On land he owned at the western end of Malop Street, Gray erected a 'fountain' far enough from the road to ensure a dozen waiting water carts would not cause an obstruction and involve him with the council again. It could fill a water cask in a minute, but there was no tank there – the supply came direct from the holding tank so it was fitted with a valve that would

AN IMPROMPTU WATER DISPLAY

A valuable addition to the resources of the fire brigade for the purpose of extinguishing any configuration that may take place in the town was completed and tested yesterday afternoon. We refer to the new hydrant in connection with Mr Gray's water works which had been in the course of construction during the past couple of days at the corner of Moorabool-street and Malop-street, and opposite the southern front of the stores of Messrs Dalgety Ibbotson & Co. About noon, yesterday, the hydrant having been brought into working order, Mr W Watts, foreman of the fire brigade, accompanied by Mr J Macintosh and, we believe, one or two other members of the brigade, came upon the ground, bringing with them some hundred feet of hose, which they proceeded to attach to the hydrant. This being accomplished, Mr Watts directed the water in the first instance against the eastern front of Messrs. Dalgety Ibbotson & Co's store, the summit of which is upwards of forty feet from the ground. The jet of water reached the tops of the highest tier of windows, or, in other words, about five and thirty feet. The next experiment was made on the southern front of the same building, with similar results. The hose was then directed towards the houses on the opposite side of the street over the roofs of which the water was thrown with great force while the buildings themselves were completely deluged. The final essay was made on the Victoria Hotel and the roof and walls of this building were also copiously drenched, as were the streets for a considerable distance around the hydrant. The longitudinal range of the stream was very considerable. It passed over the angle of Mr Mercer's building into Moorabool-street and with some assistance from the westerly wind reached a considerable way past the eastern extremity of the Victoria. Had notice been given that such a display was contemplated there would no doubt have been a larger attendance of lookers on, but notwithstanding that the affair was unanticipated by the public there were, towards the close of the trial, some hundreds of persons congregated to watch the proceedings. The spectacle was considerably enlivened by some impromptu shower baths administered by Mr Watts to portions of the assemblage, and which gave rise to considerable merriment, especially on the part of the recipients of the favor.

The extension of Gray's water supply helped the fire brigade, which, in turn, helped promote Gray's service with some unusual publicity. From the Geelong Advertiser, October 21, 1856.

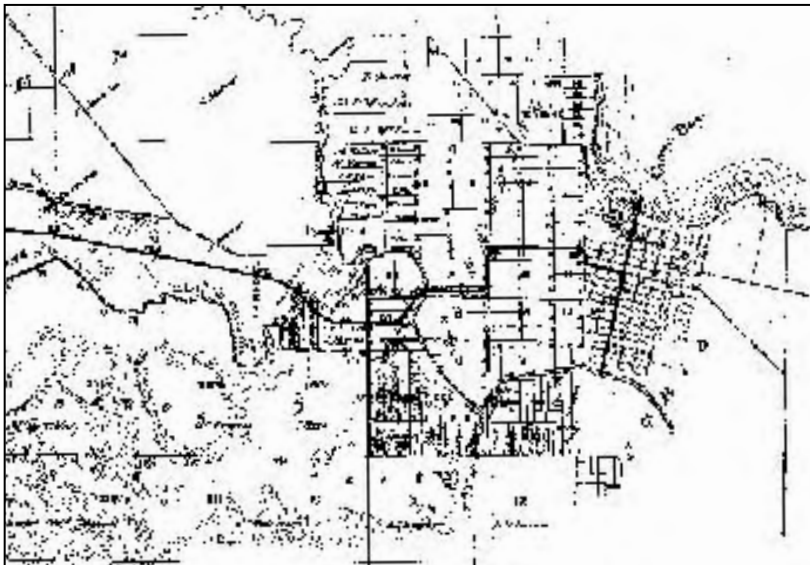
shut off immediately if there was an accident. The equipment was difficult and costly to maintain, however, and it was sometimes closed prompting more complaints about Gray's service. Initially, he charged 2/- a load, but by 1858 the cost was reduced to 1/6 and he supplied about a third of the water consumed in Geelong in March, 1858. A count of water use in the first two weeks of March, 1858, found 1,325 loads were taken from Gray's hydrant, 2,768 from pumps on the river,

60 at the railway jetty, 240 from the railway station (both supplied by Gray) and 28 from a dam in Mercer Street.

As well as being 'sludge', to quote one report, water from the Barwon River was expensive. In 1858, it cost between 5/- and 7/- a load, depending on the distance it was carted. As a result, people used as little water as they could and tried to collect and save it. By the mid-1850s, some people had tanks dug in their yards. At first, they were open holes that stored rainwater collected from roofs, but they were dangerous and the water in them was easily contaminated. Later, more elaborate tanks were constructed, generally 15 to 20 feet deep, circular with brick-lined or stuccoed walls, with a small hole at the top that made them and the water in them safer. But these tanks could cost £20 and were too expensive for many people who had no option other than the carters.

Water for fire fighting also was important to Geelong. When Gray removed his tank, residents feared water would not be available to fight fires and that insurance premiums would increase dramatically as a result. Insurance companies were active in the Water Supply Committee, but Gray offered another solution that equally suited fire fighters. He installed hydrants on the main water pipe that ran down Moorabool

This map is part of the complete plan published in the Geelong Water Commission's Wormbete water scheme report. The main pipe is the thick black line entering the town from the west and running north and south through the centre of the town. The map shows the extent of the town in 1857.



Street – one on the corner of Ryrie Street and the other on the corner of Malop Street. He agreed to keep the pipe filled with water every night and received £50 a year, guaranteed by insurance companies doing business in Geelong.

Millar submitted his report to the Geelong Water Commission on the long-term supply for Geelong on February 20, 1857, showing the only satisfactory source was Wormbete Creek, a tributary of the Barwon River, south of Winchelsea. Barwon River water from closer to Geelong was too polluted and a proposal to take water all the way from Yan Yean to Geelong was not viable. The Wormbete storage would hold sufficient supplies to service an estimated population of 50,000, with an average 50 gallons of water per person a day. It would be a gravity-fed system in which the water stored at the main reservoir would be forced through pipes, using the height of water in the storage, 26½ miles to Geelong. The advantage of this system was that although pipes cost more, the project would not need to be so carefully surveyed and engineered than if the water was transported along an open aqueduct. The estimated cost of the project was £362,430.

In August, 1857, the government sent a short response, suggesting further investigation and asking the commission to recommend the best and most economical way of providing a temporary supply for Geelong. The commission replied in September, 1857, with a scheme that would cost £64,848 to pump water from above Buckley Falls to a service basin for distribution around the town. The report concluded by repeating that Barwon River water was far from desirable, but supplies from above Buckley Falls were the best that could be obtained within the reach of a system pumped by a steam engine. By the end of 1857, the commission had spend £4,000 on its investigations.

At the beginning of 1858, the people of Geelong and the commission in particular suffered two crushing blows in rapid succession. In January, they learned money allocated for the Geelong supply had been spent on the Yan Yean scheme instead. The government explained the Yan Yean

scheme had cost more than expected and that when the £600,000 budget had been exhausted, it could not stop or all the money would have been wasted. Rather, the Geelong allocation went to supply water to Melbourne. A large and angry crowd attended a public meeting to protest, but there was nothing to be achieved except complain. In February, the commission heard the Commissioner of Public Works had told Parliament the commission had done nothing, or if it had, he had heard nothing about it. Parliament set up a Select Committee to investigate the whole issue of the Geelong water supply. As soon as the Geelong Water Commission heard this, the entire board resigned, angrily saying it had been treated badly by the government, it had hardly heard from the government about the reports they had sent and that, since a Select Committee had been appointed, there was no point in remaining in existence.

The Select Committee was appointed on February 4, 1858, and sat from February 11 to June 2, 1858. To many Geelong people, it appeared the real purpose of the Select Committee was to give the government an excuse for not having met the commission's recommendation of a project costing £360,000. The committee's recommendations did nothing to dispel those feelings, saying the Wormbete scheme was too costly for the small population of Geelong, the town should not be connected to the Yan Yean scheme, the government should inquire into the best means of supplying Geelong with water from above Buckley Falls and proceed with that plan, and the Wormbete forest should be protected as a watershed for a future reservoir for Geelong. These recommendations would be cheaper and closer to the sum of £80,000 to £100,000 it had in mind.

When the government had not announced any plans for a supply for Geelong by the following November, the town council sent a reminder. The council complained, yet again, that none of the £200,000 allocated for a Geelong supply had been spent for the town's benefit, that as a result it had been systematically deprived of its rights and subject

to “much unnecessary inconvenience, expense and suffering” and that the existing supply was “altogether inadequate and unwholesome”.

In early 1859, the government sent two experts to report on the recommendations of the Select Committee. Their report, which was ready by the end of June, 1859, was barely two pages long. It stated categorically that no water supply could be taken from any part of the Barwon River below the Leigh River because pollution from Ballarat made it unsuitable, and it was getting worse. Neither did the report recommend the Wormbete scheme nor piping water to Geelong from Yan Yean. Instead, it recommended the best – and ultimately the cheapest – way of supplying Geelong would be by taking advantage of the many springs, streams and gathering ground in the neighbourhood of Mount Buninyong, Lal Lal and Warrenheip, an area not far south east of Ballarat. It argued this source could provide good quality water in sufficient quantities for twice the population of Ballarat as well as Geelong. Water would be sent to Geelong in a pipe along the planned Geelong-Ballarat railway to reduce construction costs; the water also could be used for steam locomotives. The report concluded by asking the government for the authority to proceed immediately with more detailed surveys, but nothing happened.

Geelong and its leaders continued to remind the government of what it had not done for the town, but the government was preoccupied with other matters. Victoria had only had self-government for less than 10 years and had not yet developed traditions of government and administration or a body of men experienced in how to conduct the affairs of government. This was compounded by the anarchic way in which governments rose and fell before the development of significant and lasting alliances, let alone political parties. Indeed, Victoria had 12 Premiers between 1858 and 1874. In this political environment, it was difficult to create and implement any coherent policy.

In addition, the rapid expansion of the population from 77,000 in March, 1851, to 540,000 in April, 1861, placed immense demands on the government to provide services. The result was a period in which the need for development of services and facilities was unquestioned and all the resources of nature were to be turned to making Victoria a more prosperous place. The only interest in conservation was in trying to repair some of the damage incurred by pastoralism and mining over previous decades that held back future development.

The two most pressing issues for the colonial government were establishing more farmers on the land and reducing the cost of government, and both affected Geelong. The popular demand to open up land for more farms rather than the vast sheep runs that had existed became politically irresistible. In 1860, the government was forced to pass an Act that applied largely to the Western District. But it contained so many loopholes it was not difficult for pastoralists to keep control of huge tracts of land. Accordingly, the Western District remained largely dedicated to wool production that continued to be exported through Geelong. Later legislation learned from that experience and regions such as the Wimmera were broken up into thousands of small farms, most of them dedicated to grain production that would also help Geelong prosper.

Establishing local government was a good way of reducing the financial burden on the colonial government, so it created municipal councils to take over many of the smaller and day-to-day activities of government. The first local government legislation was enacted in 1854 and created councils where there were towns and road districts in rural areas. New local governments were easy to form; a public meeting of local residents only had to send a request to the central government and a council could be created. Residents knew they would have to pay local taxes to fund local

councils, but the central government offered grants to make their formation attractive and they sprang up everywhere. Existing local government areas in Melbourne and Geelong were broken up into smaller ones and the Town of Geelong began to fragment, with South Barwon seceding in 1857, Newtown and Chilwell in 1858 and Geelong West in 1875. The Corio Road District was formed in 1861 and became the Shire of Corio in 1864 while the Shire of South Barwon was formed in 1874. This divided local government around Geelong, making it harder for the entire community to present a united front to the government in Melbourne. Regardless, the remnant of the old Town of Geelong was the most powerful and influential of Geelong's local government.

Council rates were the only common form of direct taxation in the colony. The central government raised money in other ways, including vast amounts from selling licences and other gold-related activities and the later massive land sales as the rural areas were broken up for closer settlement. Most government civil works were funded by borrowing, mainly from Britain when Victoria became a safe and secure home for investment after 1850. Major public works, such as buildings, railways and waterworks, were funded by borrowings in which repayment of the principal was so delayed that interest payments were calculated into the cost of operating works as a matter of course. Building the infrastructure of the colony on debt seemed to some likely to doom the community to endless loans, with borrowing for each new project adding to the chain of debt "link by link".

But Geelong prospered, along with the rest of Victoria. New factories opened to provide goods for the growing population of the colony, and the town gained new services, such as gas street lighting from October, 1861, an omnibus service in December, 1872, and schools intended to train skilled workers for new industries. The latter included the Technological School and School of Arts



The Yarra Street Pier extending out into Corio Bay. By around 1880, when this photograph was taken, Geelong had become an important sea port for the wool trade. Photo courtesy of the Geelong Heritage Centre.

Design, founded in April, 1869, and the Gordon Memorial (after General Gordon) Technological College, opened in January, 1888. The railways continued Geelong's dominance of the Western District, with the opening of lines to Ballarat in April, 1862, Colac in July, 1877, and Queenscliff on the Bellarine Peninsula in May, 1879. The railway to Ballarat was significant because, as the Wimmera region was opened to closer settlement and began exporting large quantities of grain, it all travelled down the line to Ballarat and on to the port at Geelong on its way overseas. The railway also allowed a greater diversity of social and cultural inter-action of people across the region, including the first football match played by Geelong and Melbourne teams in Geelong in September, 1860. (It was declared a scoreless draw after three hours.)

While these developments were taking place, Geelong continued to drink Barwon 'sludge'. In April, 1863, a report of water use in the town showed an average 31,275 gallons was taken from the Barwon River daily, from Gray's hydrant in Malop Street, from his supply at the river and from Jewell's supply on the river.

A correspondent to the Geelong Advertiser in March, 1862, asked: "Is it apathy or despair that caused the quiet submission of the citizens to the want of a supply of water?" He went on to say there had been no rain for two months, the Barwon River was "absolutely salt" and the "sanitary, economic and fire-suppressing benefits resulting from having water service throughout the city ... are inestimable".



CHAPTER TWO

WATER FOR GEELONG

1860 TO 1910

The chain of events that would give Geelong a permanent water supply began in March, 1862, when a local landmark, 'Singapore Terrace', caught fire. Although 76 loads of water from Gray's fountain (more than 14,000 gallons) were poured on the blaze, nothing could be done to save the building. Within days, the Geelong Town Council, wanting to prevent further fires and again critical of Gray's service, formed a committee to consider the "best and most economical" way of supplying Geelong with water. The committee did nothing between April, 1862, and March, 1863, but then considered the three existing proposals - Wormbete, Lal Lal and the upper Barwon as well as another suggestion, Anakie, to the north west of Geelong. A survey there found it unsuitable, but enquiries led further north to Stony Creek on the south-western branch of Little River, which enters Port Phillip Bay on the coast a little north of Corio Bay. The site was suggested by Thomas Walker, a farmer who knew the country around Steiglitz. At the request of the Geelong Surveyor, he and his son explored the rough country of the Brisbane Ranges for days before settling on a site known as Burnt Station in the Stony Creek Valley, about four miles north of Steiglitz and 26 miles from Geelong.

Henry Christopherson, a civil engineer who had come to Geelong in 1862, offered to undertake a detailed survey of Stony Creek for £50, the bare cost of labour and expenses. This scheme was much more modest than the Geelong Water Commission's Wormbete proposal that planned to provide a population of 50,000 with 50 gallons of water each a day. The new plan would provide Geelong with 25 gallons per person a day for a population of 20,000.

The Stony Creek site had a large watershed of 4,072 acres from which rain would be collected and 375 additional acres of swamps or lagoons covered with permanent water that also might be used. The centrepiece of the project would be a large earthen embankment 1,325 feet long, 15 feet wide at the top, 427 feet wide at the base and 84 feet high. It would contain 272,820 cubic yards of earthworks and 36,600 cubic yards of 'puddle' (the part of the dam that was impervious to water). It

This photograph of the Lower Stony Creek Reservoir was taken in 1917. While not in the original plans, problems with the Stony Creek embankment forced the government to construct this stone and concrete dam.

had to be so immense because it had to hold back the weight of an estimated 950 million gallons of water as well as support its own great weight without collapsing or subsiding.

Water stored in the reservoir would be released through pipes in a tunnel 291 feet long below the embankment. It would then travel along an open aqueduct through hilly country for five and a quarter miles, crossing gullies on flumes or embankments and passing through 10 tunnels cutting through ridges, before entering another stream flowing toward Anakie where it would be stored. This short distance of open flowing water would be a significant engineering achievement because it had to maintain a constant gentle downward slope to keep the water moving. Another method would have been to use pipes to carry the water under pressure because that did not need a carefully surveyed and constructed slope. From Anakie, the water was to be sent 13 miles to Geelong in iron pipes 14 inches in diameter running along the Geelong-Ballan Road to a service reservoir of six million gallons capacity at Lovely Banks, 80 feet above the highest point in Geelong. From there, the supply would pass through mains and sub-mains to the town, the weight of water at Lovely Banks providing sufficient pressure to reach all the distribution points. The total length of the mains and sub-mains was to be about 59 miles. The total estimated cost of the project was between £123,000 and £193,000, depending on the diameter of pipes used in some sections of the system to limit how much water could flow through it at one time.

Christopherson's report was ready by August, 1864, and the Minister for Mines, who was responsible for water supply, visited Geelong to discuss it and other matters with the town council. Nothing happened again until May, 1865, when a deputation from Geelong went to Melbourne to meet the Minister and there was "quite a deal of straight talking". The Minister introduced to Parliament a Bill to borrow £1 million and it became law in October, 1865. Geelong received a share of the borrowed money and the contract for construction of the dam at £42,572 was awarded in May, 1866. The first men

AT THE STONY CREEK DAM SITE

Thanks to the skilful driving of that whip of whips, Harry Finlay, we drove five in hand through stumps and along the shelving sides of the hills with a most assuring confidence. Arriving at Burnt Creek, we found that already a little township had been established, two hotels had been erected and extensive offices built by the contractor, Mr Chappell. Refreshments were partaken of, and an adjournment was made to the dam, which is about a quarter of a mile on. The valley which it is proposed to span was dotted with numerous fires, a satisfactory evidence that the work of clearing had already been commenced. His Worship the Mayor was conducted to the spot where the first sod was to be turned, and supplied with pick, shovel and barrow. He addressed the assemblage, which numbered about two hundred – many visitors having come to witness the ceremony from Ballarat and Steiglitz.

The Burnt Station reservoir is about four and a half miles from Steiglitz, and adjoins the Geelong and Ballan road. It is so admirably situated that it will gather water from very near Ballan. Its greatest length will be about a mile, and the width will vary between half and two-thirds of a mile. It will derive the greatest supply of water from two creeks – the heads of the Little River, and the engineer informed us that these two creeks, running as they sometimes do, would fill the immense basin in twenty-four hours. Round about there are four large swamps, some of which have pure water to a depth of six feet. When the reservoir is ready, channels will be cut from the swamp, and it is essential that the quantity of water obtained should be sufficient to supply Geelong for three or four months. At the upper end, the reservoir widens out, there being a clear space of ground which was placed under cultivation by Mr Steiglitz. With the exception of this space, the valley is thickly timbered. All this will have to be grubbed and burnt, and the charcoal so obtained will be allowed to remain on the ground. This part of the undertaking will, it is estimated, cost twelve hundred pounds. Of course, being so thickly timbered, but a faint idea could be formed of the dimensions. The water will be about 70 feet deep at the deepest part, and when finished it will form a beautiful inland lake, on the borders of which the future generation will doubtless enjoy many a merry picnic. The ground is marked and a trench some six feet deep had been cut across the lower end of the valley, and denotes where the dam will be built. An engine is expected to be on the ground in the course of a week and the contact will then be pushed with vigour. We found that a shaft had been sunk a little above the creek down to the solid rock, which is reached at six feet, scaly gold in small quantities being found from top to bottom. Some fine grained slate was struck and the bedrock is that known as whinstone which is as hard as iron. The puddle wall, which is to be thirty-six feet deep at its base, is to be sunk two feet in this rock. It is stated that the contractor will most likely have to go ninety feet to find the bottom in some places. This puddle wall will be embanked on each side, the widest part

The construction of Geelong's water supply system was a big event and it was celebrated in full by a large party that travelled to the isolated Stony Creek site. This report from the Geelong Advertiser, June 16, 1866.

of this embankment at the surface will be about 435 feet from the foundation to the top; it will about, say 180... We forgot to mention that [at] each end of the dam by-washes will [be] cut to allow surplus waters to escape into the valley below the dam.

were on site by the beginning of June, clearing wood and stumps where the embankment would be built.

An official ceremony to mark the start of work was held on site on June 15, 1866. It was attended by dignitaries from Geelong and Ballarat, who used a train to Meredith and then coach or wagon to witness the ceremony in which the Mayor of Geelong turned the first sod. The work was hard and labourious; most was done by hand with picks, shovels and wheelbarrows. A large number of men were employed and a thriving township with two new hotels grew up adjacent to the site.

Work also commenced on the aqueduct and the pipe head basin at Anakie. More than 20 separate contracts for the project were let over the next few years, but there were delays in 1868 when the allocated money ran out. The contract for the service reservoir at Lovely Banks was signed in April, 1869. Pipes for the line from Anakie to Lovely Banks were imported from Scotland and commissioned in 1872. For the water supply system from Lovely Banks to and around Geelong, 38,706 pipes with internal diameters ranging from three to 16 inches were imported and tested to ensure they could withstand the pressure of a head of water varying from between 400 to 600 feet in height. These pipes gave Geelong a reticulation network of more than 44 miles in length.

Problems were beginning to appear in the project by 1871, however. The most significant were the embankment that had sunk four feet nine inches in the middle, the by-wash that had been made of soft schist (almost pipe clay) that would erode quickly if used too frequently and a leak in the tunnel under the embankment that lost about 300,000 gallons of water daily. The ambitious aqueduct to Anakie also developed problems. The cause of these was poor workmanship and a failure to follow normal engineering practices. General worries grew that

the whole system might not be large enough to supply Geelong's water needs, so in 1870 work began on a channel to divert nearby Wallace's Swamp into the Stony Creek Reservoir. There were also accusations of malpractice and Christopherson, who had been appointed the chief engineer responsible for waterworks in the colony, took most of the blame and was later dismissed.

While the Stony Creek scheme was important to the people of Geelong, it was far from being the government's most pressing water project. Over the ridge of the Central Highlands, an extensive system of waterworks, the Coliban scheme, was under construction to serve the mining towns of Bendigo and Castlemaine. It was designed to supply the towns and provide the vast amounts of water needed for mining. Work commenced in 1862 and the £250,000 allocated to the project had all been spent by 1866. By 1868, a total of £326,000 had been expended and much more needed to be done to complete the scheme. Technical problems also plagued the project and the scheme was a public scandal by 1870. The Engineer-in-Chief of Railways was asked to inquire into the workings of the Water Supply Department, which was responsible for both the Coliban and Stony Creek projects. He reported significant technical difficulties and cost overruns with Coliban while, in comparison, the difficulties at Stony Creek were relatively minor.

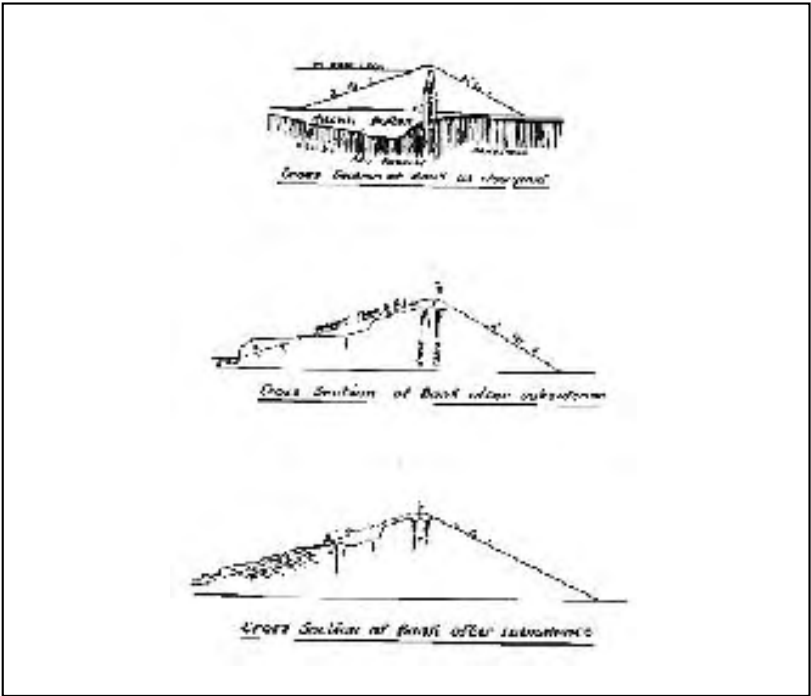
The government called for expert advice from Colonel Richard Sankey, of the Royal Engineers in India, who was asked to report on the Coliban system and the condition of the Geelong supply. His assessment and comments on the Coliban scheme were detailed and critical, but his report on the Geelong works were more tempered because, although he found some problems, the overall project was sound. He suggested, for example, that the subsidence of the embankment would have no long-term effect on the capacity of the scheme and there was no need to bring in extra water from Wallace's Swamp, so that project was abandoned. He said it might have been better to lay a pipe from Stony Creek to Anakie, the route

of the pipe from Anakie to Lovely Banks might have been better chosen and plans should be made to duplicate the pipe to enable supplies to Geelong to continue if the first pipe was damaged. In general, the Stony Creek project was sound and work proceeded toward completion.

Sankey made some useful general observations about the planning, construction and operation of waterworks. He believed some of the problems in both schemes had arisen through lack of sufficient and professional planning. “Haste and failure are synonymous terms when applied to waterworks,” he commented. “The patient scientific study of all the conditions under which these works can be economically carried out can alone, I must observe, secure success...” Water was almost a living thing that “never makes a mistake”, so it had to be properly studied and understood if it was to be tamed and used. Otherwise it would find the weaknesses and faults in any system and undo it.

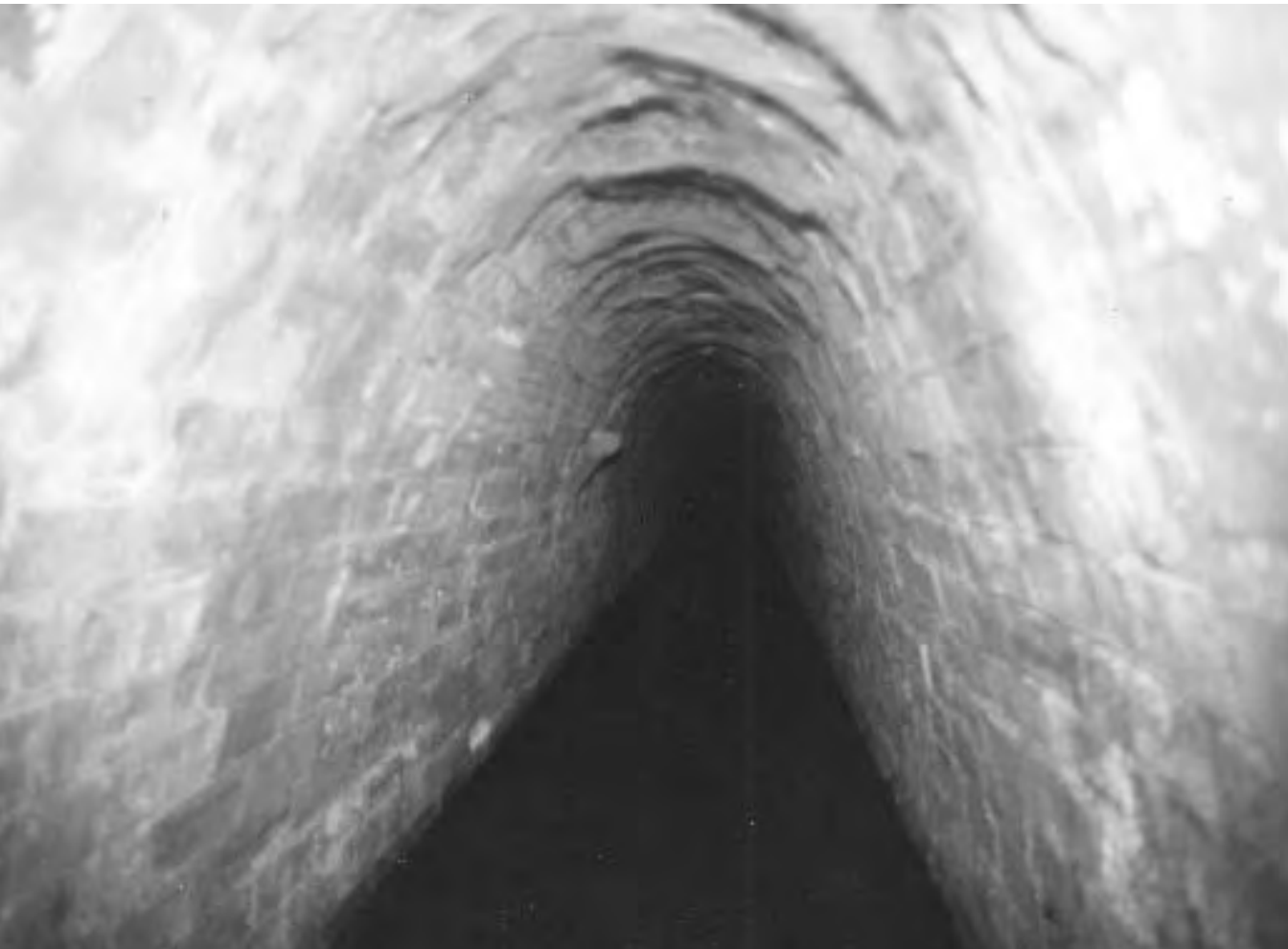
Water found the weaknesses in the Stony Creek system soon enough. In July, 1872, it became evident the embankment was

This diagram, made around the beginning of the 20th Century, demonstrates the stages in which the main Stony Creek embankment subsided. The most serious problem was that it was built on poor foundations and it was almost inevitable it would subside.



moving and it subsided gradually until it lost eight feet in height. In an attempt to investigate the cause, shafts were sunk into the embankment and found the 'puddle' was extremely soft and so dangerous it was unsafe to go any further. The shafts were abandoned. The embankment was clearly unsafe on August, 20, 1872, and the outlet valve was opened and all the water released, with the reservoir empty by September 7. Even so, two days later there was slight movement on the water side of the embankment and on September 14 a heavy slip occurred. After this, the embankment was allowed to settle until March, 1873, when it appeared to have come to rest. The only way to make some use of the dam was to cut a new by-wash at the northern end of the embankment, 27 feet lower than the earlier one, seriously reducing the reservoir's capacity. Other work was undertaken to

A tunnel that was part of the aqueduct to carry water from Upper Stony Creek to the pipe head at Anakie. This tunnel is three-quarters of a mile long and the sides are constructed of brick while the top appears to be bare rock.



reduce the embankment's height and strengthen it. The work cost £2,000 and cut the capacity of the reservoir from 750 million gallons to only 168 million. To increase the supply from Stony Creek, another reservoir that would yield 232 million gallons a year, giving a total system capacity of around 310 million gallons, was constructed four miles downstream. This concrete dam was built in 18 months in 1873-74 and cost £17,000. Because it was lower than the first dam, water could not be sent along the existing aqueduct and a tunnel costing £12,000 had to be driven through the ridge to allow the water to get to Anakie.

Equally serious faults occurred with the aqueduct to carry water from Upper Stony Creek to Anakie and again the major causes were the use of poor materials and poor workmanship. Work stopped in 1870 until problems with the tunnels and embankments could be found and it cost another £20,000 for repairs.

During these delays, the only supply for Geelong remained the polluted Barwon River. No attempt was made to fill the supply pipes in the town until Christmas, 1872, when rainwater that had collected at Anakie was allowed to run through the service basin at Lovely Banks into the mains to provide water for fire fighting. Winter rains in 1873 increased the supply until the Lovely Banks service basin was full and, on August 17, the water found a weakness and burst through the banks, drowning a nearby flock of sheep. The break was due to poor workmanship in the brickwork of the outlet. This allowed the water to find its way through the weak points and erode them until the embankment gave way.

Repairs at Lovely Banks were completed sufficiently for the first supplies to be made to the Geelong Infirmary and Benevolent Asylum on September 11, 1873. First domestic supplies started on January 13, 1874, in Block 1, the area north of Malop Street to Corio Bay, between Gheringhap and Bellarine Streets. The water was turned on at three in the afternoon and gave very strong pressure, with a hose from the Victoria Hotel sending water high into the air. The water looked muddy, but it was much softer than Yan Yean water. (Geelong people never tired of finding ways to criticise Yan Yean because their money had been taken to help

build it.) The second block, from Great Malop Street to Little Myers Street, was connected the following day and the entire initial reticulation scheme was connected by November, 1873. The system then gradually expanded with sub-mains and reticulation extending to portions of the suburbs in 1875. In early 1875, the network was extended to Breakwater with pipes laid in the road over the top of the dam Fyans had had constructed 35 years earlier.

In December, 1873, the Board of Land and Works set the first water rates for Geelong using local council property valuations. Houses were rated on a sliding scale, from 10/- a year for houses valued under £10 to £3 per £100 for homes valued above £500. Water from standpipes cost two pence per 100 gallons and water troughs for horses and other animals cost £1 each a year. This rating method was necessary because supplies to individual houses

The Upper Stony Creek Reservoir in the early years of the 20th Century. The main embankment is on the left with the tower standing out of the water. It was made of wrought iron and pre-fabricated in England before being erected at Stony Creek in 1871.



were not metered and it was not possible to charge for precise usage. It also meant poorer people (judged by the value of their houses) paid less than those who had more valuable homes.

The new system replaced Gray's supply. His pipes were dug up in 1874 and sold to the government and the property where his service tank had existed was sold in May, 1890. A spirited attempt was made in 1874 to demolish Fyans' dam, but it survived – and survives today.

At the end of 1875, average consumption from the new system was seldom above 270,000 gallons a day. This equated to a daily average of 22 gallons per person based on 12,000 customers, who included the railways, gas works and other factories. The actual quantity used for domestic purposes was only about 12 gallons a person each day. One reason given for the low consumption was that many people still used their rainwater tanks; another was the water was so discoloured it was "scarcely fit for either washing or drinking without being first filtered". The government acknowledged the water hardly looked pure, but in comparison to the polluted water from the Barwon River it was better and safer. Settling ponds were constructed at Lovely Banks and completed in June, 1877, where the water was left to stand for some time to enable the solids to settle out. Lime was added to help the settling process, although it made the water too hard for many uses until things gradually improved by 1880. Water purity also was a serious problem beyond Geelong and in Melbourne the quality of water from the Yan Yean system haunted the government. The same problem occurred in many country towns – like Colac, where a proposal presented in October, 1888, but not adopted, was called the 'Purity Scheme' to emphasise what people wanted from their water supply systems.

The quantity of water available for Geelong also had become a serious problem by the early 1880s. Geelong's gradual expansion during the long boom that followed the gold rushes saw residential housing being constructed further from the town, the spread of residential development up the slopes of the hills and the creation of new suburbs like Newtown. This

growth strained the system's capacity and, as more houses were built higher up the hills, water pressure to them fell off. Work began on a new service tank at the end of Noble Street, Newtown, in November, 1877, to overcome the problem. It was unsuccessful, however, because even though pressure was improved, water from the tank was often used more quickly than it could be replenished. About 1880, a small brick tank was constructed in Highton to increase water pressure in the area. After supplies had been drawn off during the day, it was refilled at night from Anakie. But it only held 6,000 gallons and it later fell into disuse as other developments made it redundant.

The situation for all Geelong was desperate by 1882 and, in October, the town was put on 'famine allowances'. The supply was turned off at night so there was no water in the pipes, especially in higher places like Newtown. As a result, when there was a fire, the building often burned to the ground. The restrictions continued into January and were imposed again in October, 1883, because the reservoirs were almost empty. A worse water shortage was only averted by an unexpected thunderstorm right over the Stony Creek catchment.

With Geelong facing water restrictions every year, the town needed a quick solution to the problem – while the government needed a cheap one. It appeared in the form of a scheme to pipe water from a small weir on the East Moorabool River, called Lutz Weir after its designer, 18 miles to Stony Creek and then into the Geelong supply system. The government allocated money for the scheme in 1882 and it was completed by May, 1884. The weir was a concrete structure 22 feet high, 120 feet long and 10 feet wide at the base, tapering to five feet at the top. The pipe comprised 15¹/₄ miles of 12-inch earthenware pipes and two and a half miles of nine-inch cast iron piping and the whole project cost £21,000. It promised to deliver three million gallons of water a week into the Stony Creek system, but the job was bungled. Construction of the pipeline was poor and it only delivered one and a half million gallons weekly. The engineer in charge was suspended, but the

system stayed in operation without repairs because even half the promised flow was better than nothing. The failure of the scheme gave the people of Geelong even more to complain about in Melbourne.

By the beginning of summer of 1884, there was only 16 weeks supply in the storages and again restrictions were introduced to reduce consumption. Again water was turned off at night and again, in March, 1885, a property burned down for lack of water. A deputation to the Premier of Victoria told him the town was half famished, property was losing its value and trade was being hampered, all by the lack of water. To make matters worse, rumours began circulating in March, 1885, that poisoned rabbits had been washed into Stony Creek, contaminating the water. The government denied it, but the Water Supply Department told Geelong people to boil their water. By this time, Geelong water was described as "abnormally foul" and, several months later, another report said: "The water is certainly unfit for drinking unless filtered or boiled." To inflame public indignation even more, the Geelong Times ran a lengthy series of articles from mid-1885 titled 'Complete History of the Geelong Water Failure' that described in lurid detail every time and way the government had abused and mistreated Geelong in giving it a miserable water supply.

The increasingly loud and impatient complaints from Geelong had some effect on the government in Melbourne. In 1887, the Chief Engineer of the Victorian Water Supply prepared a report on the possibility of obtaining further supplies for Geelong from the upper Barwon, the Moorabool or the upper Werribee rivers. He favoured obtaining water from the Barwon catchment with a reservoir on Pennyroyal Creek, near Deans Marsh, or a more extensive scheme on the East Barwon River with water being conveyed to Geelong along 80 miles of open channel. As well as supplying Geelong, branches of the channel could be extended to service Queenscliff and Portarlington on the Bellarine Peninsula. He suggested the work should not be undertaken immediately,

however. This report led to detailed surveys of many likely water sources, with survey gangs working around Lal Lal, Pennyroyal, the upper Barwon River, the East Moorabool, at Bolwarra north of Ballan, and Korweinguboorra, near Daylesford, between 1885 and 1898. Nothing immediate came from all this work, but it would prove useful in the future.

The Victorian Government was not immune to Geelong's problems, but it had the entire colony to think about and the preservation of its major industries – pastoralism, agriculture and mining. To protect water resources into the future, the government reserved to itself frontages along 280 water courses in the colony in 1881 and established the Department of Water Resources in July, 1884. A Royal Commission into water in 1884 led to the 1886 Irrigation Act which, among other things, declared state ownership of all water rights, one of the first acts around the world to do so. At the same time, the government took on responsibility for constructing and owning water supply headworks (reservoirs and other works where water was harvested and stored). It did so partly because experience in Australia had shown private enterprise could not marshal the resources necessary to undertake large works, such as the railways, and partly because overseas experience had shown the advantages of state-owned headworks.

By the 1880s, the government's primary water interest was in irrigation to support closer settlement of the land. Accordingly, most of the works it assisted were intended to irrigate areas that were otherwise too dry for closer settlement. By 1899, there were about 90 irrigation and waterworks trusts in Victoria, but none had been financially viable for years and were barely able to pay the interest on the money they had borrowed let alone pay off the principal. An exasperated government introduced legislation that wrote off 75 per cent of their debt. The government was not so single minded about urban waterworks, however. In 1860, it passed legislation to enable two private water systems to be set up and established commissioners for the Ballarat supply system in 1872. It also purchased a privately-owned system

promoted by the Bendigo council in 1873. The government's control of water was established more clearly in the Water Act of 1905, which abolished the irrigation trusts (they had debts of more than £3.3 million by then) and replaced them with a central agency. It also vested all water use rights and the ownership of waterways – beds, banks and so on – with the state.

All these factors meant that when a deputation from Geelong went to Melbourne to demand a better supply, the government was preoccupied by the wider picture. The deputations and petitions raised at public meetings blamed the government for Geelong's problems and said it was the government's duty to provide an adequate supply. Geelong did not want more promises and bungled attempts. It wanted action – and it not only wanted water but a plentiful supply of good water. The existing Stony Creek scheme "was simply a series of bumbles from beginning to end for which Geelong had paid dearly". Another critic said it was simply "a miserable abortion" while another said: "What this town has a right to demand is that the government, which takes money and undertakes our water supply, should carry out its contract..."

The government was not indifferent to Geelong's pleas, but as the Premier told a deputation in September, 1885, the government had two problems – a lack of money and a lack engineering skill in the colony. When another deputation visited the Minister for Water Supply, Alfred Deakin, in October, 1887, he said the government acknowledged Geelong's water system was inadequate, but there was little it could do because the £100,000 or more a new system would cost was simply too much. Then he put the problem back on Geelong by saying that if local government in and around Geelong wanted an improved system, they should form a trust to borrow the necessary money. The government would help raise the loan for the trust, but otherwise the money could not be raised, he said.

The Geelong councils resisted, saying it was the government's duty to provide the new scheme because such

important works were undertaken for the entire colony and local government could not afford to do it. But the government would not move; the only solution was a trust and it would not spend another penny on the Geelong system, not even extensions to the reticulation system, because there was insufficient water for those already connected. Local government around Geelong, including Queenscliff and Portarlington, capitulated and the shape of a new scheme began to emerge. It would cost £130,000 and bring water from the upper reaches of the Barwon River across the plains to Geelong in an open aqueduct, with a spur feeding towns on the Bellarine Peninsula. The government would keep the Stony Creek system, except for the distribution network in Geelong, and use it to supply the Anakie and Little River districts. This arrangement would please the people living there, who complained that since the Stony Creek reservoirs had been constructed Little River had become no more than a ditch and farmers had been forced to travel long distances to find water. Negotiations continued and the government and councils reached an agreed value of £180,000 for the system in 1893. But nothing more happened.

This time the cause was outside the control of Geelong or the government. By 1892, most of Australia was in the grip of the worst depression it had experienced. The flow of funds from Britain that had become the staple of almost all borrowing for public works dried up, as did land speculation, property development and agriculture. An estimated 25 to 30 per cent of skilled labourers were unemployed and even more unskilled workers. Between 1891 and 1906, Victoria lost population as many people sought work in other colonies and public works spending did not return to pre-depression levels until after 1905. The height of the financial crisis came in 1893, which could not have been a worse time for Geelong councils to think about setting up a trust and trying to raise loans.

The depression did not reduce Geelong's water problems and they became part of the general misery of the times. Water restrictions continued along with shortages in the high areas of

Bolwarra Weir in March, 1916, when it was being repaired after severe flooding. The stone embankment confines the water at a level so it can enter the Ballan channel and flow down to Stony Creek. The water off-take for the channel is on the far side of the weir; it flows off to the right behind the men and horse high up on the rise.

Geelong. Residents often had to get up at three or four in the morning to run off a tank of water to use during the day. Toward the end of the 1890s, shortages became so severe the government planned to pump water from the Barwon River. Initially, strong public objections halted these plans. But the situation was so severe in March, 1899, with only nine days supply remaining, pumps were installed and ready to start when heavy rains averted their use.

With unemployment at very high levels, the government sought ways of relieving the misery through public works. At the end of 1899, it decided to construct a channel 23 miles long to convey water from a diversion weir on the East Moorabool River, at Bolwarra, north of Ballan, down to Stony Creek, a project that had been suggested in the 1887 report on supply



for Geelong. The government proposed a channel capable of conveying five million gallons a day while the Geelong Town Engineer said it should have 10 million gallons capacity. The government won and an unlined channel of five million gallons capacity was dug from the diversion weir constructed of basalt blocks at Bolwarra down to Stony Creek, giving many men work. The government went further with more works to overcome the problem of supply to the higher areas of Geelong, using the additional water from the Ballan channel. In March, 1898, it decided to build a new service basin on the hill at Montpellier to take water direct from Anakie along a new pipe. This project improved the flow of water to the town, gave insurance against a disruption of the supply from Anakie to Lovely Banks and created employment. Construction at

The Ballan channel flowing beneath one of many small bridges. The channel was relatively small and in later years some sections were concrete-lined.



Montpellier took place in 1900 and the new basin was put into service in November that year. It cost £75,000 and to that point something like £400,000 had been spent on the Geelong supply system.

By 1901, Geelong had a population of 25,017, making it the fourth largest town in Victoria after Greater Melbourne (496,079), Ballarat (49,414) and Bendigo (42,701). Of note, Geelong's location as the port of the Western District and its growing industrial base gave it the foundations for growth when prosperity returned. It had become home to many industrial activities, such as tanneries, woollen mills, rope manufacturing, paper mills, meat processing and freezing works and general engineering. Most were established on the banks of the Barwon River, many down toward the Breakwater, to capture the water they needed for their processes. A further necessity of modern industry came in May, 1901, when Geelong welcomed its first electricity supply. Small towns on the Bellarine Peninsula and along the coastline close to Geelong also grew as they became popular tourist resorts. In 1905, the Geelong Harbour Trust was created to manage and develop the port. It had to pay the government 20 per cent of its revenue, but it was given the power to borrow £200,000 in the first instance and issue debentures on its loans. By 1909, Geelong's population had grown to 28,361 and there was a feeling of optimism and progress in the air.

Discussions between the government and the councils of Geelong about forming a trust to take over the water system continued. The municipalities agreed to Deakin's proposal in November, 1891, but nothing eventuated. Likewise, discussions in August, 1896, in 1898 and in December, 1902, were fruitless. The municipalities began discussing the idea again in October, 1905, and this time there was some headway. A Geelong Water Supply Committee was established with representatives from local councils and James Sharland, the Town of Geelong's surveyor, was appointed Secretary. By mid-1907, the committee had resolved that Geelong should buy the existing system from the government and all that needed to be

INSTALLING THE MONTPELLIER SYPHON

The syphon by which the Geelong water supply is to be conveyed beneath the Barwon River to a high level basin at Montpellier for distribution to the elevated parts of the reticulation area was successfully laid across the bed of the stream on Sunday. After it had been put together by the employees of the Vulcan Foundry, a trench was excavated beneath the syphon, parallel with the river bank, at the foot of the road leading down from the Protestant Orphan Asylum. On Saturday night the river broke into the trench and, as the following day was exceptionally favourable for the operation, the syphon was floated in the trench upon a timber raft. The syphon, which is 210 feet in length and 15 inches in diameter, weighs about 12 tons.

Water supply systems have always involved innovative engineering. This project was reported in the Geelong Advertiser, May 11, 1900.

resolved was how much it would cost and how the purchase would be arranged. Naturally there was resistance, particularly from those who wanted to know what Geelong would gain. They argued that no matter who owned the system they would still have to pay water rates. Another objection was that much of the system needed replacing and the cost would have to be met by Geelong. Critics also said the Stony Creek system was defective and only the Ballan channel and Montpellier service basin were acceptable. Others supported the scheme on the basis that being an owner/operator would allow Geelong to make its own decisions about water supply. The personal energies of several civic leaders, including most notably Mayor Bostock, of the Geelong Town Council, pushed the proposal to a conclusion. In the end, the turning point of the argument seemed to be that if Geelong bought the waterworks it would be able to do as it wished, rather than having to wait for the government. The other advantage was “local control means local taxation for local purposes; government control means local taxation for government purposes”.

During discussions and meetings in Geelong in 1905 and 1906, the earlier plan to establish a new system based on water from the upper Barwon was hardly mentioned. The reason, apparently, was Geelong could not afford it and the Stony Creek system had been made satisfactory by the channel and new service basin ensuring ample supplies then and in the future. People outside Geelong had a wider view. When an engineer was

Geelong about 1896. By this time, it had grown considerably, with a number of substantial buildings demonstrating its wealth and importance.

Photo courtesy of the La Trobe Picture Collection, State Library of Victoria.



asked to prepare a report for Colac on a water scheme in 1906, he suggested the western branch of the Barwon River as a source, but added the Barwon was generally considered to be earmarked for future extensions of the Geelong supply.

In August, 1906, the Geelong Water Supply Committee agreed to offer the government £250,000 for the existing system. It expected the bid to be accepted because earlier prices mentioned had been much lower. But when a deputation met the Premier in September, he told them the waterworks were worth much more. He advised that he preferred not to sell at all, but since the Minister responsible for water had investigated the matter the government was prepared to sell. He personally preferred to sell for £325,000, although he believed the works could be worth £440,000. So when a deputation met the Minister and he offered the waterworks for only £265,000, the committee accepted. The figure was not what anyone estimated the works were worth. Rather, it was the amount the government estimated it could make in revenue from them. All the councils except Geelong West readily accepted the proposal; there was lengthy debate about the additional cost and a

motion to accept the offer was only passed five votes to four. One councillor wanted ratepayers to be asked to make the decision in a referendum, but that was avoided.

Three mayors were appointed to draft legislation to go before Parliament to constitute a trust controlling the waterworks. A meeting of representatives of the various councils discussed and revised the proposed legislation and all 51 sections were read through. One section granting right of veto to the Minister for Water was deleted and another section that trust commissioners should be elected by the councils they represented was hotly debated because some felt they should be elected by ratepayers. The committee took the draft Bill to the Minister, who reinserted the clause giving him veto powers over the trust. It then went to Parliament to become law. The Minister told members of the deputation they had “got a handsome present from the State, which they should be very thankful for”.

Parliamentary debate on the Bill to create the Geelong Municipal Waterworks Trust began on August 13, 1907, and passed through most stages relatively smoothly. The government said it had struck a “very fair bargain” with the Geelong councils because, if it retained ownership, the waterworks would need more money to bring them up to a good standard. Further, as Geelong was likely to expand, it would be necessary to spend even more money to meet that growth. Instead, the future of the system would be in Geelong’s own hands and that was a good thing because everything that was controlled by local municipalities rather than the government created a local spirit and local enterprise. Local authorities knew better than the central government what local people wanted and they were likely to administer to those wants more carefully. The other side of the coin was that if Geelong people wanted to have local control and improve their water supply, they would be responsible for any mistakes.

The trust would be controlled by five commissioners to be elected each year by the municipal councils they represented based roughly on the number of ratepayers in those

municipalities. The Town of Geelong would have two commissioners, the Borough of Newtown and Chilwell, and the Borough of Geelong West one each, with one representing the Shires of Corio, Bellarine and South Barwon. Who should elect the commissioners became the main argument during the debate; should they be elected by the councils or the ratepayers? This, in turn, posed the question of who would own the new trust – the councils or the people of Geelong? Those who thought ratepayers should vote for commissioners believed there should have been a referendum asking ratepayers if they wanted to become involved in owning and running such an expensive operation and that people should have the right of direct representation.

Those who supported council elections of commissioners said there had never been a meeting in Geelong where there was a considerable number of people against the Bill, that the councils that would elect commissioners were already representatives of ratepayers and councils were better able to judge the qualities of members than ratepayers. Another argument was that men were elected to municipal councils to manage the whole of the works owned by the municipalities and the waterworks would become a business owned jointly by the municipalities. When the vote was taken in Parliament on who should elect commissioners, it was close. The councils won by two votes, 27 to 25.

Other questions were less hotly debated. Should the new trust be given control of the waterworks before or after it paid the government, did it have sufficient borrowing powers and what rates would apply? Finally, debate came to a conclusion with only minor amendments to the Bill and it was passed by a comfortable majority. The Geelong Municipal Waterworks Act 1907 constituting a municipal waterworks trust for the supply of water to Geelong and district was given Royal Assent on December 16, 1907.

The works, buildings and plant of the Geelong waterworks were transferred to the trust on January 18, 1908. The most important part of what the trust bought from the government was

the land on which the facilities were located. This comprised the 20-acre Bolwarra Weir reserve on the East Moorabool River, the 23-mile long, two-chain wide strip of land along the channel from the Bolwarra Weir to Stony Creek, the catchment area of about 7,573 acres of the upper and lower reservoirs at Stony Creek, the Anakie pipe head basin of two acres, the Lovely Banks service basin of 13 acres, the Montpellier service basin of 13 acres, the one-acre Newtown service tank and the Germantown tank of a quarter acre. The Lutz Weir and pipeline to Stony Creek had been abandoned by the time the trust took ownership of the system.

Forming the trust was relatively easy. The water supply system and the men who looked after it already existed. All the councils had to do was elect commissioners, who were then approved by the Minister for Water Supply on January 11, 1908. Despite the trust's apparent autonomy, the Minister retained ultimate control with the right to veto commission decisions. This meant most major decisions by commissioners had to be sent to the government for approval.

The elected commissioners came together for the first time in the water supply office in the Post Office building on Saturday, January 25, 1908. Present were Isaac Hodges and John Doyle representing the City of Geelong, Hugh Sutherland representing the shires of Bellarine, Corio and South Barwon, Henry Brown representing the Borough of Newtown and Chilwell and Henry Christopher the Borough of Geelong West. Commissioner Hodges was unanimously elected the first Chairman and, in accepting the honour, he said he expected the trust would be "a big success". Although commissioners were due for re-election every three years, they decided who would face re-election by lots in 1908 and 1909. When their turn came, all were re-elected and Hodges remained Chairman. Commissioners began holding regular meetings on the last Friday in each month at 7.30 in the evening. (An incident that reminds us of the everyday living conditions of the times occurred at the meeting on February 25, 1908, when the gas lights failed. Commissioners had to wait until candles were lit before continuing the meeting.)

Twenty years had passed since Alfred Deakin first suggested the creation of a trust to take over Geelong's water supply system. Countless hours had gone into making the suggestion a reality, but now the time had come to make that reality work – and make it "a big success". The men elected commissioners now had to learn the minute day-to-day details of what was involved in owning and operating a water supply system.

Their first decision was to appoint James Sharland, who had helped steer the Geelong Water Committee to a successful conclusion, temporary Engineer and Secretary. The appointment was confirmed at a meeting on February 24, 1908, when he was selected from a field of 21 applicants. The following day, commissioners also appointed him Treasurer, rolling all three tasks into one position and putting the burden for making the trust a success squarely on his shoulders. In addition, he was appointed to represent the trust in arranging details of the transfer of the system from the government. It must have been a heavy burden and it is little wonder that when he returned from holidays in 1909 he looked "much improved".

The commissioners first priority was to ensure the efficient operation of the trust, which involved appointing staff, finding accommodation and setting up systems needed to run the new body. The trust remained in the existing waterworks office in the Post Office building for about 10 months, but the government wanted £150 rental a year which commissioners considered too high. They found a new location in the old Post Office in Ryrie Street that would only cost £40 a year and had the advantage of being more easily accessible to the general public, who did not have to climb stairs to pay their bills. The foreman, Mr Hooper, moved into the residential quarters attached to the offices and his wife cleaned them to offset the rent. The trust moved into the new offices in November, 1908, and made improvements to the building, storeyard and quarters.

The Chairman and Secretary of the trust, Hodges and Sharland, went to Melbourne and discussed the fine details of the transfer of ownership. The financial accounts of the government's Geelong service were audited and the trust and government agreed on a value of £1,500 for the plant and stores. Government staff in Geelong were transferred to the trust, but several returned to government employment. Philip Reilly, who came from the government to the trust, was appointed accountant and Peter Paterson collector. An auditor was appointed, a part-time analyst engaged and the trust took out insurance to cover staff and employees against accident. All the files and plans of the Geelong system remained the property of the government, but they were loaned to the trust to copy the information it needed. Copying in 1908 was not a simple or easy business; plans had to be traced, information in files had to be copied by hand and the most difficult, labourious and painstaking job of all was writing up the rates ledgers. These contained information on all the properties connected to the system, including property values that dictated rate payments. The trust also became responsible for testing plumbers and issuing licences. There were 39 qualified plumbers in Geelong in 1908 and 44 in 1909. The trust bought new equipment and furniture; leather chairs suitable for commissioners, plan cases and other office furniture, a clock, a barometer, a typewriter that cost £28 and a bicycle for staff use.

The trust soon associated with other organisations, principal among them the Geelong Harbour Trust, which also had been recently created to take over government-owned facilities and help Geelong grow and prosper. The trust supplied water to the harbour trust and the industries attracted to Geelong by it. Indeed, the waterworks trust resolved to do everything possible to support the harbour trust. The Ballarat Water Commission wrote to the Geelong trust soon after it was created inviting it to visit the works at Ballarat. In August, 1909, the trust received – and accepted – an invitation to join the Waterworks Association. The close association between water supply and the fire brigade continued and the trust provided a

water supply to the new showgrounds for a demonstration there in September, 1908.

Finance was the trust's major preoccupation because, without it, there would be no money to pay for a working water supply system. Commissioners set the trust's first water rates in August, 1908, at 1/3 in the £ based on municipal property valuations. Although the rates were set once a year, they were collected in two instalments and ratepayers who did not pay on time were charged an overdue rate of 6 per cent. As a result, there was usually a last-minute rush of people paying their rates. In June, 1909, there was such a large crowd in the building and waiting outside the office had to be kept open and £350 was taken during the day. In the first few months of trust ownership to the end of the financial year in June, 1908, it collected revenue of £6,556; in its first full year of ownership, to June, 1909, it collected £16,260, which it described as "eminently satisfactory".

While water rates were based on municipal valuations, it was far from a perfect system as there was no measure on the amount of water people used. By the end of 1908, Geelong had 1,354 meters installed at various places and around 27 per cent of water was charged on the basis of meter readings. This was said to reduce consumption. In Geelong, the maximum consumption per person per day was 38 gallons. By contrast, Ballarat, with a higher population but only 430 meters, used 90 gallons per head a day. Commissioners quickly decided to extend meter use, particularly to users who had traditionally been given water free or at reduced charges. All charitable institutions had meters installed by late 1908 and a meter reader was paid 9/- a day to read them all. The hospital still received a free supply, but now the trust knew how much water it used. Schools were put on meters and charged 1/- for 1,000 gallons. People, businesses or gardens with meters also were charged 1/- per 1,000 gallons and water for shipping purposes was 3/- for a similar amount. By mid-1909, there were 1,541 meters connected to the supply system.

The largest financial challenge facing the trust in its first year was paying for the system it had bought from the government. The money market was unfavourable for borrowing in March, 1908,

with high interest rates. Commissioners, therefore, decided to ask the government if it was prepared to postpone payment of the £265,000 until interest rates improved. The government did not agree. Following discussions through March, 1908, the trust reached an agreement with Messrs Thonemann & Co to underwrite a loan float, with the loan lasting only eight years in the expectation that interest rates would have fallen by then and further borrowing would be more favourable. It was the largest provincial loan raised in Australia to that time and when loan tenders were opened on May 4, 1908, the trust was highly pleased with the results.

The successful borrowing allowed the trust to pay for the waterworks in instalments to help reduce the interest. The first instalment was made in April and by the end of the year the entire £265,000 had been paid, as well as interest of £6,400. Raising the huge £265,000 loan had been so successful the trust confidently floated a second loan, Loan B, in 1909 for a mere £25,000 to fund future works. Again the float was conducted through Messrs Thonemann & Co, this time at more favourable rates.

Conservation occupied the trust from the first meetings when commissioners began seeking ways to protect the environment in its catchment to ensure water quality. Although the weir on the East Moorabool River at Bolwarra was vital to Geelong's supply, the trust had control over only a small portion of the catchment. First attempts to gain control over the land failed because the government said the area was only suitable for growing timber and was the responsibility of the Forestry Department. The catchment, however, also included a small township, some cattle grazing and gold mining and the trust pressed its claims with the help of the Gordon Institute, which prepared a report on watershed protection. This proved successful and at the end of 1908 the trust was told it would be given control over 650 acres in the East Moorabool catchment.

The trust already had a large catchment area at Stony Creek and wanted to make it profitable as well as a source of good quality water. Four years earlier, the government had planted several



This relatively modern photograph of the Lower Stony Creek Reservoir shows the close relationship between good water quality and the area from which it is harvested. For decades, water was not treated and its quality depended on protecting the catchments.

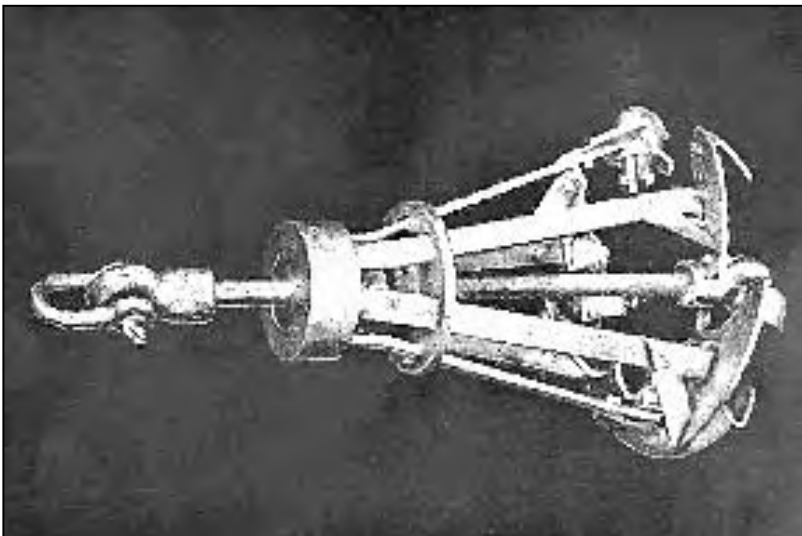
thousand pine trees and the trust spent £100 planting another 5,000. It did not plant more because the Forestry Department suggested that cultivating wattles could bring greater revenue, albeit, the ground would have to be cleared and big trees in the area ring-barked at great expense. Commissioners postponed any decision because clearing and planting wattles would be expensive.

Animals also threatened water quality so the Secretary was empowered to find ways of stopping cattle grazing too close to the aqueduct between Stony Creek and Anakie. As rabbits were damaging the channel from Bolwarra to Stony Creek, tenders were called for a rabbit exterminator in June, 1909.

The trust now had considerable responsibility for water in the region. In March, 1908, farmers below the Bolwarra Weir asked if water could be released because the Moorabool River downstream was dry. It agreed to the release. Later that year, the trust also approved applications from companies to pump water from the Barwon River, probably for industrial use. The trust was also included in wider planning and, also in 1908, commissioners were asked if they objected to land being developed in the Barwon Downs area. They refused, saying the

land should be retained as a future water supply for Geelong and district. They withdrew the objection, however, when the State Rivers and Water Supply Commission (SR&WSC) approved the application.

When the trust took over water supply, it began receiving requests for extensions to the reticulation system for newly developing areas and new industries. The trust said it had long-term plans to supply Queenscliff and Torquay, but in the immediate future it was fully occupied closer to home. The first extension was requested by Geelong West council in February, 1908, for a water main along Separation Road to the new Geelong West sanitation depot. The trust agreed to construct it if the council guaranteed the value of the project by paying 5 per cent of its cost. The council consented and the work was undertaken in April, 1908. Other requests followed and, if it appeared they would make a useful addition to the reticulation system, they were usually approved if the council or business making the request provided a guarantee of 5 per cent. In this way, extensions were made on the North Shore to the harbour trust's freezing works and Corio Quay, to timber works in North Geelong and to Belmont and Ceres. The government also assisted by funding construction of an extension to the main along Colac Road. When services were extended, people were



A pipe scraper. It was pulled through pipes to clean off the incrustations that built up inside cast iron pipes and gradually blocked them, reducing the water flow.

requested to connect; when the Separation Street main was completed, an advertisement in the newspaper told residents they had to be connected by the end of May, 1908.

As well as extending the system, the trust also faced the challenge of maintaining and improving existing assets, many of which had been installed in the early 1870s. Some improvements were made by joining dead ends and other minor alterations. Over the years old pipes had become encrusted on the inside, restricting the amount of flow and water pressure. Pipe scraping commenced in mid-1908 and by November £82 had been spent on cleaning four miles of pipe mains. The effects were so immediately beneficial it was decided scraping would be extended to the rest of the reticulation system as quickly as possible. The Anakie main was cleaned in mid-1909 and, when the Melbourne Metropolitan Board of Works could not lend its six-inch scraper, the trust bought its own and employed a work gang to use it.

In 1900, Geelong had consumed more than 274 million gallons of water and by 1907 that had grown to 353 million

After 30 or 40 years, some of the pipes in Geelong's water supply system were so corroded they could not be scraped and were replaced.

CORRODED MAINS

Some idea of the extent to which the corrosion of water mains interferes with the supply of water in the summer has been afforded during the scraping of the mains between Bellarine and Garden Streets. Two sections of a three-inch main could not be penetrated by the scraping instrument, and when taken out were found to be thickly coated with a firm material resembling sand and tar. In one case the diameter of a three-inch main had been reduced by corrosion to barely two inches, and the second pipe was almost as bad. On several occasions the scraper has been blocked by lead casts, which leaked through when the mains were being laid.

gallons. The number of customers now totalled 29,000, the average daily consumption was 1.09 million gallons and the average daily consumption per person ranged from 23 to 55 gallons. Based on 1907 figures, the supply catered for the present population but not for increasing demand. In 1908, Geelong used 416 million gallons. Estimates of Geelong's future growth suggested it could achieve a population of around 65,000 by 1957 and the trust recognised it was prudent to plan ahead.

From early 1908, the trust invested significant time and effort into investigating a reservoir on the Werribee River at Ballanee. The government approved the scheme, but the new storage would be restricted to flood water. This suggested the government was not happy with the proposal because the Werribee River was outside the traditional Geelong catchment area, although Ballanee was only separated from the East Moorabool River by a narrow ridge. As this gave no long-term security of supply, the trust turned to other proposals to increase capacity. In July, 1908, Sharland reported to commissioners on the feasibility of raising the Upper Stony Creek embankment to its originally planned height and tenders for the work were called in August. There was only one tender of £408 and the work started almost immediately. Another possible location for a new storage was Korweinguboora, north of Ballan, and the existing weir at Bolwarra. The former had been surveyed and recommended as a storage site in the 1887 report, but nothing was done until the trust approved construction on September 25, 1908.

On the same day commissioners approved the Korweinguboora project, they gave serious consideration to the rapidly diminishing reserves of water in the storages. They could either restrict Geelong's consumption or quickly improve the supply. The government gave permission for pumps on the Werribee River to transfer water over the ridge into the Moorabool system. But as approval to pump was only on a day-to-day basis, the trust abandoned the plan. Restrictions remained the only option, with storages down to 196 million gallons or six months supply and those low levels threatening to encourage algae growth that would make the water unfit for consumption. Restrictions were imposed on watering gardens and roads from October 12, and the trust employed two inspectors to enforce the limits. (Road watering was commonplace and necessary to keep down dust from unmade roads and help wash away horse dung.) Soon after, heavy rains replenished supplies and restrictions were lifted less than two weeks later, on October 23.

Even with restrictions lifted, the trust retained one inspector to encourage people to conserve water. The inspectors had found

many cases of wanton wastage, even among those on metered supplies who paid for what they used. Restoration of the Stony Creek embankment was completed in December, 1908, increasing its capacity by 77 million gallons. Simultaneously, the pace of planning for the new storage at Korweinguboorra picked up, but the first tender for clearing 400 acres was not awarded until April, 1909. The government approved the dam design at the end of July and the tender for construction, at £10,984, was awarded on August 27, 1909. But neither the new dam nor the enlarged storage at Stony Creek could solve Geelong's water problems immediately.

The short bout of water restrictions, the inspectors and raising public awareness about the need for conservation had some effect, but by early 1909 water levels in the storages again were critically low. The trust prohibited street watering from the beginning of February, 1909, and restricted garden watering – except market gardens – from February 16. In April, the trust considered but rejected proposals to interrupt supplies to the town to reduce usage and made more enquiries about pumping. By the end of March, reserves were down to 105 million gallons and on May 12 only 63 million gallons remained. Every cloud and every sprinkle of rain bought hope. Finally, the rain started and continued steadily for weeks. The storages were up to 83 million gallons only two weeks later, around mid-June they had reached 188 million gallons and at the end of June there were 237 million gallons. As the trust removed restrictions, the rain kept falling and people stopped wondering how much water was in the storages and began speculating on how much was needed to fill them. By the beginning of August, only another 59 million gallons were needed. On October 28, the storages were full at 631 million gallons, before beginning to fall back again. A period of warm dry weather began to use up supplies and there remained 602 million gallons in storage by the second week of November. Street watering resumed and during the warmest days in October more than 100 loads a day were sprayed on the streets of Geelong to keep down the dust. The authorities discovered salt water did a better job of suppressing dust, but on the warmest days it was quicker to get water from the supply system than from the bay.

THE COMMISSIONERS' LITTLE JOKE

Rejoicing no doubt at the greatly improved storage at the reservoirs, the Water Trust Commissioners to-day perpetrated a little joke. It is announced that from yesterday householders were at liberty to water their gardens. The spectacle of thankful gardeners, clad in oilskins, sou-westers and sea boots, turning their hoses on to the "parched lawn" is all that it needed to make the joke a very good one.

Commissioners found there were some occasions when it was impossible to please everyone. This comment from the Geelong Times, July 2, 1908.

During 1909, while commissioners and staff were fully occupied in maintaining supply and planning the new reservoir at Korweinguboorra, the rest of Geelong was arguing about whether the town would get a sewerage scheme and how it would be managed. Local councils and those who supported or opposed sewerage held meetings, debated each other in the press and watched as the Geelong sewerage Bill gradually fought its way through Parliament. If sewerage was to come to Geelong, it would have a profound effect on the water system because, despite all its advantages, sewerage systems made greater demands on water. The Geelong Municipal Waterworks Trust remained aloof from the vigorous debate raging in the town and simply passed a motion, in February, 1909, that it was favourable to incorporation into a Sewerage and Water Supply Board to serve Geelong.

In November, 1909, Chairman Hodges presented commissioners with a handsomely framed photograph of commissioners and Secretary and Engineer, Sharland. Hodges said it was desirable to have a permanent pictorial record of the first members of the commission who has worked so amicably and harmoniously since they had taken over management of the Geelong supply. The men in that photograph were to be the only commissioners of the Geelong Municipal Waterworks Trust. (The photo has since been lost.)



CHAPTER THREE

SEWERING GEELONG

1906 – 1917

Disease, and the fear of it, was a fact of daily life in Geelong's early days. People knew what happened and what effect it could have, but not how it happened. That knowledge began around 1854 when the citizens of Geelong were taking water from the polluted Barwon River and Louis Pasteur was appointed professor at the University of Lille in France. Before the end of the 1850s, he was sure there was a link between cleanliness and the prevention of disease, but finding that link took many years. By 1875, however, many physicians agreed that some diseases were accompanied by specific micro-organisms; gradually 'germ theory' that described the link between micro-organisms and diseases became accepted. When the Water Supply Department told the people of Geelong in 1885 to boil their water before consuming it, most understood it was because rabbit carcasses in the Stony Creek Reservoir were the sources of germs that could be killed by boiling the water.

Typhoid fever was among the most feared diseases. It was easily caught in the unsanitary urban environment and there were many other intestinal infections that could kill. They could be controlled by public cleanliness, a good supply of water and sanitation so public health began to improve in Geelong with the arrival of the water supply scheme. But the public health situation in Geelong was far from good by the end of the 19th Century. In Melbourne, it was even worse and a Royal Commission into public health led to plans for a sewerage scheme. The Melbourne Metropolitan Board of Works (MMBW) was created in 1890 to take over the water supply system and give Melbourne a sewerage scheme. This development was keenly observed in Geelong.

Sewerage systems promised a new level of public health and urban development because they removed human excrement, one of the major sources of disease, and offensive sights and smells from the environment. They also removed other hazards like sewage from bathrooms, laundries and kitchens. Local government provided sanitation services to take away the excrement, but only after it had been left waiting for days to be

Rows of pipes for Geelong's new sewerage system manufactured in the factory at Marshalltown in the background.

collected, becoming more offensive and dangerous as it waited. Meanwhile, the slops from washing and cooking just ran out into yards and streets where they too became dangerous. A sanitation service was relatively simple and cheap to start, requiring little infrastructure, and could be easily changed if the need arose. A sewerage system, however, was a massive and costly undertaking that could easily go wrong if the people who designed and built it made even a simple mistake. While the advantages were obvious, so were the costs and dangers and the decision to construct one was not taken lightly.

In February, 1906, the Mayor of Geelong, T E Bostock, called a meeting of all municipalities to discuss a unified sanitation system for the town. The meeting created the Sanitary Conference to act on behalf of all the councils. In March, 1906, a party of councillors inspected sewerage systems in Sydney and Hobart, and Sharland prepared a report for them in April that year. The conference then commissioned a report from Hayden Cardew, of Sydney, who proposed a septic tank scheme costing between £117,000 and £128,000.

This report sparked vigorous debate – not because people opposed sewerage, but simply the schemes that were proposed. One of the main opponents was Dr John Small, who asked if a sewerage scheme was necessary, where the water for it would come, what the best scheme would be and how much it would cost. These questions were aired at a public meeting on April 9, 1907, where 400 people crowded into the Town Hall and more again had to stand outside. Equal hearings were given to both sides and then the meeting agreed to a resolution that Geelong should be sewered. Ten days later, the Sanitary Conference passed a similar resolution and the government was approached to approve appropriate legislation. The Municipal Waterworks Trust legislation had yet to reach Parliament and there was a suggestion water supply and sewerage should be linked. But as finalisation of the sewerage proposal would delay passage of the water legislation, they

remained separate. A further delay occurred when the Septic Tank Company of London offered to send an expert to Geelong to prepare a detailed report for the Sanitary Conference. The fee was 500 guineas, but half was refundable if the company won the job of sewerage Geelong. The expert arrived in Geelong in January, 1908, and had completed his report by mid-April. It recommended a scheme costing £163,000 with a subsidiary scheme in North Geelong costing £17,000. After some wavering, the Sanitary Conference adopted the plan.

When the government became involved in the proposal, the Premier insisted that sewerage should be placed under the control of the newly created Geelong Municipal Waterworks Trust. The Geelong Municipal Water Works Act 1907 Amendment (Sewering and Cleansing) Bill was introduced for debate in Parliament on July 15, 1909, and passed, with amendments, by the end of August. Among its many provisions were the election of commissioners by ratepayers (with no ratepayer having more than three votes), a borrowing limit increased by £50,000 and continuation of the government's veto on all the trust's major decisions. There were long delays in passing the Bill through the complete parliamentary process, but the Geelong Waterworks and Sewerage Act, 1909, which established the Geelong Waterworks and Sewerage Trust, became law on January 4, 1910.

Election campaigns began well before the Geelong Municipal Waterworks Trust held its final meeting on March 24, 1910. All members of the old trust nominated for the new trust and several new men also stood. The contest was fought at rounds of public meetings and in the columns of local newspapers, and candidates organised bands of supporters who canvassed the electorates and assisted on voting day by transporting ratepayers to the polling booths. The election was held on March 31, 1910, and Sharland, the returning officer, announced the results to a large crowd from the door of the trust offices. All the commissioners of the old trust won

seats on the new trust, with the exception of Henry Brown, who was defeated by Dr Small in the Newtown and Chilwell electorate.

The new trust picked up where the old one had left off, with the same staff in the same offices and Sharland as the Engineer-in-Chief and Secretary. Isaac Hodges, a relatively short, portly man, was re-elected Chairman and the trust immediately focused on deciding how to sewer Geelong. Sharland gathered as much information as possible about sewerage systems and commissioners visited Sydney, Adelaide and the MMBW's sewerage farm at Werribee. They were leaning toward a sewerage farm system, but remained unwilling to make a final decision without more expert opinion.

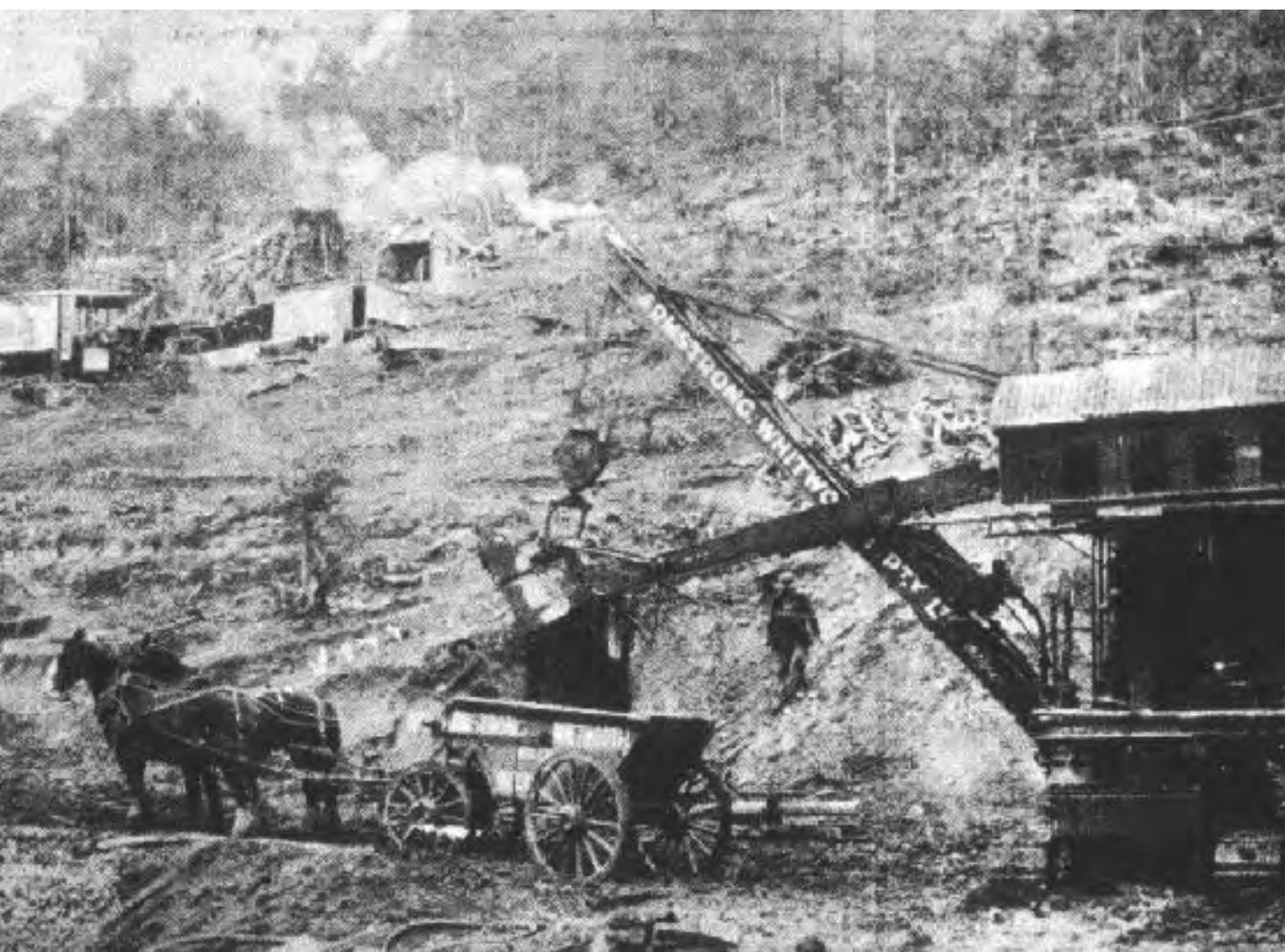
The Geelong Waterworks and Sewerage Trust's new office building opened in mid-1913.

The administrative and revenue branch was on the ground floor and the engineering branch on the upper floor. There was also a basement and a loft.



Taking on sewerage meant more staff who needed accommodation. The trust's first thought was to expand in the old Post Office building where it was renting space. But the government, which owned it, had other plans. The town council asked the trust to move into the still-to-be completed Town Hall, but the trust, now aware of its own prestige and growing importance, asked for such lavish accommodation – a suite of eight rooms – that the council quickly dropped the idea. The trust instructed architects to investigate other options and by December, 1910, it had purchased a block 66 feet long fronting Ryrie Street and approved plans for a large two-storey office. Building was delayed for almost a year when the trust agreed to become involved in the Geelong Town Council's grand plans for a civic centre that included all the

Construction at Korweinguboora. Even with this mechanical help, hundreds of men and scores of horses worked on this large earth-moving project.



major local organisations, such as the Geelong Harbour Trust, the Free Library and the council's offices, in the one large complex. Negotiations and planning dragged on for most of 1911 while the trust's sewerage staff was located in temporary accommodation on the corner of Yarra and Malop Streets. Eventually, the trust decided to press on with plans for its own office in Ryrie Street adding, at the last minute, women's toilets. Commissioners awarded the contract for construction in December, 1911, at a cost of £4,843, and it was opened in July, 1913. It was considered one of the most handsome buildings and by far the finest public offices in Geelong on what was, some said, Geelong's most distinguished street.

New offices and plans for a grand civic centre matched the spirit of the times in Geelong where growth and prosperity promised a great future. New industries that created more work began setting up in the town, bringing more people and a sense of energy and excitement. Developments encouraged a rapid growth in population, from 28,518 residents in 1911 to 39,225 in 1933. Geelong, which had been the fourth largest centre in Victoria in 1911 (after Melbourne, Ballarat and Bendigo), became the state's second largest city. In July, 1912, the Commonwealth Woollen Mills were established in Geelong, in 1923 the major Pivot fertiliser company opened a factory and in 1924 Ford Australia announced it would open its head office and a major factory in Geelong. Civic pride was boosted in December, 1910, when Geelong became a City. Geelong West was proclaimed a town in March, 1922, and the Borough of Newtown and Chilwell also became a town in April, 1924. On the surface, though, Geelong appeared a quiet, slow-paced town that sprawled over the landscape with ample vacant land where houses had yet to be built. People from Melbourne and locals who aspired to a more metropolitan way of life dubbed Geelong 'Sleepy Hollow'.

The rapidly growing population and industry needed more water and the coming sewerage system would consume



Construction of the settling basin at Lovely Banks in May, 1915. Water could stand for a time to help clarify it, but it was not very successful. The tower in the background was constructed to help equalise the pressure in the pipes from Anakie to protect them from breaking due to the pressure.

even more again. The waterworks trust had begun expanding supply with construction of a new earthen embankment reservoir at Korweinguboorra on the East Moorabool River in the Wombat State Forest. Construction commenced in October, 1909, by February, 1910, about 200 men and up to 50 horse-drawn drays were at work and the project was completed by the middle of the year. The trust then had three storages: Upper Stony Creek that had cost £69,486 and held 413 million gallons, Lower Stony Creek that had cost £20,804 and held 140 million gallons and Korweinguboorra that had been the cheapest to build at £14,580 and held the most water at 460 million gallons.

The rains were good in 1910 and 1911 and by the middle of that year the storages were filling quickly. At Stony Creek, water began running over the spillway and 'to waste' when the storage system could hold no more. To save more water, Sharland developed a plan to divert water from the Ballan channel into one of the swamps near Upper Stony Creek and, in quick order and for only £250, a two-mile long diversion channel was dug and a small embankment constructed to hold about 10 feet of water. It was called Number 1 Swamp (or Number 2 Storage Stony Creek) and locally it was known as Lake Sharland. For around £500, Sharland soon expanded the new storage with a longer

Cast iron water pipes for the duplicate main being loaded at the Moorabool Railway Station. They had a swelling at one end so they could be joined together. When the pipes were joined, hemp rope was forced into the gaps to seal them and then lead poured in to complete the seal.



channel and higher embankment to store 522 million gallons. Later, the embankment was enlarged again, including outlet works and a concrete tower, so the storage could hold 538 million gallons in better conditions. The work was completed by mid-1914 and for only £10,162 the trust had constructed the largest storage in its system to meet Geelong's requirements "for years to come".

That prediction would be correct once all the storages were full, but in 1914 the rains were very poor over the Korweinguboorra and Stony Creek catchments and neither gained much water. Commissioners imposed restrictions from the beginning of November, 1914, again forbidding the use of garden hoses or street watering until June, 1915.

Constructing new storages was one thing, getting the extra water to Geelong was another. The Bolwarra Weir, the Ballan channel and the aqueduct between Stony Creek and Anakie all needed repairs. The most important works, however, were duplication of the main from Anakie to Lovely Banks and improvement of both storages.

During 1911, a new pipe head basin was constructed at Anakie because the old one had become too small and unreliable and sent muddy water to Lovely Banks after storms. The new basin had a capacity of five million gallons and gave better control of the flow between Stony

Creek and Lovely Banks. Another service basin was completed at Lovely Banks in early 1911, providing a total capacity of almost 18 million gallons, and in 1915, a settling basin was constructed. Duplicating the main was the most urgent project because in January and February, 1914, Geelong was using water from Lovely Banks faster than it could flow through the main – it consumed nearly three million gallons a day while the capacity of the main was only 2.3 million gallons. This meant the city could be without water even though it was in the storages. The project was so important Sharland visited other states to gather the most recent information. Subsequently, a tender was awarded in July, 1914, at a cost of £28,477, construction began at the end of June, 1915, and it was completed in 1916.

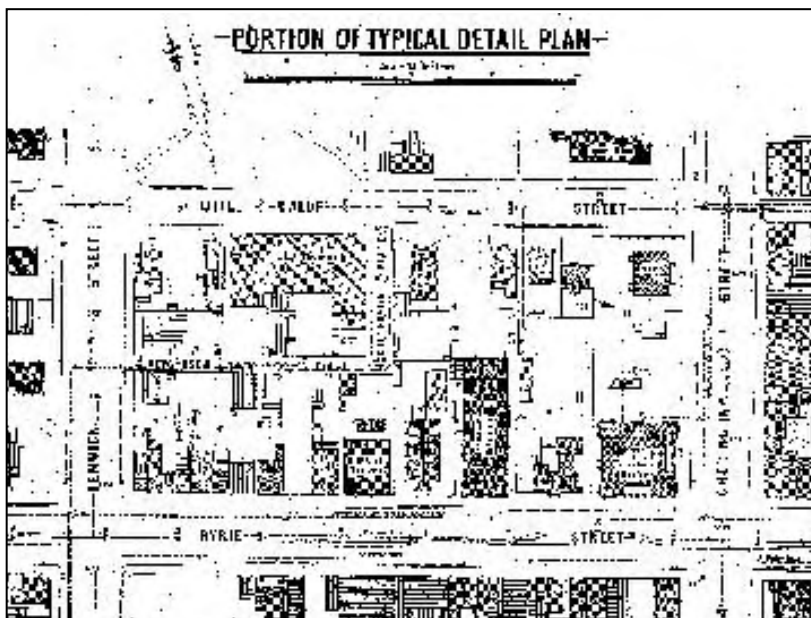
The trust also upgraded the mains feeding water into Geelong from Lovely Banks and Montpellier. It laid a new nine-inch main from Lovely Banks to North Geelong, a new four-inch main to West Geelong and replaced many old three-inch mains in the city with larger ones. The trust began experimenting with wooden pipes, which had some advantages over the iron pipes then in use. They were made of long wooden strips held together by metal bindings to create what was basically an endless wooden barrel sealed with tar. They were guaranteed for 15 years and would not burst or suffer from the internal incrustations of iron pipes that needed scraping. In 1911, a 16-inch wooden main was laid from Lovely Banks into the city, a length of 32,000 feet, costing £2,000 less than cast iron pipes (£4,815 instead of £7,187). By mid-1914, 43 miles of mains of all kinds had been laid in four years.

Even with all the work that went into improving the water supply system, sewerage Geelong was the trust's most important work between 1911 and 1916. From nothing, it planned and created a large and elaborate network of pipes, pumping stations and other facilities to sewer the city in only five years.

In 1910, commissioners contracted Chad Oliver, of the MMBW, to report on the feasibility of establishing a sewerage farm near Point Henry, east of Geelong. His report, presented in January, 1911, said a farm was feasible but did not categorically recommend it. Commissioners deferred a decision until they had appointed a sewerage engineer to oversee the project.

Although not ready to make a final decision, the trust commenced the long, painstaking and complex process of surveying the whole of Geelong for its sewerage system. It had to be more carefully surveyed, planned and constructed than the water supply system because, unlike water supplied under pressure from a high point, sewerage systems generally depended on gravity. This ensured sewage from any entry point flowed downhill toward the disposal point. The trust also had to consider other factors, such as the friction of water in pipes. Smaller pipes had to be installed at greater slopes for sewage to flow through properly. Every point where sewage entered the system had to be higher than the pipes to ensure there were no places where waste would collect and cause blockages. It was impossible for every entry point to be higher

Portion of the detailed plan drawn in 1913 for the construction of Geelong's sewerage system. In the centre is the trust's new head office. Other buildings of interest nearby are the Temperance Hall that the trust used from the 1920s to the 1970s, the flour mill where material was stored on several occasions and the properties next to the office in Ryrie Street that the trust purchased in the 1950s and incorporated into a new office building in the 1970s.



than the final disposal point, however, so pumping stations had to be constructed at key points. These stations were designed to collect the sewage that flowed down to them and pump it to a higher level through rising mains along the system. Pumping stations were costly to build and operate so the best system would have as few as possible.

These demands called for meticulous surveying and the preparation of detailed and accurate contour maps. This required an experienced surveyor and in May, 1910, Charles Breen, of the MMBW, was appointed to oversee the work. He hired experienced men, including some from the MMBW, to form three survey gangs, acquired the necessary surveying equipment and began employing draftsmen to prepare contour maps from data supplied by the surveying teams. Later, he engaged a boring gang to test the ground where work was likely to be undertaken to determine soil and rock type. A contour map of the entire area was completed in July, 1911. All the Geelong municipalities had to agree on the size and shape of the area to be sewered (called the drainage area) and the trust adopted the agreed area of 8,081 acres in August, 1910.

In December, 1910, commissioners decided to advertise throughout Australia and New Zealand for a sanitary engineer, offering the handsome salary of £1,000 a year to ensure an engineer of the highest calibre. R T McKay, of the Public Works Department in Sydney, was the final selection, but he was not an easy man to catch. At the same time he was offered a prestigious post in Queensland while his own department was keen to retain him. But after some haggling he arrived in Geelong to start work in May, 1911. With him came several others from the New South Wales Public Works Department, an assistant engineer and two draftsmen.

McKay began by reviewing all the previous sewerage reports, then developed his own proposal. He was not keen on sewerage farms, knowing of the problems with them in the Sydney area, and he quickly discovered it would be impossible to dispose of even treated effluent in the Barwon River because it was too small and slow to meet accepted standards

of effluent discharge. He learned that when the MMBW was planning the Melbourne sewerage system, it investigated disposing of its sewage straight into the ocean at Black Rock, midway between Barwon Heads and Torquay, south of Geelong. It was an appealing option because, although successful construction of a large sewerage main from Geelong to the coast would be challenging and expensive, it would not cost much to operate in comparison to other alternatives. It also would not present the problem of trying to find a site for a treatment plant or sewerage farm that suited everyone. Breen tested the currents in the sea off Black Rock to ensure waste from an outfall sewer there would not be washed back to land and found they were favourable. McKay's report, delivered on October 18, 1911, recommended an ocean outfall at Black Rock because it would be the best means of sewage disposal and would be simpler to construct and more economical to operate. He said there were three sewerage schemes in New South Wales that discharged into the sea near popular beaches and "nothing of an objectionable nature is to be found on the beaches" while a sewerage farm on another system had caused such a nuisance it was closed down and replaced by an ocean outfall system.

All these deliberations assumed Geelong's sewerage system would be along modern lines rather than the traditional sewers in many of the great cities of the world where miles of huge underground tunnels had been constructed to take away the waste. The new system would remove only domestic sewage. The rest, such as rainwater, waste from industries and water left to run into the streets by careless gardeners, was treated separately and not by the trust. From the beginning of white settlement, used water had been left to find its own way through people's yards and along streets to the river or the bay. As local government began constructing proper roads, they built drainage for this 'stormwater', which still ended up in the river or bay because it was not considered as dangerous to public health as domestic sewage. At various times, there were

suggestions the trust should take responsibility for stormwater as well, but it did not want to get involved in this issue.

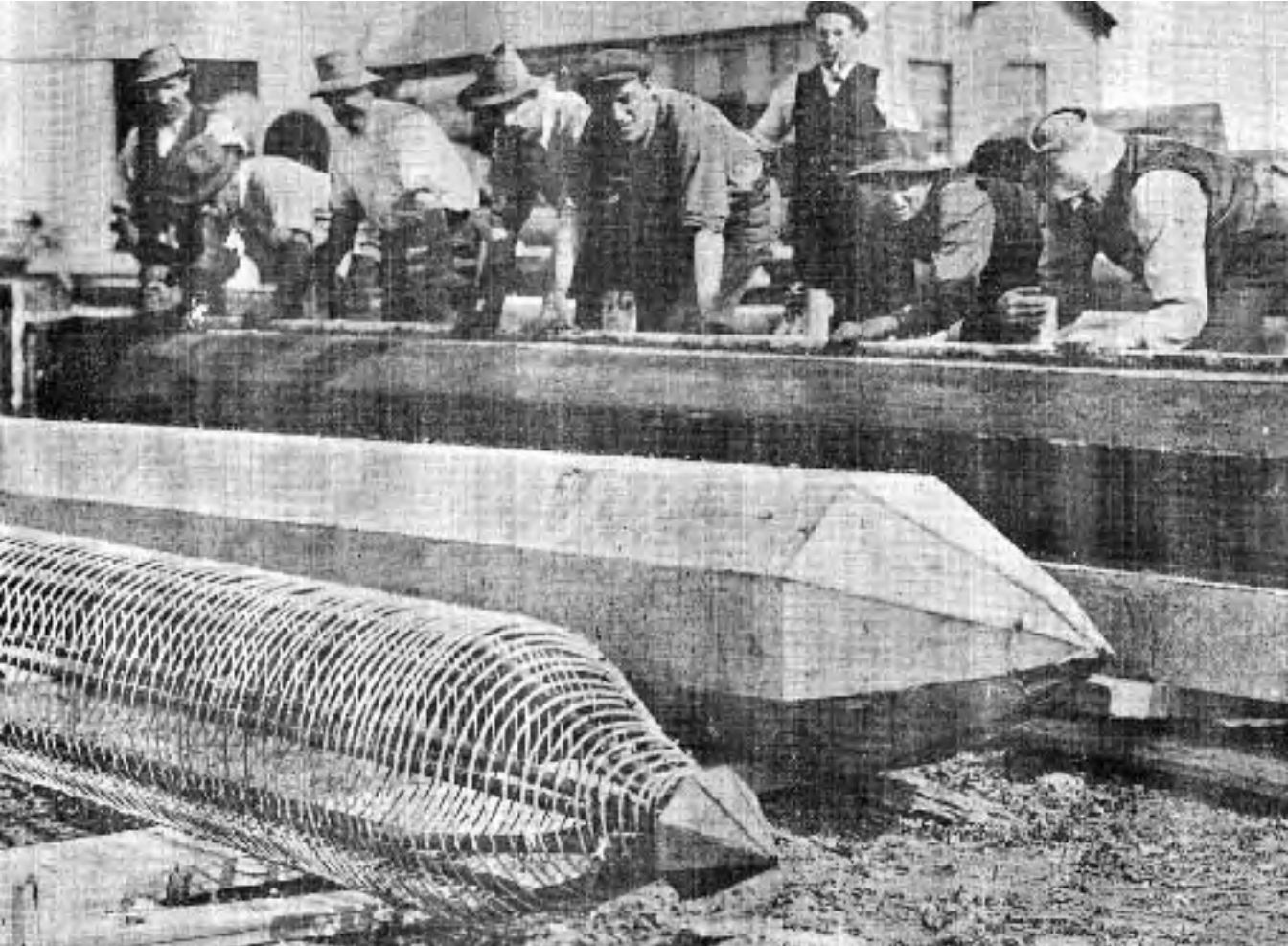
After lengthy deliberation, commissioners agreed to accept McKay's plan. It would cost an estimated £285,992 and £15,358 a year to operate. The details were made public and the only protest was that it would cost about £50,000 more than a septic tank or sewerage farm option. The Geelong Times commented that the average ratepayer would "cheerfully make a small sacrifice to secure a system which will be free from the slightest offensiveness". The trust issued a formal notice it would proceed with its sewerage scheme on January 26, 1912, and the government, through the SR&WSC and the Public Health Department, gave approval.

McKay's scheme was simplicity itself, like the trunk, branches and twigs of a tree. Its core was a large main that would run from the outlet at Black Rock up to Geelong, through the ridge under the city and then follow the curve of Corio Bay up to North Geelong. From its farthest point in North Geelong, it sloped gently downwards to the outlet at Black Rock. This would allow sewage to flow under the influence of gravity without the need for any pumping, thereby saving on operational costs. Sub-mains would run off east and west and link to reticulation pipes that would take the waste via connections from individual properties. To ensure sewage flowed downhill, several pumping stations were to be built to serve areas below the level of the main sewer.

The apparent simplicity of the scheme masked its complexity and sophistication. Each pipe would have to be accurately laid so sewage would flow through properly. The pipes had to suit the part of the system in which they were installed, pumping stations had to be dug and the sewer main had to cross the Barwon River valley. To make the project manageable, it was divided into more than 30 individual parts, with contracts awarded for each. The major works would be undertaken by contractors, who employed their own staff. The trust had little more to do than inspect the work to ensure it was carried out properly.

The first contract was for the pipes for the main sewer. They were precisely designed so water would flow through efficiently under a wide range of conditions, from almost a trickle to full. The best shape was that of an egg standing on its narrow end, so they were called ovoid pipes. They were made in a range of sizes for various parts of the main because it did not need to be so large further from the outfall. At the outfall and up to Geelong, a distance of about 40,000 feet, the pipes were 51 inches by 39 inches, big enough to carry all the sewage of Geelong. Further inland, they reduced to 39 inches by 26 inches and then there were three smaller sizes down to only 21 inches by 16 inches at its far end. These pipes were traditionally made in four foot lengths, but for this project the largest ovoid pipes were made in eight foot lengths and the smaller ones in 10 foot lengths. Longer pipes had less connections so there was less disturbances to the water that could slow down the flow. Circular pipes, ranging in diameter from 16 to four inches, which were cheaper to make, were used for most of the sub-mains.

Almost the entire system was constructed below ground, usually in trenches but occasionally in tunnels where the pipes needed to be laid deeper. There were two major tunnels for the main sewer, one through a hill not far from Black Rock at Connewarre and the other through the ridge on which Geelong had been first laid out. Smaller tunnels were dug under the Geelong racecourse to avoid interfering with the track and more further again up the main. Manholes were placed at regular intervals to allow access for clearing or inspection and ventilation shafts were constructed to ensure good air circulation. About 160 of them, standing around 30 feet tall and looking like chimney stacks, were constructed north of the ridge. The plan included several pumping stations where sewage from parts of the system that were below the level of the main sewer were pumped up rising mains to a higher level to join the sewage in the main sewer flowing down to the ocean. The most important station was located below ground near



the corner of Bellarine and Corio Streets to pump sewage from the central city into the main.

The most significant, visible and spectacular part of the entire system was an aqueduct 2,600 feet long across the Barwon River plain at Goat Island to carry the main sewer at the right level and inclination so the flow was maintained. The aqueduct design was inspired by the spectacular Firth of Forth railway bridge in Scotland and tenderers were told to use that bridge as a guide for their design. The accepted design comprised 12 spans 176 feet long and one of 136 feet, constructed in reinforced concrete. Each span was made of two cantilevers sitting on a central truss to balance the load, with the sewer pipe suspended in reinforced concrete hangars. It was designed to be – and would become – one of the landmarks on the Geelong landscape.

The first tenders for the entire project were advertised across Australia in January, 1912. Stone & Siddeley won the first contract to manufacture the largest reinforced concrete ovoid pipes and construct the first section of the sewer main from Black Rock to the edge of the city. The cost was £33,000 for 40,000 feet of large ovoid pipes and £30,837 to construct

The piles for the sewerage aqueduct also were constructed at the Marshalltown factory. On the left is the reinforcing for the pile, including the heavy metal point. In the centre is a completed pile and, on the right, workers are leaning on the mould in which the piles were made.

The ocean outlet for the sewerage system being constructed by blasting through basalt at Black Rock. The sea is quiet, but many photographs from this vantage point show waves breaking high over the rocks and working there must have been difficult.



the main outfall sewer. The contractors built a pipe factory on leased land at the Marshelltown Railway Station, a structure about 200 feet wide and 50 feet long equipped with all the necessary machinery. As much of the process as possible was designed to reduce the need for manual labour. Concrete was poured into large moulds in which reinforcing cages had been placed, it was compressed by air and set in the moulds before the pipes were turned out to cure. The work was done to a very high standard and engineers who visited the factory were impressed with the manufacturing system and the quality of the pipes. All the largest ovoid pipes had been manufactured by the end of 1914. Once these were installed in the sewerage system, the failure of just one could be catastrophic. Accordingly, trust inspectors at the factory checked the pipes as they were manufactured and marked those that went for more detailed inspection. Some were rejected as not good enough.

Stone & Siddeley constructed a two foot six inch gauge tramway from the factory across to the line along which the main sewer was to be constructed and then up and down that



A workman using a compressed air rock drill to make holes for explosives to blast the sewer trench. The pipes are ready to be laid in the trench and the air compressor is chugging away while several men in suits look on. They probably include Sharland and McKay watching this relatively novel equipment at work.

line. It carried pipes and other equipment out to the work site and carried back soil removed from the trenches and tunnels.

Construction of the outfall project began in May, 1912, with excavation of the main sewer. During winter, the contractor concentrated on digging the first tunnel at Challis Hill, employing miners from deep lead gold mines in places like Ballarat and Bendigo. The tunnel was not driven straight through, but made by digging a series of shafts from the surface and connecting them by tunneling. The work had to be done accurately so the pipes could be laid in the tunnel properly. Because the tunnel was only five feet wide with little space between the pipe and the walls, a surveying error of a mere six and a half inches could pose a major problem; it would mean the pipes would have to be laid out of alignment or the tunnel widened. By the spring of 1912, that stage of the project was virtually completed and the focus turned back to digging the trench across the plain. This involved horse-drawn ploughs and scoops to remove most of the soil and air compressed drills to

break up any rocks. This section was completed by the end of 1915.

Stone & Siddeley won the contracts to make the ovoid pipes for the second stage of the project and lay them from just south of the town, through the ridge under Geelong and as far north as the railway station. Trenches for the main sewer were dug as far as Carr Street, South Geelong, and then tunnelling 90 feet deep at the summit of the ridge began under Bellarine Street. Work on sinking the shafts began in May, 1913, and all were completed and tunnelling had just begun when the men employed by Stone & Siddeley went on strike for better pay on June 24, 1913. Negotiations had been dragging on for months and eventually a minor incident led to 175 men walking off the job. The trust was prepared to help resolve the dispute, but as the issue was between the contractor and their employees it could do little but wait. The contractor replaced many of the strikers with other workers, but had difficulty finding miners to complete the tunnels. The pace of work picked up in the first months of 1914 and the tunnel under Geelong was ready for the ovoid pipes in July, 1914. By mid-1915, the section had been completed apart from filling in the tunnel around the main sewer.

In September, 1913, Stone & Siddeley also won the contract for the third section of the main sewer, from the railway station north to the abattoirs, for £4,782. The smaller ovoid pipes were manufactured in the Marshalltown factory, but World War I, which started in August, 1914, made it difficult to complete the project on schedule. Cement became difficult to obtain and the cost went up rapidly, forcing the trust to stockpile and make the material available to contractors as they needed it. There was also a shortage of experienced miners for the short sections of tunnelling in this stage because many had enlisted to go to war. Despite these difficulties, the final section was completed in May, 1915.

The contract to build the aqueduct across the Barwon River valley also went to Stone & Siddeley. Their tender of

MIDNIGHT AT BLACK ROCK

About 100 guests had a novel excursion on Saturday night over the narrow gauge railway from the cement pipe factory at Marshalltown to the side of the sewer outfall at Black Rock, Bream Creek. First they saw an 8ft reinforced concrete oviform sewer pipe made. Comfort was not guaranteed on the trip, but the travelling conditions were by no means bad. Temporary benches had been built over the pipe supports on the nine trucks; the little engine had a Japanese lantern for a headlight; the air was delightfully mild, and the landscape looked its best in the moonlight. Two halts were made near the main road at Challis' Hill to see mechanical drills boring rock in the open trench. And later on to inspect the joined pipes which had been hitched together with stout reinforcements and concrete. Those who had counted on an early return home had their hopes dispelled when the terminus was reached at 10.15 by the announcement that the outfall, where supper would be served, was three-quarters of a mile on. It seemed an awfully long trudge, but the climax was worth it. The supper tables were erected close to the sea, and were lighted by electricity! Winter and Taylor had a tiny petrol engine driving a dynamo that supplied the light. The supper was dainty; there was an acceptable cup of tea for the ladies; gentlemen had a wider choice. Nobody seemed in a hurry, and it was 11.30 pm when the speech making began. The little engine began its snorting again at 12.15 am for the return journey, the factory was reached at 1.45, and the motors and cabs landed the guests in the City soon after 2am.

Stone & Siddeley organised a unique evening's outing to show its guests the sewer construction along the route to Black Rock. This report from the Geelong Advertiser, February 24, 1913.

£18,450 was not the lowest, but the trust doubted any of the lower tenderers could do the work as well, and the drawings and specifications were approved in February, 1913. Temporary bridges were constructed across the river to allow men and materials to get to the work site and the tramway was extended over them. The complexity of the design required a large drawing board 70 feet long and 30 feet wide on which all the details of the cantilevers were drawn in full scale. This was done to ensure everything went together precisely when the spans were erected on site. Another large board was used to graphically calculate the stresses on all the components in the structure. The aqueduct was constructed on a series of piers supported by 80 reinforced concrete octagonal piles manufactured in the Marshalltown factory.

The strike by Stone & Siddeley's employees also affected progress on the aqueduct. While some work could be

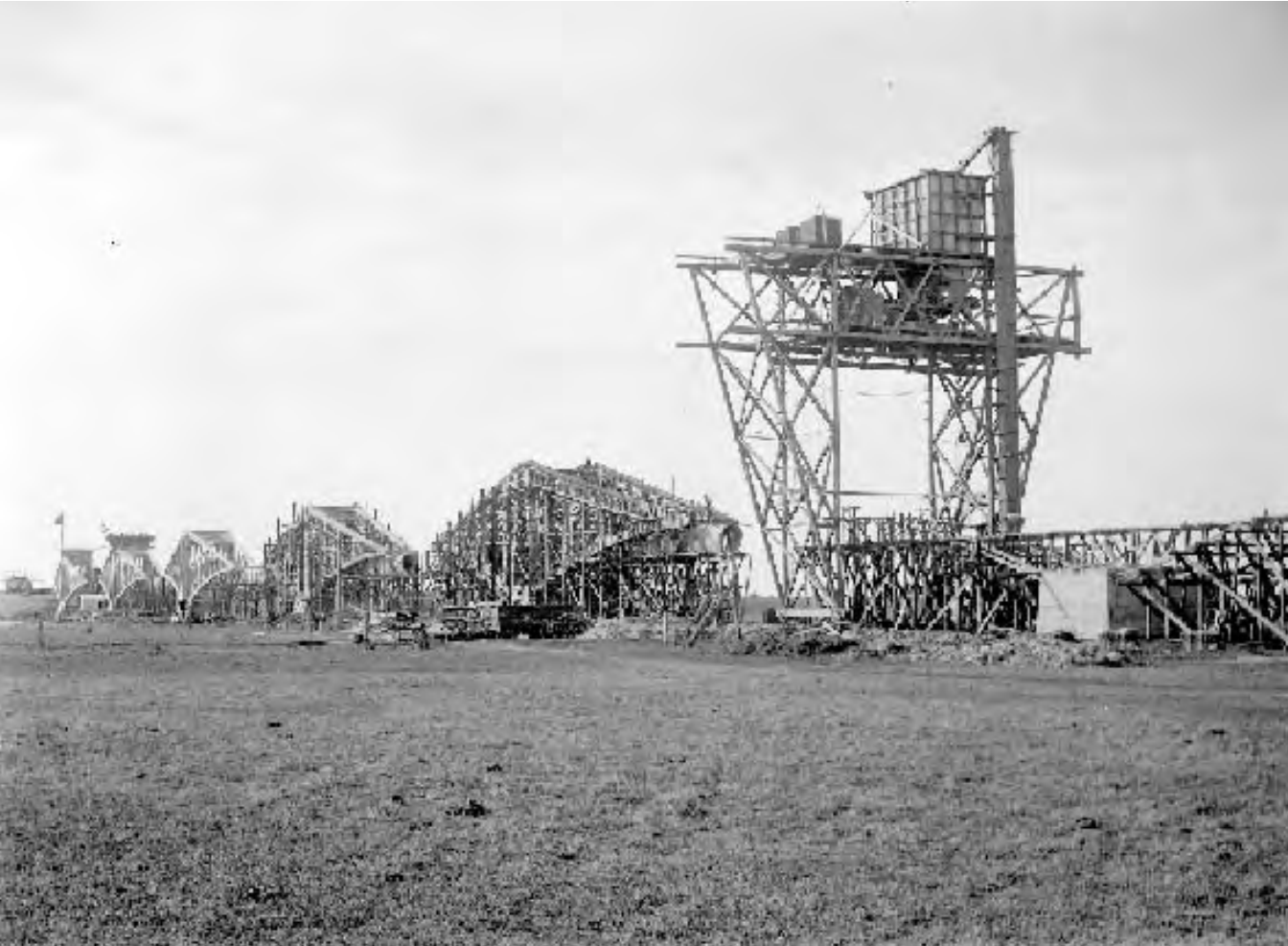


People clambering over one end of the aqueduct under construction. The shape of the ovoid sewer pipe is clear in this photograph, as is the complexity of the work involved in building the aqueduct around it.

completed by unskilled labour, construction of the structure required skilled tradesmen. After a six-month delay, work recommenced toward the end of 1913, with the first pier completed on January 10, 1914. As soon as a pier was finished, erection of the cantilevers began, so while piers were still being completed at one end of the site cantilevers began going up at the other end. The first cantilever was finished on June 2, 1914, and the second on June 26. After that, the men became more experienced and confident and they could complete one in about three weeks, with the last erected on February 13, 1915. Work on the central girders, footway and balustrades followed. By the end of June, 1915, the whole structure was almost complete.

The system was scheduled for commissioning in late 1915, but the war brought this forward to allow the large military encampment set up on the racecourse in East Geelong to be sewered. Arrangements were ready in May, 1916, the camp was sewered by July and the main sewer was then ready to serve Geelong.

The only major component not built by Stone & Siddeley was the low-level pumping station to serve the



central city. The contract was awarded to a local contractor, G F Taylor, for £1,502. The station was basically a large underground tank into which sewage from the city was collected and, when there was a sufficient amount, electric motors turned on automatically to pump it up a rising main into the main sewer. McKay had realised the ground close to the sea would be difficult to dig using traditional methods, so the trust bought 100 tons of steel sheet piling to hold back dangerous soils like runny silt and water-charged sand. While only used for a few weeks, the trust was pleased with the progress it made possible. On June 3, 1914, however, the piling collapsed and, although no-one was hurt, the contractor had to clean out the site before proceeding. The excavation was completed by the beginning of April, 1914, the concreting was finished in February, 1915, and, after being made watertight and the pumping equipment installed, the station was ready for operation by October, 1916.

After completing the main sewer, the trust turned to connecting individual properties. Surveyors, draftsmen and planners began concentrating on the reticulation

Further back, the size of the aqueduct becomes clear. The first part of the process was to build the support for the sewer pipe and then construct the pipe line on it to ensure it had the right slope. The aqueduct was constructed around it and then the walkway was constructed above the pipe.

system and, by mid-1913, had surveyed 9,200 properties, measured and surveyed 8,135 premises in detail and had 39 plans of Geelong covering an area of 935 acres. Next they moved on to other areas of Geelong and began surveying and drawing plans for Geelong West and Newtown and Chilwell in mid-1915. (The overall drainage plan the draftsmen produced was the most detailed map of Geelong and from this time until the 1940s it was used as the basis for the map of Geelong printed for general public use.)

The first contract for sub-main and reticulation pipes – 60,000 feet of circular reinforced concrete pipes ranging in size from four to 16 inches – was awarded in December, 1913, and a second contract for 100,000 feet of pipes was awarded to Stone & Siddeley, with deliveries commencing during 1915. In addition, the trust awarded contracts for the special shapes, bends and junctions necessary to connect the pipes.

Laying the sewer reticulation pipe lines across Geelong was difficult because of the accuracy with which they had to be laid and the number of ‘obstacles’ – buildings, fences, roads and gardens. Care was taken to disrupt as little as possible and in many places it was limited by sinking shafts and then connecting them with tunnels. The first contract to install 13,000 feet of reticulation piping in the centre of Geelong, the area between Malop, McKillop, Bellarine and Yarra Streets, was awarded in July, 1914, and completed in November, 1915. The second contract for the area next to it, extending between Malop and McKillop Streets from Yarra to Gheringhap Streets, was awarded shortly afterwards and the work started in January, 1915.

In November, 1914, the United Labourers’ Union sent a deputation to the trust asking if it would undertake some work using day labour rather than contractors. Commissioners agreed, with day labour supervised by trust staff. The first such work was the reticulation of another area of Geelong that went from February to June, 1915, and a



second contract started in February and was completed by May. The trust kept records to compare the cost of contract and day labour and by November, 1915, contracts completed by day labour were coming in at between 7 and 19 per cent below estimated costs. This led to the trust allocating a great deal of this work to day labour gangs.

The trust provided sewer reticulation past people's properties, but did not connect them. That was the responsibility of property owners and governed by the sewerage by-laws approved in May, 1915. Under them, the trust declared a part of the city a 'sewerage area' and everyone owning property in it was compelled to have their properties connected. Notification of sewerage areas commenced on October 29, 1915, when an area in Geelong containing 243 properties was declared. The second sewerage area containing 711 places was declared on December 17, 1915. The first property connected to the sewerage system in Geelong occurred on January 26, 1916. Thirteen sewerage areas including 3,431 places were declared in 1916, most of them still in the City of Geelong, but with the first area in Geelong West declared in March and the first in Newtown

A sewer connection being laid in a backyard. This caused a considerable mess in people's gardens, but it was unavoidable. Workers dug trenches only as large as was necessary and then broke through between them at pipe level to reduce the effect of the work on yards and gardens.

The work was hard and the working conditions unsafe. Accidents happened that would have been unthinkable in later years.

TWO LIVES LOST

On the ocean outfall sewer contract two workmen lost their lives on Monday night and yesterday morning. The victims were Joseph Johnson, who fell down No. 2 shaft at Connewarre, at 8.30 on Monday, and John Mason, on whom a barrel of cement fell at the pipe factory at Marshalltown at 8 am yesterday. Both are married men, and each leaves a family of eight children. Most of the Johnson family are grown up but the Mason children are too young yet to support their widowed mother for whom keen sympathy is felt in the Highton district, where the family reside. Johnson met his death just after crib at 8.30 on Monday night. The cage had been lowered in response to his signals, and, forgetting the fact, he wheeled his truck to the brace and fell with it 37ft down the shaft. He was killed instantly. Mason was in charge of a gang which was shifting 300 casks of cement to a new depot in the pipe factory where they would be protected from the winter weather. He had gone into a dangerous position under the skids leading to the new stack, and a barrel which got beyond the control of two men named Gilling and Newland, fell on to the back of his neck. Spinal and cerebral injuries caused his death in half an hour. Both bodies were removed to the morgue.

and Chilwell in April, 1916. The first connection to the sewerage system in Newtown and Chilwell occurred on May 4, 1916, and in Geelong West on August 8, 1916. Property connections required careful monitoring to ensure their safety and efficiency and the trust appointed its first plumbing inspector in May, 1914. A second was appointed in March, 1915, and a third in May, 1916. By June, 1916, 38 miles of sewers had been laid and 90 places had been connected.

Hundreds of men had been engaged on the project at any one time and perhaps 1,000 overall. Machinery had been used on some of the heaviest and most difficult sections and horses dragging ploughs, scoops and drays had been responsible for a significant amount. But men with picks and shovels had done most of the hard, physical work. Some had been injured and some were killed. In September, 1912, two men working on the factory at Marshalltown were caught in a storm that blew the building down. Two carpenters, Yole and Harris, fell 10 feet and, while Harris escaped with a few abrasions, Yole's face and chin were badly cut and his ribs and back were injured. In December, 1912, Frederick

Fredrickson, aged 51, has his hand crushed and two fingers broken by falling concrete. In February, 1913, two men were killed at the Stone & Siddeley works. In July, 1915, 36-year-old workman, H Nottingham, was buried when a trench caved in on him. His workmates dug him out before he suffocated and he only suffered bruising.

By June, 1916, the pace of the work began to slacken and by June, 1917, the project of constructing Geelong's main



After he left Geelong, McKay kept in touch with his friends and colleagues. When he visited the trust in 1946, there were still people who had worked with him on the sewer project. (LtoR) R G Pearce, G Nuenhoffer, R T McKay, P G Reilly and G A Cameron. Pearce and Reilly had been at the trust in the 1910s.

sewerage system had been completed. There still remained the immense project of connecting all the properties, but that would not be finished for years. At the end of June, 1917, 52 miles of pipes had been completed, 843 places had been connected and connections were being made at an average rate of three a day. At the June meeting of commissioners, sanitary engineer McKay presented a report of what had been achieved since his arrival in Geelong in May, 1911, and he then resigned. Commissioners put on record their indebtedness to him for his work in devising the ocean outfall scheme and the efficient, economical and tactful way in which he had approached his job. They resolved to attach inscription plates to the pumping station, the aqueduct and the outfall sewer to commemorate his achievements. In August, 1917, Stone & Siddeley sold their factory at Marshalltown and in October, 1925, the trust sold the sheet piling it had bought for the project. McKay returned to Sydney where he later became Chairman of the Sydney Harbour Trust. He seems to have enjoyed his time in Geelong because he went out of his way to visit old friends and colleagues in Geelong on several occasions and they visited him in Sydney. When he died in September, 1949, the trust still remembered his contribution to Geelong and commissioners stood in silence in his memory.

Sewering Geelong continued into the 1920s. The trust's policy was to sewer the most densely populated areas first before extending to more scattered parts. Eleven new sewerage areas incorporating 1,120 places were declared in 1917. Most of the reticulation pipes were laid by day labour gangs, but by September, 1917, the work was diminishing and the trust began dispensing with some of its labour force because it was running out of loan money. No new sewerage areas were declared in 1918 and only three, incorporating only 205 properties, were declared in 1919. In 1920 and 1921, only 14 new areas containing 1,037 properties were declared and the trust laid off one of its plumbing inspectors in 1922, with more reductions expected as the work slowed.

By the beginning of 1924, virtually all the most densely populated parts of the drainage area had been sewered and the trust planned to extend to other lower areas that needed pumping stations before they could be connected. The trust bought land for more pumping stations – in East Geelong in 1921 and in West Geelong in 1922. In 1924, land for another station was leased at Breakwater for 1/- for 56 years and land for another was bought in Belmont in 1925. Connecting Belmont and Breakwater to the sewerage system was made possible by construction of a new road bridge across the Barwon River under which the trust hung sewerage pipes. The first sewerage area declared beyond Geelong, Geelong West and Newtown and Chilwell was the Shire of Corio in August, 1923. The first connections were not made there until April, 1926. South Barwon followed in June, 1926, and the Shire of Bellarine was first connected in July, 1929. Ninety-three per cent of residences in Geelong had been connected by 1926, with the remaining connections to more remote places more expensive and taking longer. In 1929 and 1930, 18 new sewerage areas were declared, but they contained only 156 properties.

Linking individual properties to the system was undertaken by plumbers using connection plans prepared by trust designers. The cost depended on the distance between the sewer and the connection and the condition of the ground and could range from £20 to more than £100. If a property owner could not afford the work, they could use the trust's Deferred Payment Scheme. This provided the money for the connection and was repaid in quarterly instalments over 10 years or so. In January, 1917, the trust borrowed £30,000 and opened a house connection loan account to finance the scheme. It proved so popular the trust borrowed another £30,000 to top up the account in 1922, did it again in 1924 and in April, 1926, borrowed another £70,000. When property owners used the scheme, the work was put out to tender, either individually or in groups of jobs depending on the estimated cost of the connections. The first 10 contracts

were awarded in April, 1917, and by the end of the year 429 had been awarded. By October, 1919, more than 4,100 contracts had been awarded and, with so many people using the scheme, the trust spent considerable time chasing up defaulters on their repayments.

More difficult and time consuming was the process of making people connect to the sewerage system. By April, 1918, the trust was issuing property owners with formal connection notices, but if that failed it had to take a further step and issue orders to compel people to sewer their properties within 28 days. The first orders were issued in March, 1919, to 16 owners of 19 properties and this process continued. In March, 1928, the trust issued 50 notices, with a further 100 notices in July.

The existing sanitation services were disrupted by the almost random spread of the sewerage system that could leave only one or two houses needing the service streets apart. The trust did not have to take over the sanitation services, but in 1917 it reached an agreement with local councils to reimburse them for the cost of providing sanitary services that were no longer required. As the sewerage system expanded, however, this became more expensive. By 1927, the City of Geelong had only about 100 places not connected to the sewer, but it still had to provide a sanitary service. Other municipalities began suffering the same problem. The trust finally gave in to pressure and in February, 1928, agreed to assume responsibility for the sanitation services to all unsewered buildings in the drainage area.

The sewerage system did what its original supporters and planners claimed – improve the public health of Geelong. Even in 1917, when only some houses in Geelong had been sewered, the incidence of typhoid was much lower than previous years and only one death occurred. Seventy-five cases of diphtheria were reported in Geelong during the year, 10 of them fatal, and most of them in unsewered houses. By 1924, with many more houses sewered, conditions were even better. There had not been a case of typhoid fever in Geelong

since 1922. In Newtown, which was sewered except for the most remote parts, typhoid fever had become very rare and the town was in a most healthy state. Public health in Geelong West had never been better, with the incidence of infectious diseases steadily diminishing since the inception of sewerage, and there was practically a minimum of “typhoidal, dysenteric, diptheric and other infectious diseases”.



CHAPTER FOUR

GREAT WORKS

1917 – 1929

As soon as work on constructing the sewerage system finished, the trust turned its attention back to water supply. In 1917, it increased the Stony Creek embankment to its original height and design capacity of 754 million gallons for about £5,000. It also raised embankments 200 feet long around another nearby swamp to create Number 3 Storage that would hold water 20 feet deep with a capacity of 850 million gallons.

All this work, in water supply and sewerage, was undertaken with the skills and knowledge of the trust's engineers, surveyors and draftsmen, the labour of the thousands of men . . . and money. Nothing happened without money.

Rates and water charges paid for the day-to-day operations. Each year, the Secretary and account staff prepared the trust's budget for the coming year, covering salaries, wages, equipment, expenses and interest payments on borrowing, and recommended rate levels to cover those costs. The rate was based on local government property valuations. From the early 1910s, the annual water rate was set at 1/3 in the £ with a minimum rate of £1. In 1927, it dropped to 1/1 in the £.

Laying water pipes in Geelong in the 1920s and 1930s was hard physical work.



The tower at No.3 Storage, Stony Creek. It quickly became the favoured place for people to have their photographs taken during visits.

The trust also installed meters and charged users, such as businesses and schools, for the water they used. People could elect to have a meter fitted and be charged for what they used; in 1910, the amount was 1/- per 1,000 gallons for domestic gardens. The trust's policy was to increase meter use as much as possible. In 1910, there were 1,931 meters and in 1915 there were 3,253. In 1910, the trust collected £317 in water rates, £403 in charges for metered water and £70 in meter rentals. The amount collected from metered water varied from year to year while rates were constant and allowed the trust to budget more accurately.

The cost of water became an important element in Geelong's development. In 1917, 10 organisations were receiving free water, with all but one deemed charitable. In 1926, commissioners decided all charitable institutions would be exempt from water rates and charges until further notice. The one non-charitable organisation to enjoy free water in 1917 was the Federal Woollen Mills, which was granted a no-cost supply for its first five years of operation and then charged at the reduced rate of 6d per 1,000 gallons. It was an important industry the trust believed was worthy of support. The trust also knew that ample supplies of well priced water was one of the keys to industrial development. As such, it helped attract a phosphate factory to North Shore in 1923 by agreeing to provide the required water supply. Likewise, it helped ensure Ford Australia established its headquarters in Geelong by delivering a secure supply of water involving a new service basin.

Sewerage rates were calculated separately, but in the same way as water rates. Even before the sewerage system was ready for use, the trust began imposing a special fee on all properties in the drainage area to offset the cost of managing the project. Initially, the special sewerage rate, set in 1911/12, was 3d in the £ and it increased to 6d in 1914 as the project grew. In 1915, commissioners set a general rate of 1/6 in the £ for properties connected to the system and the special sewerage rate dropped to 4d in 1923, 3d in 1926 and then nothing. In 1928, the

general sewerage rate dropped to 1/4 in the £, giving ratepayers a saving of £4,800, and to 1/3 in the £ in 1929.

Until 1926, rates notices were delivered by the trust's rates collector. He could also collect money from ratepayers, thereby saving them having to send it in or visiting the trust's office to pay. In 1926, the trust began sending out notices through the post and by March more than 7,000 had been mailed. The response was favourable because ratepayers received their notices earlier and could pay at their convenience. Many left their payment to the last days before interest would be charged and it became traditional for the revenue office on the ground floor of the trust's building to be very busy for the final few days and for long queues on the final day.

Total revenue was £16,742 in 1909/10, £74,982 in 1922/23 and £99,673 in 1929/30. The increase was due to Geelong's growth, although charges had been slowly reduced. This revenue only paid to keep the water supply and sewerage systems running; generally it did not pay for their construction, which was met through borrowing. Commissioners of the old trust had paid for the water system with borrowed money and financed its early works with more borrowings. The new trust continued in the same way and by June, 1915, had seven outstanding loans – £425,000 in four loans for water and £250,000 in three loans for sewerage. Initially, these were raised through private financial organisations, but two of the largest loans, both worth £100,000 for the sewerage system, were raised directly from banks. Other lenders, such as the Commonwealth Superannuation Fund, began providing large amounts of money, but loans also were open to smaller investors through inscribed stock. Geelong investors, many of them private individuals contributing quite small sums, began buying stock in the trust as a way of investing their money locally.

The loans began coming due for redemption from 1915 and the trust took care of them in various ways, ranging from simply negotiating with the same organisation to raising new

loans to pay for the old. Fluctuations in interest rates made raising loans and refinancing more difficult. In 1913, the trust had borrowed at 5 per cent and in 1915 the rate was $4\frac{1}{2}$ per cent, but by 1918 it had risen to 6 per cent. For a loan of £150,000, this meant a significant increase in interest payments. In 1919, the trust postponed some work until “conditions [were] more favourable”, but by 1920 it was impossible to find money at less than about $6\frac{1}{4}$ per cent. Commissioners resisted having to pay so much at first and postponed additional work, but when projects could be put off no longer they had to borrow money at the going rate. In June, 1920, the trust had borrowed £793,000 and by June, 1930, its debt had reached £1,536,000. Of that, £673,000 was for water supply, £614,000 for sewerage and £248,000 for sewerage installation.

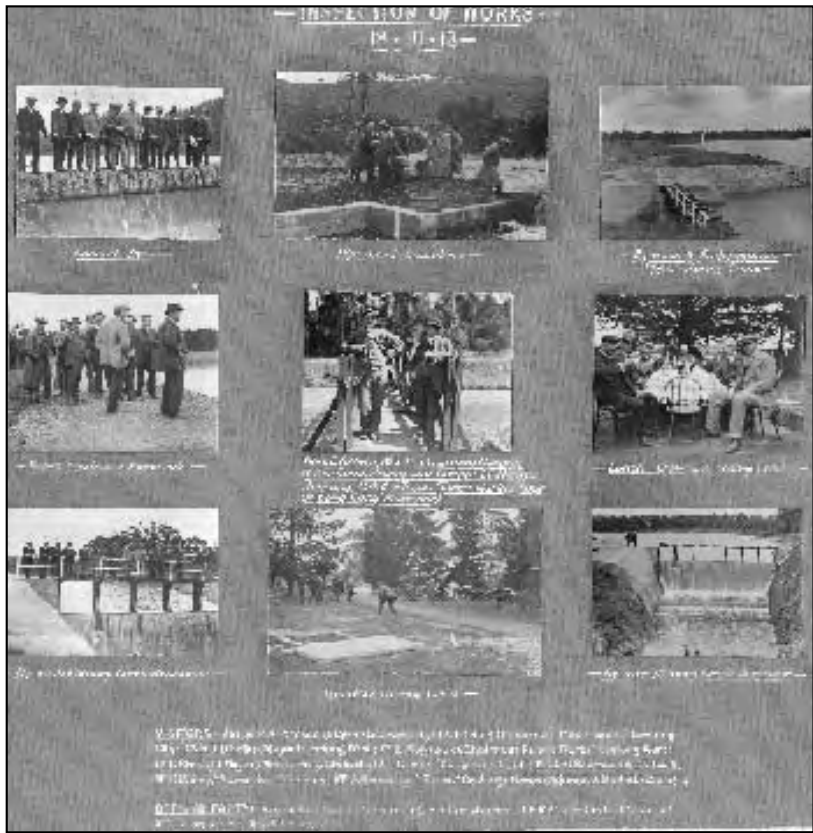
The government was involved in the trust borrowing such large amounts of money. It had to approve the loans because it needed to control the overall level of state debt, even though the trust’s borrowing was only a small part. The government also was directly involved because legislation set upper limits to its borrowing. Each time the trust needed to go beyond those limits, it had to ask the government to amend the legislation, which meant passing a new Bill through Parliament. Although the government was willing to do that and the debate might last no more than 10 minutes, finding time in a government’s parliamentary program and the parliamentary draftsmen’s resources often caused delays. The first time this occurred was in 1910 when the trust needed more money for improvement and expansion of its water supply system but had reached the limit imposed by the legislation. In June, 1910, it requested the local Member of Parliament to ask the government to increase its limit by £50,000. The government agreed. But the political process was slow and from January, 1911, a number of approved projects were deferred until the legislation was passed. This did not occur until October, 1911. In early 1914, with the sewerage project well under way, another Act was passed to increase the trust’s borrowing

powers by £75,000. But that did not last long and by July the trust was spending money borrowed for water supply works on sewerage while it waited for another Bill that was given assent in October, 1915. Similar Acts were passed in March, 1918, December, 1921, December, 1924, December, 1926, and August, 1933, and increased borrowing was included in an Act covering wider sewerage powers in April, 1930. These financial problems forced commissioners to plan their spending carefully. In November, 1916, they asked McKay to report on works to be undertaken in the next 12 months – if the money was available. The following year they asked Sharland and McKay to prepare estimates for works “for a period of say five years on a graduated scale” to help contain projects to only those that were necessary.

During the same period, Parliament passed other legislation allowing the government to borrow for water supply and sewerage works. As a result, the government borrowed large amounts of money that it granted to the many sewerage and waterworks trusts around Victoria. Geelong was excluded however, and had to borrow its own money. This appeared unfair to some Geelong people.

Despite difficulties, the trust sailed through the two decades from 1910 to 1930 relatively smoothly. It became one of the most important bodies in Geelong, ranking with municipal councils, the railways and post office. Apart from the occasional burst water main, poor pressure and dug up roads, there was barely a complaint. This was reflected in the annual elections of commissioners, three seats being elected one year and the other two the following year. Despite this annual opportunity for ratepayers to express their opinion, commissioners rarely changed and a contested election was unusual. In 1911, the commissioners were Isaac Hodges, John Doyle, Henry Christopher, John Small and Hugh Sutherland. In 1928, Hodges, McCabe Doyle and Christopher were still there. Sutherland resigned in 1914 because he was leaving the district and he was replaced by W Wilton. In January, 1916, Dr Small died and was replaced by

For many years, commissioners traditionally conducted an annual inspection of the water sources in the Moorabool catchment. These tours also became annual public relations events with invited guests. In the early days, these trips were quite arduous because of the hard travelling over rough roads in the motor vehicles of the time.



J Cairns, the Mayor of Newtown and Chilwell. Both these men were still commissioners in 1928. Through this entire period, commissioners annually re-elected Isaac Hodges as Chairman. Each year, they made a tour of inspection up to Korweinguboora and back, looking at the storages, channels and other works. Although the trip was short by today's standards, the roads were unmade and often rough and the journey took the entire day. The outing was usually broken by a sumptuous lunch at the old pub at Korweinguboora and refreshments served at places like Stony Creek.

Commissioners held regular meetings in the wood panelled boardroom on the first floor of the trust's Ryrie Street office. The building had a basement, two floors and a loft, which was occupied as the staff grew. Most people in Geelong only knew the building from going there to pay their

rates; just through the large wood and glass doors and on the left side of the lobby there was a long wooden counter in the style of a bank where tellers sat. A staff of perhaps 10, the rates collector, typists and clerks, sat on stools, either at the counter or at a long bench facing the wall. Large, heavy rate books were kept there during the day, but at closing time they were loaded onto a special cart and pushed into the strongroom where they would be safe overnight. When the rates were due, the tellers worked extremely hard, taking money and writing out receipts. If the money did not add up properly at the end of the day, the tellers had to make up any shortfall out of their own pay. If there was money over, it went to the trust. Those with commercial business visited other rooms on the ground floor where the Secretary and his secretary (Miss Reid), the accountant and other administrative staff worked. Up the imposing timber stairs from the right in the entrance lobby were the boardroom and accommodation for the engineering staff. Downstairs, staff worked at desks and benches, using nib pens and blotting paper for the ink; upstairs, many of the men worked at drawing boards. In the loft, there was photographic equipment used to copy and reproduce plans with a big dark room and storage area.

From the time the trust moved into its new office until McKay's resignation, Sharland probably occupied the Secretary's office on the ground floor, although he was also the Hydraulic Engineer. McKay probably occupied the office on the first floor that later became the Engineer-in-Chief's office. Sharland and McKay were on the same level as the heads of the hydraulic and sewerage branches, but McKay's salary was much greater than Sharland's. Sharland, however, carried the heavier burden of being responsible for water supply and its administration and that affected his health. In May, 1916, he was in bed seriously ill and Commissioner Doyle said nothing short of a change and complete rest would restore him to health. He was granted two months' leave on full pay.

James Sharland was highly regarded in Geelong. To mark the respect of his colleagues, a dinner was held in his honour, as the Geelong Advertiser on November 25, 1929, reported.

THE DOYEN OF GEELONG ENGINEERS

The engineers associated with municipal and corporate bodies in the city assembled in full muster at the complimentary dinner tendered Mr J S Sharland, M.Inst.C.E., at the Victoria Hotel on Saturday evening. Mr H G Oliver, C.E., as chairman, paid a warm tribute to the public service efficiency and the genius for administration shown by Mr Sharland over a very long period, and testified to the respect held by the engineering profession unanimously for their guest. In submitting the toast of the evening, Mr A T Andrews, A.M.Inst. C.E., reviewed Mr Sharland's association with engineering activities of the city, commented upon his keeping in stride with the general progress of the district and said that both professional and layman realized the value of his services to the community. Mr Sharland, who was warmly received by the gathering, said in responding that the personal nature of the function was a complete surprise to him. He appreciated the cordiality shown by his professional colleagues. As one who had served the public for more than a quarter of a century in the Greater Geelong area, he had been called upon to exercise his administration in almost every activity in public, corporate and private enterprise, and he wished to record his appreciation of the many kindnesses and considerations that had been shown to him from all sources in the interests with which he had been connected. He felt that the night's gathering being of a professional character, was the high water-mark of congratulations that could be tendered him. He took occasion to refer to the remarkable development in high technical education at the Gordon Institute of Technology – an institution that had been responsible for more of the city's progress than the general public realized. It was behind every movement for the benefit of the city, as well as primarily standing for, and maintaining, educational activities of a technical nature in the district.

The opportunity to lighten Sharland's load came in June, 1917, when McKay resigned and the trust restructured the organisation. Sharland was appointed Engineer-in-Chief on June 29, 1917, and the accountant, P G Reilly, was appointed acting Secretary on July 19, and made permanent on January 25, 1918. This created two separate areas in the organisation – the Secretary's branch that took care of day-to-day business and raised the money needed for the trust to function while the engineering section spent the money on Geelong's water supply and sewerage services. The two branches were not equal, judging by the salaries paid to the Engineer-in-Chief and the Secretary. In May, 1919, when Reilly's salary was set at £450 a year, Sharland's was £800. In 1926, when Reilly's

salary was increased to £900 a year, Sharland's went to £1,150. Sharland was undoubtedly the most important man on the staff and he had a wider reputation. From 1913 to 1915, he did consulting work for the Ballarat Water Commission in the construction of the Moorabool Dam and in 1923 he was given permission to do private work for Horsham and Lorne.

The trust needed room for storage as well as its office and it leased land from the Geelong Hospital Committee next to its office in Ryrie Street, facing onto Little Malop Street. Three buildings were erected on it, one of weatherboard for the storeyard staff and two metal structures with concrete floors for the sewerage and water supply sections for testing water and sewerage fittings, meters, pipes and so on. They were located either side of the wooden building because the trust ran the two sides of its engineering operations separately for accounting purposes. Testing was a major activity that began at the beginning of April, 1917. All articles to be used for house water supply and sewerage had to be tested and passed by the trust because there was almost no quality control in manufacturing. Accordingly, the trust set standards to ensure all materials used in water supply and sewerage services would not fail when installed. The only exemptions from testing were pipes and fittings examined and stamped by the MMBW.

The trust continued to use the hospital land until 1926 when it was taken back for a nurses' home. Fortunately, the old Temperance Hall in Little Malop street, close to the old storeyard and the trust's office, became vacant and the trust took a 10-year lease at £50 a year. As the hall was in bad condition, the trust spent £3,000 improving the site, removing the stage, installing ties to stop the walls from falling, constructing offices for the storeyard foreman, meter reader and storekeeper and creating a public enquiry area. A brick building was added at the rear for testing pipes and fittings and testing and repairing meters and a detached brick building in the yard housed the blacksmith shop, the carpenter shop and a garage for the trust's vehicles. Plumbers



Staff of the Geelong Waterworks and Sewerage Trust on June 11, 1918. Now only some of the faces are recognised, although we know the names of all the staff at the time. The names of the two women in the front row are not known, but the men are (from the left) Secretary Reilly, Commissioners Hodges and Doyle and Engineer-in-Chief Sharland (who looks as though he has just returned from a work site inspection).

and contractors making water and sewerage connections went there for information and approvals, to arrange inspections or to register for licences. Initially, the trust tested all plumbers before issuing them with licences to work around Geelong. But it was a costly process and many times there were no applicants for the regularly held examinations. When a Plumbers' and Gas-fitters' Board was appointed in 1931 to examine plumbers, the trust was pleased to work with it and Sharland represented the trust on the Plumbers' Examination Committee.

The atmosphere in the office and in the old Temperance Hall and yard was different. In the office, staff wore collar and tie at all times and a coat, never a cardigan or jumper. The ranking of staff was recognised by how they spoke to and treated each other; those down the ranking referred to those higher up, including commissioners, as 'Mister' and treated them with deference. Those higher up the ranking were more informal with their staff and occasionally used first names, but not often. Staff were aware of the trust's status in the community and they treated the public with respect, although not always with helpfulness and cordiality. In the hall and yard at the back of the

office, the environment would have been different, with more informality and a less restrained attitude. There was little interaction between those in the office and those at the back in general, particularly those in the Secretary's branch.

Women were a very small minority in the trust's staff. Employing women would have been unthinkable a few years earlier, but by 1913 women had established themselves in several 'low status' jobs, such as telephone switchboard operators, secretaries, cashiers and typists. When McKay unsuccessfully sought a junior clerk with knowledge of typewriting and shorthand at a salary of £50 a year, he engaged a girl at 15/- a week instead. Women were paid significantly less than men. In June, 1916, Miss Scenenay's salary was increased to £20 a year or less than 10/- a week. When the house connection clerk resigned in 1925, commissioners suggested a junior girl clerk might be engaged as a trial to save money.

There were some occasions when staff and workers came together informally. From 1921, commissioners gave permission for annual staff picnics paid for by the staff putting in a shilling or so every pay day. They were usually held in February, when only a skeleton staff remained at work and the rest went together to a nearby resort or picnic spot for the day. There were organised sporting events, such as races and a game of cricket between the office staff and maintenance workers.

SUCCESSFUL SOCIAL

The staff of the Geelong Waterworks and Sewerage Trust held a successful social in the Freemasons' Hall, Yarra Street, on Tuesday evening. Mr A J Freeman was in the chair. A splendid musical programme, to which the following contributed filled in the first half of the evening: Orchestral selections: Messrs J W Gogoll, D Sutherland, C F Stanley, F Gliddon and A V Stanley; selections on the pipes, Messrs R Fraser and T McKenzie; recitation, Mr Comr J McCabe Doyle, BA, LLB; monologue, Miss Vera King; song, Mr E Tozer; pianoforte solo, Miss B O'Brien; accompanist, Mr John Thomas. During the evening the prizes won at the recent picnic were presented to the successful competitors by the Chairman of the trust (Mr Comr. I G Hodges). After supper had been partaken of, the gathering indulged in dancing and cards. The committee, with Mr S W Birrell, AAIS, secretary, are indebted to the performers and all who so kindly assisted.

The trust's staff seem to have enjoyed an active social life, if this report from the Geelong Advertiser of March 1, 1922, is any indication.

Commissioners usually attended and by the late 1920s it had become traditional to name some of the races after them; in 1929, the events included the McCabe Doyle Handicap, the Wilton Sack Race and the Cairns Flag Race (won by storeyard staff).

When the new trust was established, it had only the barest necessities of equipment. It quickly acquired more second-hand office equipment, new instruments for its surveying teams, reference books, a camera and, as the amount of work grew, new typewriters. In 1912, the trust made enquiries about an adding machine, but the staff was expected to be skilled in mental arithmetic and a Burroughs adding machine was not bought until November, 1921. It cost £285, equivalent to five years' salary for some of the people who used it.

When the trust began surveying for the sewerage scheme, it bought a fireproof safe for the irreplaceable survey books; if they were destroyed or seriously damaged, years of work would have to be repeated. The other irreplaceable records were ledgers of all who had bought stock in the trust and, in 1922, a copy of the ledger was made by hand and the original kept at a bank. After that, trust officers made inscriptions in the duplicate copy as changes occurred and regularly went to the bank to write them into the originals. When office renovations were planned in 1926, a strong room was included in which all the most valuable documents could be stored. The ledgers of inscribed stock were still kept at the bank, however.

Peter Hammerli started work at the trust in 1927 when he was 14. He recalls getting the job.

THE JOB INTERVIEW

At that stage they were in the process of advertising for a messenger boy. So I had to go in to the office on the tram that ran past the front door.

Mr Reilly got down a big ledger and said, "Add those up." I was very good at doing that sort of thing, so I added them up. Then he said, "Oh well, are you all right to come in on Monday, and we'll put you on on a temporary basis?"

That's how I got the job, and I stayed there 51 years. It was a rather long temporary employment.



The trust's first motor vehicle was a large Albion car previously owned by the Governor. It seemed ideal for engineers and commissioners to make inspection tours to Stony Creek, Korweinguboorra or Black Rock. But by June, 1912, they had discovered it was too big and expensive and it was sold. The trust then tried a series of smaller cars, but rarely had more than one or two at a time. In August, 1913, it bought its inspector of sewerage works a motor cycle and by the mid-1920s it had several motorbikes with toolbox sidecars for maintenance workers. The trust had a horse and cart for heavy loads, bought its first motor truck for £265 in 1922 and replaced it in 1926 with a new Ford truck. In June, 1928, it bought its first tractor, in June, 1929, another Ford 30cwt truck and in August, 1930, a crawler tractor. The trust gave allowances to staff and workmen who used their own vehicles; in 1927, a ganger with a horse and cart was allowed £1/1/- a week and timekeepers and gangers with motorcycles were paid 10/-.

The trust began using telephones for instant communication over long distances. In 1911, Sharland was given permission to have the telephone connected to his house and the following year telephones were provided for the foreman and the Secretary's office. In 1915, the PMG

The trust's first truck. The trust had relied on horses for many years and would continue to use them into the 1950s. But this vehicle was so successful in meeting the trust's needs that a fleet of all kinds of vehicles grew rapidly.

extended a telephone to Anakie, with the trust paying a large portion of the cost, and it was linked to Stony Creek in 1926. In 1927, the telephone was connected to the channel keeper's quarters at Ballan. The trust also introduced its first remote measuring equipment in 1923 when the PMG provided lines to five of its six pumping stations linked to an electrical recording instrument in the office. This allowed the working of each station to be monitored at a glance. The other station could not be connected because there was no telephone line nearby.

The trust established professional relations with many organisations. It sent delegates to the first Victorian Town Planning Conference in 1919 and Sharland attended the first Commonwealth Conference on Public Health Engineering in 1927. The Chairman or a deputy usually attended the annual sessions of the Waterworks Trusts' Association, but the organisation was mainly involved with rural waterworks so the Geelong trust did not renew its membership after 1919. When the Association of Provincial Sewerage Authorities was established in 1924, the Geelong trust did not join because its constitution did not permit it. Nevertheless, the trust had links with many water and sewerage authorities and commissioners and the Engineer-in-Chief visited and corresponded with them. The trust was on good terms with Colac's waterworks and sewerage authorities and provided them with information on some facets of its operations. The Colac Waterworks Trust visited Geelong's service basins at Lovely Banks and Montpellier in July, 1916.

The closest relationships, however, were with local government, which had created the trust, and many commissioners also served as local councillors. As time went by, the trust became more assertive about water supply and sewerage. And while it listened to the councils on occasions, it also often chose to ignore them. At a conference between the City of Geelong and the trust in 1926, the city reminded the trust of its origins. It said that when the trust had been

established there was an honourable agreement the trust would not levy rates on councils. The trust replied that it was honouring the agreement and that it was not levying rates but charging for water the councils used. One of the most persistent causes of squabbling was that the trust dug up the councils' roads and footpaths and did not repair them properly. The trust usually did what it could to fix those problems. When Geelong West council sent a deputation to the trust in 1929 with a list of specific demands about the laying of water pipes, commissioners replied that they always tried to meet the wishes of any council as far as possible.

Commissioners often had to remind charitable organisations and fund-raisers there was nothing in its constitution that allowed donations. On the other hand, there was nothing to stop them from helping in other ways, such as assisting fire brigades to conduct practices and demonstrations or lending its equipment for others to use. Most popular were its cars; in 1912, it loaned the Albion to the Geelong Cricket & Football Club when the English cricketers visited Geelong, and later to the town council when the Governor visited. Trust cars were used on several occasions in fund-raising for the hospital or the orphanage.

The trust also made its contribution to the homefront effort during World War I. It loaned its car to the City Recruiting Committee and invested some of its sinking fund in Commonwealth War Loans. Several staff members "answered the Empire's call". Garnet Nightingale and Thos Sutterby had enlisted by mid-1915 and commissioners decided to pay all those who enlisted the difference between the wage they had received from the trust and their military pay. Those who enlisted also were allowed to return to their positions when they came back from the war. By 1916, however, the drain of experienced men was beginning to have an impact on the trust's work, and when an assistant engineer was called up for compulsory service the trust asked the authorities for him to be exempted. The only recorded trust staff member to die in action was assistant engineer Blanksby. After the war, the trust

In this period, it was traditional to adopt a motto, usually in Latin, to set the tone for an organisation. The trust decided to adopt a motto and a symbol that signified its role in the community.

ADOPTION OF CREST AND MOTTO

The matter of adopting a crest and motto was discussed, and it was decided to adopt a design featuring Hygieia, the Goddess of Health.

According to Dr. William Smith, L.L.D., Editor of the "Dictionary of Greek and Roman Antiquities", Hygieia, also called Hygea or Hygia, was Goddess of Health and a daughter of Asclepius. In one of the Orphic hymns she is called the wife of Asclepius, and Proclus makes her a daughter of Eros and Peitho. She was usually worshipped in the same temples with her father, as at Argos, where the two divinities had a celebrated sanctuary, at Athens, at Corinth, Gortys, at Sicyon, at Oropus. At Rome there was a statue of her in the temple of Concordia. In works of art, of which a considerable number has come down in our time, she was represented as a virgin dressed in a long robe with the expression of mildness and kindness, and either alone or grouped with her father and sisters, and either sitting or standing, and leaning on her father. Her ordinary attribute is a serpent, which she is feeding from a cup. Although she is originally the goddess of physical health, she is sometimes conceived as the giver or protectress of mental health, that is, she appears as mens sane and was thus identified with Athena, surnamed Hygieia.

Mr. Commissioner J.P. McCabe Doyle, B.A.L.L.M., was requested to select an appropriate motto and from the many submitted the one recommended "Salus populi suprema lex esto" (Let the health (or welfare) of the people be the first great law) was chosen.

A letter conveying the trust's appreciation and thanks was forwarded to Mr. Commissioner Doyle for his work in selecting and submitting a number of mottoes suitable for adoption by a water and sewerage authority.

The complete design is not only appropriate but distinctive and original.

continued to encourage staff to "do their duty" by granting unpaid leave or by making up the difference between military and trust pay whenever staff members were away on military or naval training.

In 1921, the trust adopted a crest and motto in Latin to be used on its stationary, commissioners' medallions and the common seal. Mr Shield, who submitted the adopted design, was paid five guineas. The medallion was designed in line with the MMBW's, in gold with blue enamelled lettering, with the title of the trust and the goddess Hygieia stamped on one side and the motto and the names of commissioners on the reverse. Identification disks also were issued to employees who had to identify themselves to members of the public.



The Geelong Waterworks and Sewerage Trust's crest bearing the image of Hygieia, the motto in Latin and the year the trust was established.

Domestic sewage had been taken out of Geelong's streets, but industry had turned the Barwon River into another kind of sewer. Over the years, many industries had been established along the north bank of the river, which was their source of water and a repository for their wastewater. In 1905, there had been plans to remove all obstructions from the river to enable industries on its banks to send their produce away on boats, with the Geelong Harbour Trust given responsibility for the waterway. There also had been plans to sewer the industries to prevent them fouling the river, but nothing happened and the harbour trust generally ignored the river.

By 1918, the river was in a very bad way and stank. The Geelong Town Council met the trust and suggested a sewer be constructed along the north bank to collect the industrial waste. But the trust was not keen because of the quality of the waste and the cost involved. The land along the river was very low, meaning any connection to the main sewer would involve costly pumping stations.

This passage from an editorial in the Geelong Advertiser shows the strength of feeling about the state of the Barwon River in January, 1920.

BARWON RIVER MENACE

Mayor Hitchcock's vigorously worded letter to the State Premier, regarding the intolerable and noisome condition of the Barwon River, must be regarded as an ultimatum to the enemy. Pour parlers have been passing for years, and still the detestable nuisance continues to afflict the large population within the radius of its poison gas attacks. It has gone beyond all endurance. No population on the banks of the Yang-tse-Kiang would tolerate an affliction so fearful. Its speedy removal is imperative. Industries on the banks of the river must be encouraged rather than discouraged. They must be multiplied rather than reduced. So, too, must suburban settlements, and a healthy contented population. But such settlement is impossible while present noisome conditions exist. To expect it amid a foetid atmosphere, cumbrous with vile stench compared with which sulphureted hydrogen is almost as attar of roses, is fatuity. Nor are the civic authorities doing their duty to permit the continuance of the vileness. They must not be attacked for not having protested. That they have done until they have grown weary. But protests count for nought. What is wanted is action so concerted and irresistible that the "something", about which so much is heard, will be done, and will be done without a moment's unnecessary delay. The Mayor has laid before the Premier the ultimatum of the people. If the Government fails to do the imperative "something", then the people know their course.

The summer of 1920 was particularly warm and the river that year had never been worse. "The smell is simply awful", the City of Geelong wrote to the Premier, "and whatever complaints are made are thoroughly justified". Many people began complaining that the Breakwater stopped salt water flowing in to flush the river and held back the sludge from industry. While the Breakwater was the responsibility of the harbour trust or the government, it was argued the government should remove it because it had put it there in the first place. The harbour trust showed little interest and the government in Melbourne could not understand the fuss.

The only likely solution seemed to be a sewerage system to collect the industrial waste. The trust agreed to sewer if legislation that governed its operations was amended to allow it to charge different sewerage rates in different areas. This course of action would ensure the cost of providing the expensive service would not be a burden on the entire



Line No 2 in Special Area No.1, laid at the back of Collins Mill. The cast iron pipes were mounted on piles to maintain the correct slope and protected by rock. Buried sewerage pipes were usually earthenware, but since these ones were at ground level cast iron had to be used because it was stronger.

community. The legislation went smoothly through Parliament in September, 1920.

Commissioners accepted Sharland's plans for the scheme in December, 1920. There were two areas on the north side of the river where industry had congregated – the first stretching from Princes Bridge to Latrobe Terrace and the second taking in the area from there to the Breakwater. Both would have a long main line to intercept the sewerage outlets of the industries and both would have a large underground

pumping station to elevate the waste to the main sewer. The scheme would cost an estimated £27,000 and, while the work would be done with borrowed money, industries would be expected to pay the full operating costs. The government gave its approval in April, 1921, and work commenced almost immediately.

Special Sewerage Area No 1 that included 13 properties was ready to start in April, 1922. Not all industries were connected immediately, but the trust said the new system would stop “deleterious and filthy matter” entering the river. Indeed, there was a noticeable difference in the cleanliness of the river soon after the system started. Special Sewerage Area No 2 was more difficult to construct due to the difficult ground, but it was ready by March, 1923, when 15 properties were connected.

The special sewerage rates levied on the two areas seemed astronomical in comparison to the general rate. While domestic properties were rated at 1/6 in the £, properties in Special Sewerage Area No 1 were rated at 8/- in the £ and those in Special Sewerage Area No 2 at 11/- in the £. The industries also had to filter their waste before it went into the

The special sewerage areas were new to the people of Geelong and the press followed their construction with interest. This report from the Geelong Advertiser, April 14, 1921.

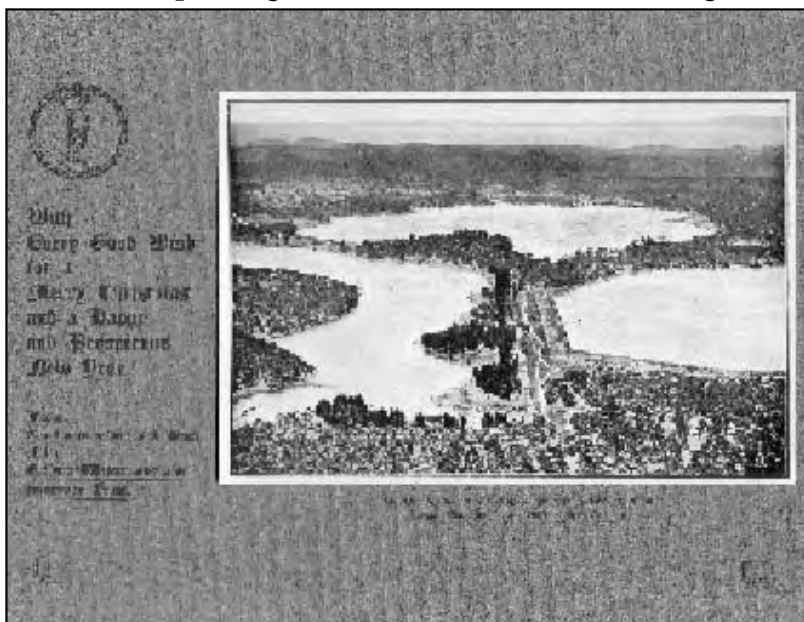
BARWONSIDE SEWER PUMPING STATIONS

Laymen who read in "The Times" that riverside industries are to be sewered, do not realize the vast amount of draughting work which goes with the job of such magnitude, in which every littlest angle, bend, and casting has to be calculated to hairbreadth and drawn to scale. The two pumping stations which will lift the Barwonside effluent to the gravitation level of the general sewerage system, and so permit its natural flow to Bream Creek, are big works in themselves. Each station will call for excavation of a chamber nearly 30 feet deep and as great in circumference, huge pits with pumping in the centre of an encircling "sump" into which riverside sewerage will flow by gravitation. Three pumps will co-operate to lift the sewage to gravitation level; the three being so governed by floats on the surface of the fluid that as the inflow to the sump beats one pump first, a second and then a third will come automatically into action to meet the flow and keep the system at work. Drop boards enable half the sump capacity to be shut off at will to permit periodic cleaning. These pumping stations will be almost identical in size, set one each near Bowlers' fellmongery and the Excelsior Woollen Mill.

system. They complained bitterly at such high rates and the trust offered a reduction if they contributed toward the construction costs. But they would not agree to paying £20,000, so the rates continued. They gradually fell during the 1920s, however, and had reached 3/- and 2/3 in the £ when the general sewerage rate was 1/1 in 1930. Notwithstanding, the work did little to treat the other problems that beset the Barwon River.

The quality of water from Geelong's supply was cause for widespread comment. It looked uninviting and brownish in colour and, if it was left to stand, a film of sediment settled on the bottom. Visitors frequently commented on it and some declared it "foul". Chemical and bacteriological examination found little wrong with the water, but people preferred the evidence of their own eyes. In September, 1926, the trust appointed J M Hennessy, of the Gordon Institute of Technology, as its analyst so water samples could be tested efficiently and regularly.

The trust tried to ensure the purity of water in its storages by protecting the catchments from which it was harvested. It failed in its attempt to gain control over the Korweinguboora



The trust's Christmas cards usually showed a picturesque scene of one of its storages. This card shows an aerial photograph of all three storages at Stony Creek.

The completed circular storage basin at Bell Post Hill that was constructed to improve the water supply to northern Geelong and assist industrial development there. This photograph, taken in September, 1926, shows farming land between the storage and the city. Photo courtesy of the La Trobe Picture Collection, State Library of Victoria.



catchment, but was successful in getting the government to make it a reserve for water supply, with the Chairman appointed to the Committee of Management. The catchments at Stony Creek and Korweinguboorra were declared game reserves for native animals and both reservoirs were stocked with fish. But the need to protect the catchments led the trust to restrict disturbance of the land as much as possible. The occasional picnic was allowed near the Stony Creek embankment, but fishing and trespassing were forbidden in November, 1927.

By the early 1920s, the trust's total storage capacity was more than 2,600 million gallons in comparison to the 555 million gallon capacity it had when Geelong took it over. The success of the system in delivering adequate supplies was the result of careful long-term planning that was necessary because of the cost of major improvements to meet demand. In 1917, Sharland undertook a major analysis of the water supply system to guide its future development and, in 1923, he recommended important additions. In 1926, he proposed future developments for an estimated population of 50,000 costing around £146,000, including the construction of a new major reservoir.

GEELONG'S WATER SUPPLY

Many complaints have been made during the recent hot weather at the low pressure of water in the Geelong mains, it being stated that the water from showers and garden taps is little better than a trickle. When questioned on the matter Mr J S Sharland replied that the service had been provided for normal weather conditions and the mains carried only sufficient supplies for normal requirements. When a hot spell was experienced the demand for water was made almost simultaneously by citizens who generally expected the same pressure to be available when practically everybody was drawing on the supply as during the cool weather. Such a service could, of course, be provided, but would entail a great deal of expenditure and higher rating in making such provision. The service was being extended in all directions, and the Waterworks Trust had planned many improvements, including a new reservoir.

The state of Geelong's water supply system in 1926 was far from what would be considered acceptable today. This report from the Geelong Advertiser, December 10, 1926.

Growing demand for water forced the trust to plan more storages around Geelong. Commissioners approved the acquisition of land for a new service basin at Montpellier in 1919, but work did not commence because of funding problems and the later need to develop the service basin at Bell Post Hill. In May, 1925, commissioners decided to defer development at Bell Post Hill, but several weeks later, with the announcement Ford Australia would set up a factory at North Geelong, they reversed their decision and resolved to proceed. Twelve acres were purchased and work started quickly. Excavation was completed by January, 1926, and the basin was filled gradually during the following winter months. The Bell Post Hill basin was not particularly successful, however, and toward the end of 1926 £6,000 was set aside to line it with concrete and an engine was bought for pumping in April, 1927.

By the mid-1920s, development of service basins at Lovely Banks, Montpellier and Bell Post Hill had increased their combined capacity from 11 to 55 million gallons and mains had been laid to adequately serve Geelong. But by 1925 the city's population had grown to more than 40,000 and it consumed 1,004 million gallons of water annually. The new service basins and additional storages at Stony Creek could hold more than before, but they could not

bring any more water into the system because they relied on the same catchments used since the completion of Korweinguboora in 1910. By 1925, the trust knew it had to develop new catchments if it was to meet growing demand and decided to construct another dam on the East Moorabool River, at the junction with Paddock Creek, about a mile west of Ballan. The trust had been surveying the area from 1922 and in July, 1925, commissioners decided to proceed with a new reservoir of 1,000 million gallons. They decided to name the new reservoir "Bostock" in honor of T E Bostock, who had been instrumental in creating the waterworks trust, initiated the Sanitation Conference and had died in May, 1922. In October, 1925, the government approved the scheme and tenders were being prepared in August, 1926. At this point, however, development of Bostock Reservoir was deferred.

While the trust was highly active providing Geelong with water and sewerage services, places nearby also were keen to be connected. One of the most enthusiastic was the settlement of Lara, north of Geelong, which made its first request in July, 1909. Commissioners had no objection, but cost was always a problem; in 1912, the condition of the money market meant works were held in abeyance. In 1918, commissioners said Lara would receive attention when conditions were more favourable and in 1925 connection was promised if the Shire of Corio was prepared to make a financial contribution. Nothing happened. In 1922, the Shire of South Barwon asked the trust to extend the water supply to Torquay and Barwon Heads. Commissioners agreed – provided the shire paid for it. Another expression of interest in serving those towns arose in 1925 and the trust replied that it would be willing to conduct an investigation and survey into the proposal for £100. Again nothing happened.

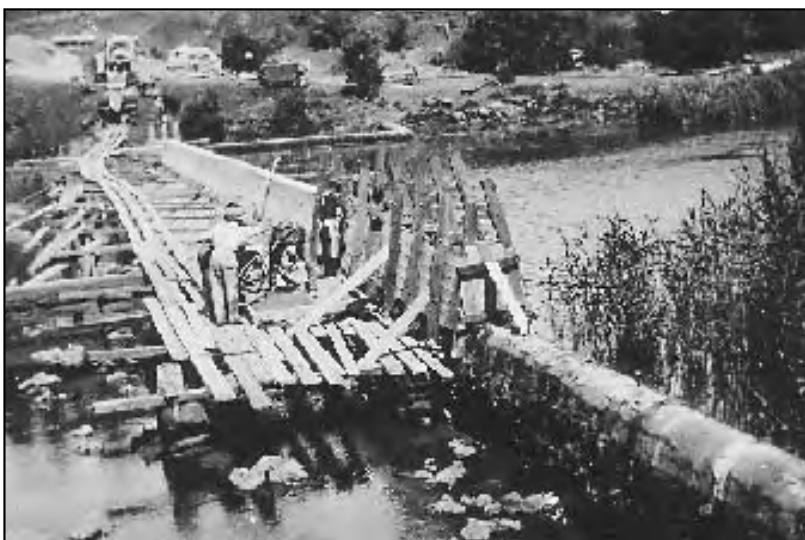
The most persistent requests came from communities on the Bellarine Peninsula. In 1912, the Bellarine and Queenscliff Water Supply Conference asked the trust to provide a service. The trust replied it was willing to examine

the proposal, which would cost £100, the conference agreed and the report was completed in 1913. But nothing came of it. In 1919, the trust was asked to re-consider the proposal and Sharland reported that a service to the towns on the Bellarine Peninsula would cost an estimated £55,000. Again nothing came of the proposal. In 1915, government departments and the Geelong Chamber of Commerce and Manufacturers began lobbying the trust to look at the upper Barwon River as a future source of water. Despite inspections and reports, the trust said it would only turn to the Barwon River system after it had exhausted the potential of the Moorabool system. Its plans to develop Bostock Reservoir demonstrated its intention. While there seemed little doubt Geelong would have to take water from the upper Barwon in the Otways at some time, it was also the source of water used by other communities; the Colac Water Board took its supplies from there and the SR&WSC used Otway water to supply towns far to the west, including Warrnambool, Camperdown, Cobden and Terang.

A long dry spell began affecting most of Victoria in the mid-1920s, with the Bellarine Peninsula hardest hit. It became obvious to everyone the peninsula's future development and the potential of its seaside towns as popular resorts depended on a secure supply. A large conference of municipal councils, progress associations and other interested groups held in January, 1926, discussed two options – an extension of the Geelong supply network or water from headworks on the Barwon River. A representative of the SR&WSC said the commission was willing to investigate the Barwon River proposal, but the conference should first ask the trust. The latter responded that it had so much to do to meet the demands of Geelong, it would be pointless undertaking investigations into supplying the Bellarine Peninsula. At a second meeting in April, 1926, the SR&WSC tentatively proposed a scheme to use water from the upper reaches of the Barwon River to supply the peninsula and representatives of the Bellarine communities agreed to support this plan.

The commission's report was completed in February, 1927. It proposed to take water from the upper Barwon to supply the towns of Drysdale, Portarlington, Queenscliff, Point Lonsdale, Ocean Grove, Barwon Heads, Torquay and Anglesea, with possible extensions to Winchelsea, Birregurra and Geelong. With annual rainfall over the Otway Ranges high but run-off in summer very low, the scheme involved constructing diversion weirs on several Barwon River feeder streams. These weirs would direct water into an open channel and onto a storage at Wurdee Boluc swamp constructed by an embankment about three or four feet high around it. From there, water would flow along an earthen channel for about 15 miles to a pipe head basin at Waurin Ponds, from which it could be piped to towns on the peninsula. The Waurin Ponds site was chosen because of the possibility Geelong would eventually need to take water from the system and a basin there would be high enough to supply the service basin at Montpellier by gravity.

The importance of this new scheme was not lost on the trust; it would provide Geelong with a great deal of water at relatively little cost since the project would be undertaken by the government. In March, 1927, the trust and SR&WSC discussed the possibility of Geelong joining the scheme, which could provide the city with water from a large new catchment that had capacity for expansion. Commissioners decided to support the Barwon scheme and defer the Bostock project. In December, 1927, the trust agreed to buy bulk water from the commission at the rate of £2/10/- per acre foot, beginning with £2,000 worth of water in the first year and rising to £5,000 in the seventh year with the same thereafter. The trust began preparing its own plans for accepting such a large amount of water and distributing it around Geelong. The government approved the project and construction on the Wurdee Boluc Reservoir started in late 1927. The trust expected it would receive its first water from this new scheme in about 18 months. But even such a short wait would be very trying for the trust.



Construction of the new temporary weir on an old weir at Buckley Falls. The pumping station was constructed on the opposite bank. It was used in 1927 and 1928 and later removed.

By early 1927, most of Victoria was experiencing a severe drought and water supplies were low everywhere. There had been practically no rain over Geelong's catchments for three and a half years, and although there was 888 million gallons in storage it was being drawn off quickly. As the drought continued, the storages fell and the trust told consumers they had to exercise the "utmost care in the use of water". By July, 1927, the storages were down to 373 million gallons and, despite a slight increase after some rain, the situation looked desperate by October. On October 3, commissioners adopted Sharland's plan to erect an emergency pumping station with the necessary power supplies, rising mains and chlorination plant on the banks of the Barwon River above Buckley Falls. At the same time, they deferred any other new work. A temporary barrier was erected on an old abandoned weir above the falls to retain as much water as possible for pumping. Toward the end of October, the storages only held 10 weeks supply and the trust imposed severe restrictions. Inspectors were employed to detect any illegal use and visit houses to issue warning for things like leaking taps. On November, 17, Ballarat's water commissioners offered Geelong 300 million gallons from their storages. It could be transferred to the Geelong system through the Bolwarra Weir and Ballan channel and the trust would have to cover the cost of arranging the transfer.

A cartoon published in the Geelong press in November, 1927, celebrating Ballarat's generous donation of water to Geelong during the severe water shortages.



Pumping from the Barwon River started on November 19, 1927, and the three pumps were capable of transferring four million gallons daily through a 21-inch diameter steel concrete-lined main into the Montpellier basins. The water was chlorinated at the pumping station to kill bacteria and chemically dosed at Montpellier to remove impurities. The trust began testing the water fortnightly and analysis showed it was of "very fair quality". There was a mild epidemic of stomach complaints, however, that may have been due to people ignoring warnings to boil the water before drinking it. Restrictions were lifted slightly to allow people to water their gardens by hand and the trust continued to urge citizens to be as frugal as possible in their usage.

As Ballarat's offer of free water was likely to cost £20,000 to transfer it into the Geelong system, commissioners deferred a decision as long as possible. By the beginning of December, 1927, storages were down to 254 million gallons, but water was banked up 10 miles from the temporary weir on the Barwon after rains had created good flows. In January, 1928, commissioners called for tenders for the pipes necessary to transfer Ballarat's water, but in February it began to rain and Geelong had a record fall of 613 points in a week. Water began flowing into the storages, the pumping stopped, water restrictions were lightened and then lifted and commissioners wrote to their colleagues in Ballarat thanking them for their offer that would no longer be needed. By June, there was 435 million gallons in the storages, the pumping plant had been closed down and Chairman Hodges said: "The trust has successfully passed through a wonderful test." By the end of August, 1928, there were 481 million gallons in the storages and all seemed right with the supply system.

In September, 1928, nominations were called for the annual election of commissioners, with the three sitting members, Hodges, Christopher and Wilton, all standing for re-election. Hodges and Christopher had been commissioners 21 years and Wilton for 14. The last time there had been a contested election was in 1924 and no sitting commissioner had ever been defeated. But this time there was discontent in the air over how the trust had handled the recent and severe restrictions. Each commissioner was opposed and September, 1928, became a hectic round of electioneering with ceaseless processions of public meetings and attacks and retorts in the columns of the papers. The three new candidates claimed commissioners had not taken their responsibilities seriously and had placed too much reliance on the Barwon scheme and not accepted Ballarat's water, with the result Geelong people had drunk polluted water from the Barwon River that had cost them well over £10,000 and ruined their garden. Commissioners standing for re-election said the storages had been full in September, 1924, and it was not their fault there had been little

rain for several years. They argued it would have been impossible to get water from Ballarat in time to make any difference and the heavy rains of February, 1928, had solved any problems. One new candidate commented that “stagnation is bad for everything, most of all water”, and one commissioner said Geelong’s water supply was in the hands of providence and the situation could not be changed by any election.

The election was held on October 1, 1928, and when the polls closed the boxes were taken to the trust office and counted. As many as 12,000 to 15,000 people waited for the results. By eight o’clock, it was practically certain Hodges and Christopher had been defeated and by 9.30 it seemed likely Wilton had held his seat. Christopher told the crowd he had done everything a commissioner should have done and left undone things that should be treated in that manner. He had been re-elected on three occasions against opposition and that showed him that his services had been appreciated. When Hodges appeared at the front of the office, he was applauded. He said he had “given them his best service” but the ratepayers had shown they wanted change. He died in October, 1930.

At the next election in 1929, the mood for change remained. Both elections were contested and Commissioner Cairns, who had served 13 years and nine months, was defeated. Three of the five who had been commissioners at the beginning of 1928 had been replaced by the end of 1929.

Commissioner Doyle was elected Chairman after Hodges’ defeat. He said the way things had been going the trust had to assume everything was going against it and it should set as its main objective supplying the people of Geelong with the best water obtainable. Sharland was sent to Ballarat to ask for the promised 300 million gallons and make arrangements for its delivery. Three weeks later, a contract was awarded for a wooden main costing £11,024 to be laid on the ground from the Ballarat supply to the East Moorabool River above Bolwarra Weir.

The pumping station started again on December 9, 1928, and the first water from Ballarat flowed on December 21. There was also some rain and the storages held 288 million gallons on

January 7, 1929. A week later, they had gained 13 million gallons, guaranteeing there were no water restrictions that summer. The full measure of 300 million gallons from Ballarat had been taken by March 12, 1929, on April 5 pumping from the Barwon stopped because rain had muddied the water and the day before the first water from Wurdee Boluc flowed into the Montpellier basin. It was the beginning of a new era in Geelong's supply. The temporary weir at Buckley Falls was dismantled in 1931, the emergency pumping station was removed in 1933, the pipes between the pumping station and Montpellier were used for a new main between Montpellier and Newtown and the pipes that had brought water from the Ballarat system were lifted and used by the SR&WSC as part of the Bellarine Peninsula scheme.

Commissioners visited the Bellarine scheme on October 22, 1928, when water had just started flowing into Wurdee Boluc at the rate of four to five million gallons a day. They noticed the supply was discoloured due to the shallowness of the storage and wind stirring up the water. To increase the amount harvested from the Barwon system, the channel to Wurdee Boluc was extended a further eight miles to tap three new creeks. A little later, it was extended again to tap the East Barwon River, which had an almost permanent flow.

The open channel from Wurdee Boluc to Waurin Ponds was completed by the end of 1928. The peninsula system extended from there along a 14-mile main 16 and 14 inches in diameter to the Bellarine basin at Wallington, which had a capacity of about 44 million gallons. A nine-inch pipeline extended to a service basin overlooking Queenscliff, another nine-inch main went to Ocean Grove and a wooden main extended from there to Barwon Heads where a reinforced concrete service tank was constructed. An earthen service basin was constructed north of Drysdale and a reinforced concrete service tank at Portarlington. Channels were constructed to serve Anglesea and Torquay and, by the time the work was completed around 1935, the whole region was using water that had travelled about 80 miles. The ample supply improved the general appearance of towns on the peninsula.

Water from Wurdee Boluc reached the Waurin Ponds basin in

early 1929, but delays in laying the main to Montpellier meant water from the Barwon system did not begin to flow into it until April 4, 1929. The trust had committed itself to taking water from the Otways as the most practical source of supply and expected it to provide for the future growth of the city. When the water arrived, however, it was a serious disappointment and the trust used as little as possible because the murky conditions at Wurdee Boluc and the long flow along the open earthen channel made the water almost too muddy to use. In November, 1929, commissioners asked the SR&WSC to immediately make the water from Wurdee Boluc available in a condition suitable "for city requirements" because the reservoirs at Stony Creek were below normal levels and there was no option but to use Wurdee Boluc. The trust tested the water frequently and reports stated there was nothing in the bacteriological examination to indicate the samples were not acceptable. The water was not harmful to health and considerably better than what had been pumped from the Barwon, but it did not look good. The trust continued to ask the commission to improve the Wurdee Boluc supply, but the way the system had been designed and constructed meant the quality of the water was something the people of Geelong would have to accept for a considerable time to come.



The trench for the Waurn Ponds-Montpellier main under construction. It was dug by machine. The men are trimming it with their shovels and preparing the bedding along the bottom of the trench for the pipes.



CHAPTER FIVE

PROBLEMS

1930-1950

For the best part of the next two decades, the trust faced almost nothing but problems. The Great Depression ravaged the economies of the world for most of the 1930s and World War II and the recovery from it strained the nation's resources to their limit during the 1940s.

Yet the first signs of trouble surfaced in the mid-1920s. In July, 1925, the trade unions asked the trust to do as much work as possible to relieve unemployment. The trust did what it could with the Bell Post Hill service basin being constructed by unemployed labourers. But an estimated 400 Geelong men were looking for employment by mid-1927 and the unions again requested more work. By the beginning of 1928, the situation was no better and there was another plea from the unions. The trust, however, had no plans for large projects and 98 per cent of buildings in the sewerage area had been connected, although two day labour gangs were retained to complete authorised sewerage works. By August, 1929, the situation had deteriorated and the trust approved an additional £2,660 for projects that would enable it to keep on many of the men as well as employ 10 more.

In May, 1930, the trust drew up a list of unemployment relief works worth about £130,000 that could engage around 120 men for up to 10 weeks. These works, however, were all new construction projects that had to be funded by borrowing and, by then, trying to raise new loans was difficult. In 1932, the trust found another £2,000 for work, but there are no records it did anything else. In April, 1929, the housing connection staff was reduced, the men who operated the emergency pumping station on the Barwon River were kept on as long as possible but laid off in June and more sewerage workers were dismissed in September. As funds dried up, the day labour gangs were disbanded and the men in them joined the swelling mass of the unemployed.

Layoffs also became inevitable in the Ryrie Street office. In February, 1931, staff told commissioners they were willing to accept reduced salaries for 12 months and the 10 per cent reductions started at the beginning of July. Commissioners also reduced their allowances 10 per cent. But in July three office

The Barwon River had become a desolate wasteland by the 1930s. Photo courtesy of the La Trobe Picture Collection, State Library of Victoria.

staff, L J Cosgrove, T Shield and G Foster, were given one month's notice and three months' pay. Two more, V Hine and Miss F Hollis, were given a month's notice and a month's pay. Only one, Hine, was re-employed as a clerk in the revenue office in September, 1932, and he remained with the trust until he retired in August, 1962, after 34 years' service.

In Victoria, unemployment jumped from 8.6 per cent in the first quarter of 1929 to 21.9 per cent in the last quarter of 1930 and peaked in July, 1932, when more than 61,000 were out of work. The government tried to solve the problem by creating jobs, but unemployment relief work was severely rationed. Men and women who could not find work received only a small food allowance at first but later a pitifully small financial allowance. Many who remained in work also struggled because wages and salaries were cut by 10 per cent, with a trust maintenance worker receiving only £3/4/9 a week. This was still better than a man on unemployment relief, who could only earn £2/16/- a week if he worked a full 48-hour week and had a wife and eight children.

These conditions made it extremely difficult for people to pay their bills. In 1929, the trust had 221 unpaid bills, in 1930 there were 330, in 1931 661 and in 1932 429. While many

Commissioners struggled to create work for unemployed men, but by the 1930s it was becoming harder to make more work. This report from the Geelong Advertiser, May 5, 1930.

WORK FOR UNEMPLOYED?

"When I passed the Labor Bureau this morning, I saw several hundred men applying for positions on the Bellarine Peninsula water supply scheme," said Commissioner F Burn at yesterday evening's meeting of the Geelong Waterworks and Sewerage Trust. "They were all willing to work, but only 12 men were wanted," he added. He made an appeal to the commissioners to find work for some of the men, even if it were necessary to proceed with additional sewerage works. The chairman (Commissioner J P McCabe Doyle) said he had consulted with the Engineer-in-Chief (Mr J S Sharland), who thought it might be necessary to put some men off in about seven weeks' time. In view of what had been suggested, however, he was of the opinion that he (Commissioner Doyle), Mr Sharland and the Secretary (Mr P G Reilly) should look into the matter in the next few days, and if any decision was reached, a special meeting of the trust should be called to consider the question. "If anything can be done to help these people, it is our duty to do it, individually and collectively," concluded Commissioner Doyle.



A gang digging a trench for a water main at Cowies Creek. The tools were shovels and picks. It was hard work, but better than no work.

people delayed paying their bills as long as possible, only 25 were prosecuted in 1929. That went to 61 in 1930, 330 in 1931 and back to 290 in 1932. People had other bills, such as rent, and the eviction of tenants from their homes caused great bitterness. In July, 1932, a large body of unemployed virtually demolished a house after the couple living in it had been turned out onto the street. The trust was more sympathetic because commissioners had to consider how ratepayers would respond to the trust's activities. The trust never sold any furniture or household effects, although on one occasion a Chinese market gardener had his horse and dray seized, virtually putting him out of work.

Unemployment relief work was funded by new taxes and, from 1933, by borrowing for public works. By 1940, the total cost of unemployment relief to the Victorian Government was almost £32 million. Most of the money was distributed to local government for public works and some was allocated to government projects, including waterworks. Some relief money was used for major repairs to the Wurdee Boluc inlet channel. Apparently, however, none of this money was ever allocated to the trust.



The formal photograph taken at the 1937 trust staff picnic at Anglesea. Photographs exist for many of the annual picnics and the names of some employees are known because they stayed with the trust into the 1960s or later. The three men sitting in the front row are commissioners with Chairman Doyle in the middle.

Desperate unemployed men went to the trust's office in the old Temperance Hall, but there was no work and a 'No Vacancies' sign eventually went up. There was no money for any significant new construction, but maintenance had to continue. Even that was restricted as much as possible and in September, 1930, commissioners directed that burst mains were only to be repaired outside normal working hours in the most urgent circumstances to restrict overtime costs. Employees who remained with the trust maintained the tradition of the annual picnic throughout the depression. In the worst year, 1932, more than 40 went to Torquay where there was a cricket match in the morning (the head office defeated the storeyard staff by 15 runs), sporting events in the afternoon and an official luncheon at the Palace Hotel presided over by the Chairman.

The sewerage system caused the most serious maintenance problems and it began deteriorating due to the poor quality of some materials and conditions inside the pipes. The first problems emerged in the early 1920s when cracks began appearing in the aqueduct. It was made of reinforced concrete in which most of the stresses and strains were carried by the steel

reinforcing, which was protected from corrosion by the concrete around it. When damage was first noticed in 1923, some of the concrete was cracking and lumps could fall off unexpectedly, exposing the steel to the elements and corrosion. Examination showed the quality of the concrete was not uniformly good and its thickness in many places was well below what had been specified, possibly due to poor workmanship. The solution was to force new concrete into the cracks and gaps to protect the steel, but the problem remained and lumps of concrete still fell off occasionally. In 1926, the trust erected a notice telling people they trespassed on the aqueduct at their own risk.

Another issue was the the ocean outfall, which had been designed with two outlets, one to the east and the other to the west, so sewage could be directed through one or the other depending on ocean conditions. It did not take long to discover currents from the west drove sand up against that outlet pipe causing blockages. The trust solved this simply by only using the other outlet and closing the western one with a large concrete block.

A more difficult problem in the sewer was caused by changes in the effluent that went down it and the sea water that flowed up into it. McKay's system was designed purely for domestic use, which meant that the effluent was easily broken down by micro-organisms and the action of water. After the two special Barwon River sewerage areas were commissioned, however, a different form of effluent went into the sewer, cleaned of many impurities but still containing compounds that reacted differently than domestic waste. Corrosion was first noticed in 1932 downstream of the industrial sewers. It was attributed to the formation of hydrogen sulphide (rotten egg gas) which, with water, formed weak sulphuric acid that slowly corroded the concrete pipes. At high tide, sea water flowed up into the sewer for about two miles and this also created corrosive conditions. Finding the cause of the problem was relatively simple, finding a solution that worked was much more difficult. The first approach was to improve the flow of air through the sewer to

reduce creation of the sulphuric acid. About £2,000 was spent on this in 1932, but with little success. Next the trust tried to chlorinate the sewage to reduce the chemical reactions causing the hydrogen sulphide, but this too was unsuccessful. In August, 1935, James Sharland, the Engineer-in-Chief, went to Brisbane to investigate sewer ventilation and he subsequently recommended electrically-driven air blowers to improve air flow. They were installed around 1936. But none of these attempts were fully successful, with complaints about bad smells from vents near the ocean outfall increasing and the sewer continuing to slowly dissolve.

Sharland retired in 1935 after suffering from indifferent health for many years. He was on sick leave for about three months in 1923 and took more extended sick leave three years later. In 1927, the trust gave him six months' leave on full pay so he could recover his health and he spent it travelling around Europe where he looked at waterworks. When he was 67 in 1935, his health failed again. In January, he was given six months' sick leave on full pay but this time there was no coming back and he resigned on August 1, 1935. Commissioners placed on the record their indebtedness for the work he had done and granted him an honorarium equivalent to six months' pay. He died in February, 1948.

When Sharland went on sick leave in January, 1935, Richard Pearce (pronounced Pearce) was appointed acting Engineer-in-Chief. Like Sharland, he had joined the trust when it was created and worked beside him through the following years, stepping in when he was away. Pearce was appointed Engineer-in-Chief when Sharland retired.

The worst of the Great Depression had passed by the middle of the decade. In February, 1935, the trust took on a new cadet engineer and from the beginning of July the 10 per cent reduction in wages and salaries ended. Working conditions also improved and in October, 1937, working hours were reduced from 48 to 44 a week so people no longer stayed at work on Saturday afternoons. In June, 1939, the basic wage increased by almost 10/- a week. The trust also became more mechanised and

in 1937 it bought three new motor trucks for its workers.

By 1936, the trust began receiving increasing numbers of applications for water supply and sewerage connections, but most of the work was in established areas. Only one additional sewerage area was declared in May, 1936, for an area in Corio that contained only four houses. New water mains were laid around the coast in either direction from the city, particularly north around Corio Bay to support industries that began to recover after the worst of the economic crisis. This was vital in attracting new industries to Geelong and the promise of a good supply was a factor in convincing the International Harvester Company to establish a factory at North Shore in 1937. When the Grain Elevator Board began constructing a large terminal on Corio Bay to load bulk grain from Western Victoria onto international shipping, the trust provided water and a sewerage ejector (a small pumping station) for the new facility. By 1938, Geelong had almost reached a new peak of energy and activity. During that year, £923,891 was spent on industrial development, £162,165 on commercial development and £23,397 on private homes. New industries were being established, existing ones enlarged and about 220 new homes built in a year.

Through the entire depression, commissioners barely changed and only illness and death removed them. At the end of 1935, Commissioner Gill died after a short illness and the election to fill his vacancy was contested by five nominees, with Freeman winning. He was a barrister who had served during the war, had been a Geelong City councillor and was President of the Geelong Law Association. In 1938, Commissioner Wilton faced re-election and, for once, someone stood against him. Wilton's doctor told him his health was not strong enough for the contest so he withdrew, leaving George Cameron to fill the seat. During the entire period, Commissioner Doyle was annually re-elected Chairman. From 1933, when a slight amendment to the trust's constitution included the position of Vice-Chairman, Commissioner Belcher, whose strength was finance and who took a lead in raising the trust's loans, was annually elected Vice-Chairman.

Each new commissioner was given power to sign cheques; at least one commissioner had to sign all the cheques issued by the trust. This ensured commissioners knew where money was being spent. Over time, this developed into a traditional session before most meetings where commissioners sat down and signed their way through a pile of cheques.

There were no water restrictions during the 1930s. The public's main complaint was water quality and by the end of the 1930s this was a regular agenda item at monthly commissioners' meeting. The trust maintained there was nothing dangerous in the water, but the persistent discolouration still put people off. There were two main causes for this – the build up of silt and encrustations in pipes and the quality of the water that went into the distribution system.

The trust constructed a settling pond at Lovely Banks in 1927 to allow water from Stony Creek to stand so some of the discolouration could settle out. Water from the Bellarine Peninsula system was worse and, in September, 1932, a Public Health Commissioner commented that Wurdee Boluc Reservoir was a "very expensive scheme to run dirty water to Geelong". The trust countered by saying Wurdee Boluc was a magnificent storage, but discolouration occurred when high winds disturbed the supply and that water flowing down the earthen channel to Geelong picked up silt because the earthworks were still new. The trust constructed a specially devised sand filter at Montpellier in 1937 to improve the appearance of about three million gallons of water a day. When it started operating, many residents commented favourably on the improvement. In 1938, the SR&WSC constructed a second earthen service basin at Wauru Ponds to permit a longer settling period.

Sediment and rust from the distribution pipes also added to the discolouration. Maintenance stirred up sediment that had collected in the mains as did work like repairing burst pipes, scraping and flushing. The problem seemed to have no solution and, as late as 1946, a branch of the Amalgamated Engineering Union protested emphatically about the "filthy



Construction of the sand filter at Montpellier in 1937. Although it improved water quality a little, it was not a success. Sand filters clog up after a time and where there is more than one, another can be used while the first is being renewed. But Geelong only had one and when it clogged up, unfiltered water had to be sent into the water supply system again.

state of the Geelong water supply in general and in West Geelong in particular”. They considered it was a “disgrace to a city the size and importance of Geelong the water not being fit to drink or even to wash clothes in”.

The trust also was involved in an almost constant battle to protect the catchments because unnecessary disturbance could cause organic pollution that would threaten public health. The public was kept out of the catchments as much as possible; occasional picnics were allowed on the ground at the entrance to the Stony Creek Reservoir but deeper excursions were prohibited. Fish stocks were built up in some storages, but prevailing conditions in the catchments seem to have dictated whether or not fishing was permitted there. The conditions in catchments also seems to have governed whether or not the trust allowed activities such as leaf stripping, bark stripping or taking wood. Within a month in 1935, the trust gave permission for the removal of firewood from Lower Stony Creek, but refused to sell any timber for milling purposes at Korweinguboora. Rabbits were an ongoing problem (as they were everywhere) and the trust made many unsuccessful

attempts to eradicate them. On the other hand, the trust's watersheds were declared refuges for native animals and, in the early 1940s, koalas under threat in other places were moved to one of the catchments. The trust joined an association formed to lobby the government to secure the permanent reservation of all watersheds of the Otway Ranges and, in 1934, it contributed to the vehement public protest against proposals to dredge long stretches of the Moorabool River for gold because of the effects on that river and the Barwon.

Geelong's renewed growth created a growing demand for water. The Moorabool system that fed water to Geelong through Stony Creek and Anakie could not be expanded quickly, but the trust doubled the capacity of the Ballan channel in 1940 to allow more water from the Bolwarra Weir to be stored at Stony Creek. It was an extensive job because the channel was 23 miles long, but even enlarged it was only about five feet wide across the bottom and about three feet deep. Where the gradient was too steep, there were vertical drops like small waterfalls to stop the water from flowing too quickly. By the late 1930s, about half Geelong's supply came from the Bellarine Peninsula system and the trust looked to it for even more water. In October, 1938, the trust and the SR&WSC agreed to expand use of the system, with new mains to distribute the water across the city. The most important was an 18-inch pipe from Montpellier to West Geelong to meet the growing needs of industry and it was completed around June, 1939. Investigations into expanding the system began, but the

Catchments became good habitats for native animals.

The success of a koala colony in a trust catchment quite pleased the commissioners. This report from the Geelong Advertiser, May 1, 1944.

PUBLICITY FOR KOALA BEARS

Three of the 32 koala bears recently released in a patch of manna gum in a Geelong Waterworks and Sewerage Trust storage at Durdidwarrah have come in for unexpected publicity. While industriously fossicking for sustenance in the two branches of a gum tree they came within the focus of the camera of the Engineer-in-Chief of the trust (Mr Pearce). The resultant photograph was enlarged and the natural colouring was reproduced in water colours by Mr Pearce. The finished photograph, which is an attractive record of the bears in their new haunts, was on view at a meeting of the trust on Friday night, where it received the warm commendation of the Chairman (Mr A Belcher) and his fellow commissioners.



The Barwon Tannery and Fellmongery on the banks of the Barwon River in April, 1937. Industry had been attracted to the river from the beginning of settlement and almost a century later the result was a badly degraded river environment. Photo courtesy of the La Trobe Picture Collection, State Library of Victoria.

declaration of war in September, 1939, quickly ended that work. Residents of Lara, who again began pressing for a supply in 1933, seemed to be on the verge of having the project approved. But the advent of war took away possible funding.

The future of the Barwon River became a topic of intense political debate in Geelong during the 1930s. Fyans' idea of a town facing the river and the sea had been lost and Geelong faced Corio Bay while the river became a backwater and centre of industry. Rowing was almost the only activity that drew people to the Barwon, and from Fyansford to the Breakwater the river became one of the most heavy concentrations of industry in 19th Century Victoria and one of the key industrial areas in Australia. Industry developed on the north side of the river, which was higher and less prone to flooding, and the wider flood plains to the south retained their rural and agricultural character, although the wooded plain that had existed when white settlers arrived was cut for wood and fuel.

Suggestions and ideas were floated for years, but nothing concrete happened until the Mayor of Geelong held a public meeting to discuss the matter on April 4, 1936. It passed a resolution that a trust should be formed to take control of the river from Buckley Falls to the coast. A secretary was appointed and the government soon said it was prepared to

pass legislation to set up the trust. Little happened for a year, but at the beginning of 1938 the idea emerged, from no obvious source, that the Geelong Waterworks and Sewerage Trust might be given responsibility. The trust Chairman said he could see no reason why the organisation should not accept the responsibility and it seemed like a simple problem that could be easily solved. Within days, the City of Geelong, the Town of Newtown and Chilwell and the Shire of South Barwon, which all adjoined the river, agreed it was a splendid idea because the trust already existed, had a proven record of serving the community and had the structure to collect rates and undertake the work. Another public meeting on February 22, 1938, proposed the trust should be given responsibility for the river from the falls to the aqueduct, with legislation similar to that governing the MMBW's control of sections of the Yarra River in Melbourne.

Legislation was introduced for debate in Parliament on July 19, 1939, and received a relatively smooth passage. It would vest control of the Barwon River near Geelong (a distance of about seven miles) in the trust and give it powers to carry out river improvements to keep the stream free from obstructions, beautify its banks and reduce flooding. To pay for this work, a rate limited to one half penny in the £ would be levied on all ratepayers. Some Crown land near the river would be placed under the trust's management, but the government retained all rights to use the water in the river.

The legislation was gazetted on September 18, 1939, several weeks after the declaration of war. The trust's first priority was to remove weeds that had grown in the river and threatened rowing carnivals. After that, it conducted a complete survey of the river before planning what to do next. The harbour trust offered to sell its barge on the river and the Geelong Rowing Association gave the trust its motor launch and reed cutting equipment to help start work. After that, however, the war prevented any significant progress.

War was declared at the beginning of September, 1939, but at first it was fought on the other side of the world. Australians

settled into the role of being a training base and source of manpower and produce for the British Empire forces fighting in Europe and Africa. People continued to buy and sell property, build houses and ask for water supplies and sewerage connections, but that tailed off as the effects of the war on daily life began to hit. The trust settled down to another period in which its daily work was overshadowed, this time by war rather than depression. Then, in December 1941, Japan entered the conflict and advanced rapidly through South East Asia and the Pacific to within bombing range of Australia. The war became a direct threat to the nation and the work of the trust had to conform to the overwhelming demands of national defence.

Preparations for war had commenced before the fighting began. In August, 1939, the trust joined other organisations in Geelong in preparing an Air Raids Precaution plan and took part in exercises to test the city's preparedness to meet the threat of bombing. After Japan entered the war, the bombing threat became more real and the trust, along with everyone else, initiated serious measures. Within days, it blacked out its office and facilities so they could not be seen at night by enemy bombers. It arranged to store important documents and records away from Geelong to ensure their safety, built air raid shelters for staff and participated in more air raid precaution exercises. It became part of the wider civil defence of Geelong and was included on lists of bodies that would play a vital role in the defence of Geelong if it was attacked.

The trust's facilities were vital to Geelong and had to be protected. Men were appointed to watch over the most vulnerable parts of the system to prevent possible sabotage. Fishing licences were revoked and by-laws passed to prevent trespass on trust property and catchments. Maintenance staff were put on permanent standby and paid an additional 6/- a week. Pipes and fittings were stored at depots along the main routes of water supply so they would be quickly available and the trust ordered one and a half tons of chloride of lime to decontaminate the water supply in the event of enemy damage.

Geelong became a centre in the build up of military forces for the Pacific War because of its port facilities. In 1940, the trust provided water and sewerage to an aircraft park where machines from overseas were assembled and restored. It laid on a supply from Montpellier to Fyansford where a military camp was established and sewered the military encampment at the showgrounds, working through the Christmas holidays to complete the work as quickly as possible. Where it could not construct sewerage services, it provided sanitation to camps established at the racecourse and football ground and for troop trains on the railway loop at North Geelong. Everything was done at the absolute minimum cost and for only temporary use.

Shortages and rationing became a part of everyday life. Food, clothing, many of the necessities and most of the luxuries became scarce and petrol was rationed, hampering the trust's work. In late 1941, the Engineer-in-Chief reported on available stocks because they would have to last as long as possible. Even the simplest things, such as gum boots, became almost impossible to obtain and the trust had to write to the Rationing Commission to explain in detail why they were needed.

New construction came to a standstill when the government ordered that only work of direct defence value would be permitted. Only essential work to maintain the water and sewerage systems was permitted and all house connections and sewerage work stopped. Any work had to be carried out to the lowest possible standard to conserve materials and labour. At the height of the Japanese threat, the Allied Works Council told the trust it might be necessary to requisition its equipment and provided a list of gear that could not be moved more than 25 miles from Geelong. The greatest and most important shortage was money because national security regulations controlled all borrowing and interest rates. In July, 1940, the trust told the government it wanted to borrow £30,000 for new works, but it made no further applications for new loan funds for the rest of the war.

Trust staff began enlisting in the military services. The first to go was L C Spitty in October, 1941, followed by B J Deakes, Miss V Robley, J C Harris, D F O'Toole, G B A Goddard, G Batty and P Kavanagh. Each was granted leave-of-absence for the duration of the war and, as the trust had done during World War I, it paid them the difference between their work and military pay. The money was used to buy War Loans, which the trust held on their behalf.

As the war became more intense, the government took tighter control of the lives of its citizens to ensure the country was as efficient as possible. Everyone who was not in the armed forces was subject to very strict regulations governing the work they did and where they did it. In August, 1940, the trust was asked to provide a list of employees who could be called up for universal service and for the names of those it considered could not be spared. Even so, the drain on office and storeyard staff by October, 1942, forced the trust to seek exemptions for many of its employees because it would be impossible to obtain suitable replacements. It also complained that the number of plumbers called up by the Allied Works Council was so great there might not be enough left at home to maintain an efficient water supply and sewerage system. By 1944, the trust could not obtain any suitable men for sewerage work in Geelong.

This intervention stopped some staff from joining the military forces, often leaving them to feel they were shirking their duty to the nation and their friends who had enlisted. They could still make a contribution to the war effort outside their work, however, by joining civil defence bodies – the Home Guard and the Naval Reserve, for example – to guard important installations like the Geelong wharves. Others became involved in air raid protection or joined the Red Cross or Comfort funds. Hospitality flourished to serve the thousands of men and women in uniform who were based at Geelong or transferred through it. Picture theatres, dance halls, such as the Corio Club, and entertainment venues were full.

Commissioner Doyle died unexpectedly on September 22, 1941. He had been a member of the trust since commissioners had first met 33 years earlier and possessed a wealth of experience in Geelong's water industry that would be impossible to replace. He had a big deep voice befitting a barrister. On one occasion, he was caught watering his garden during water restrictions. Although he was a commissioner, the trust took him to court where he successfully defended himself.

Vice-Chairman Belcher was elected the new Chairman and Jack Carr, a real estate agent who had come third in the extraordinary election that Freeman had won in 1936, was elected to fill the vacancy. For the rest of the war, commissioners were returned unopposed when they became due for re-election and Belcher was annually re-elected Chairman and Burn Vice-Chairman.

Although the war was far from over by mid-1943, people began to feel the Allies had withstood the initial assaults, gathered their strength and were beginning to push their enemies back. Governments began looking to the future beyond the war and to lay plans for what would put the country on the right path for the future. In Geelong, people also began looking to the future. In July, 1943, the Shire of Corio, in which most of the new heavy industrial development had taken place, asked the trust to plan for additional sewerage facilities for North Geelong and the North Shore area. Several months later, the government asked the trust to send details about the urgent and important works it would like to undertake immediately the war ended. The Shire of Corio asked the trust to add water supply to Lara to that list. In mid-1944, the Housing Commission of Victoria asked the trust to provide connections to 37 houses it was building in Geelong West and the Geelong Harbour Trust, the SR&WSC and the trust met to consider supplying the industries that might be established in Geelong after the war.

The most far reaching plans resulted from a special meeting of commissioners in November, 1942, on improving the water supply for Geelong and surrounding districts. They asked the

Engineer-in-Chief to prepare a report on supplementary supplies to Geelong and Pearce had developed the 'Supplementary Water Supply' plan by April, 1943. It proposed almost doubling the amount of water Geelong took from the Bellarine Peninsula system and constructing new mains and a new service basin at Highton (at the same height of Lovely Banks so water could flow between them). But any work would have to wait until after the war.

When the fighting ended in August, 1945, commissioners began their monthly meeting by standing silently for two minutes in memory of the fallen. They then turned their attention to returning the trust to business as usual, but they soon learned the task would be as frustrating as anything they had previously experienced. Indeed, restrictions, rationing and

An informal photograph taken at the staff picnic at Anglesea in 1948. From left to right, Bob Cowley, Brian Deakes Jim Nott, Peter Hammerli, Len Spitty, Eddy Brooke-Ward, Bob Lucas and Dan O'Toole. (Half the people in this group appear in another photograph taken in 1972, shown in Chapter 7.) Photo courtesy of Bob Lucas.



shortages remained commonplace for several more years. Work also would be made difficult because during the war government bureaucrats had become accustomed to exercising much more control than they had previously and, in the great spirit of nation building that followed, they happily supervised and controlled matters in a way unthinkable a decade earlier. At times, commissioners must have wondered whether it was they or the government and the SR&WSC who ran Geelong's water supply and sewerage systems. After a lapse of five years, a staff picnic took place at Anglesea in February, 1946, and the Chairman said he hoped it would again become an annual event.

The signs of a return to normal began before the war ended. In April, 1945, part of the air raid shelter was converted into a lunch room for storeyard staff. The trust began receiving requests for sewerage subdivisions around that time, but the end of war opened the floodgates and applications for water supply and sewerage services began arriving in increasing numbers.

Shortages and rationing continued. For example, petrol was in short supply until 1950. Many requests for extensions and connections were rejected because shortages of materials made work impossible. In March, 1948, commissioners said there was nothing they could do as the trust was in no better position than anyone else in the country. A shortage of cement caused delays because a pipe manufacturer was forced to cease production. The pipes needed for part of the 'Supplementary Water Supply' were unobtainable until a supply of steel plate intended for the manufacture of landing craft was found at the Ford factory and turned into pipes. The fact there had been no significant housing construction since 1930 meant an accommodation crisis and when, in 1948, the trust attempted to appoint an assistant engineer, two successful applicants were unable to take up the appointment because they could not find living quarters. In 1950, the trust appointed an employee, Alan Cooke, assistant engineer.

The trust also looked for additional accommodation and had no better luck. In 1946, it began seeking additional land

in Little Malop Street for stores and offices, but attempts to buy or lease land or buildings near the office in Ryrie Street were fruitless. Changes occurred in the storeyard because after the war new kinds of pipe, steel and asbestos cement, began replacing the old cast iron pipes while wooden pipes were taken out of service as the water supply system was upgraded. These changes led to new pipe-joining techniques and the blacksmith shop in the storeyard was closed and replaced by a mechanical workshop and garage. The Ryrie Street office remained relatively unchanged. It was slightly remodelled in the 1920s and the front was renovated and an inter-office telephone system installed in the late 1930s.

Office working conditions also began to improve. In November, 1947, the trust followed other local bodies by introducing the 40-hour week and closed on Saturdays. In June, 1946, a superannuation scheme for staff was introduced. Previously, employees, even those with many years' service, usually received nothing when they left. In 1924, foreman Millgate, who had served the trust for many years, was paid £50 on retiring; in 1934, when another worker left due to ill health after 25 years, he was granted a payment of 13 weeks' salary. The new scheme guaranteed staff members some permanent income after they retired and when it was launched in October, 1945, there were 46 members, including seven women. Only permanent staff were included, not the majority of the storeyard and day labour employees.

Secretary P G Reilly, who had joined the trust when it was established, retired in September, 1947. Commissioners congratulated him on 39 years' service and for the thorough and efficient manner in which he had managed the organisation and its finances. Advertisements seeking his replacement were placed in most of the country's major newspapers and four applicants were interviewed in August, 1947. Brian Henshaw, an accountant with the Department of Post-war Reconstruction, was appointed on a salary of £750 a year.

The period from the end of the war to the close of the decade saw almost more change among commissioners than had occurred in the previous 35 years. At the beginning of 1945, the commissioners were Belcher, Burn, Carr, Freeman and Cameron and at the end of 1949 F H Wallace and G Neunhoffer had replaced two of them. Burn had retired in 1945 and Belcher was defeated in an election held while Geelong was experiencing a water shortage crisis, similar to what had happened to Isaac Hodges in 1927. After the stability of having only three Chairmen from 1908 to 1945, they now changed annually. In 1945, Freeman was elected Chairman, in 1946 Freeman and Cameron stood and Cameron was elected on a show of hands, in 1947 Carr was elected, the following year it was Neunhoffer's turn and Wallace was chosen in 1949. Everyone had a turn, but no-one served for more than a year.

A change in leadership probably contributed to a decision in 1949 to join the Association of Provincial Sewerage Authorities. Previously, the trust had not been involved because it and the MMBW had been set up under separate legislation rather than the more general Act under which other authorities operated. By 1949, there were more than 40 sewerage authorities in Victoria and more than 120 waterworks trusts. In many cases, the trusts controlled irrigation areas where there was no sewerage system or towns where sewerage had not yet

Geelong from the air in June, 1948. The huge buildings near the bay are wool stores, one of the foundations of the city's wealth. Courtesy of the La Trobe Picture Collection, State Library of Victoria.



been provided. In other instances, a town might be served by a waterworks trust and sewerage authority, although it was common for both to be closely associated with the local council and run by the same men employing the same staff. Geelong had avoided this complex and sometimes amusing arrangement (with people writing official letters to themselves) because of a decision made in 1909. This provided for water and sewerage to be combined because Geelong was large enough to support a combined workforce.

Bendigo and Ballarat were the major Victorian cities closest in size to Geelong. Bendigo had a sewerage authority – it was established in November, 1916 – but no water trust because it was still supplied from the Coliban system controlled by the SR&WSC. Ballarat had the Ballarat Water Commission, which had been established in July, 1880, and the Ballarat Sewerage Authority, constituted in November, 1920. But board members of the water commission also sat on the sewerage authority. The nearby town of Colac had a different arrangement again, with separate water and sewerage authorities.

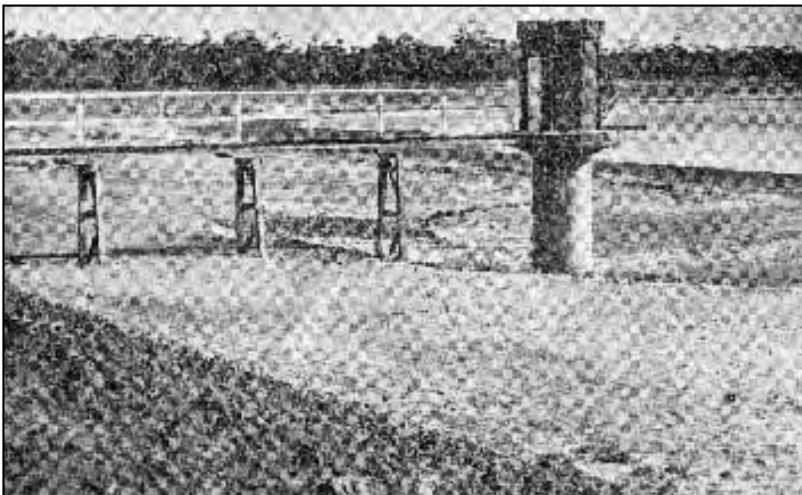
Colac and Geelong shared a history going back to the beginning of white occupation. There were strong family, church, legal and commercial links between the two. Colac drew its water supply from the Otways, as Geelong was increasingly doing, but while Geelong needed a supply of thousands of million gallons a year Colac's total storage was around 27 million gallons. (During the 1930s, demand for Colac's water outstripped supply over summer and was controlled by reducing water pressure from January to March.) Colac's sewerage system had been completed in 1927, funded partly by a government grant of £76,221, and served around 5,000 people. Since Colac was not close to the sea, it constructed a treatment plant on the banks of Lake Colac that created much public debate about the quality and effect of the effluent on the lake. In the post war period, Geelong and Colac experienced similar problems. Both began planning what would be done after the war in 1943, but Colac was more

dependent on funding from the SR&WSC and had to compete with other bodies for scarce resources. After the war, Colac's water and sewerage authorities, like the trust in Geelong, were critically short of materials, resources and manpower. Likewise, they were powerless in overcoming them.

The Geelong trust also was a member of the Standards' Association of Australia, which developed standards accepted by many organisations across the country. Under its charter, items such as water fittings, specifications, uniform sewerage regulations and toilet bowls and cisterns could be standardised. In 1929, the trust decided it would adopt the association's standards wherever possible and for many years the only significant difference was that in Geelong the common size toilet cistern was two gallons while the rest of Victoria used cisterns holding two and a half gallons. The smaller cistern could save water, but by 1947 it was almost impossible to obtain this capacity. This forced the trust to reconsider its policy, even though it would mean more water was used flushing toilets, and the larger cisterns were accepted.

In 1932, the trust's customer base was estimated to be more than 45,000, with 11,000 houses connected to the sewerage system. By the end of the war, the population had grown to 53,000, with about 12,700 houses connected, and by the end of the decade the population had reached almost 58,000, with around 13,700 houses connected. The water supply system was struggling after years of forced neglect and rapidly growing demand and complaints about poor pressure became almost as common as protests about water quality. Public criticism was sharpened when local fire brigades complained they were handicapped by poor pressure. In early 1947, the Corio Club hall burned down and the brigade claimed its failure to save it was due to pressure problems. Fire brigades, local government and the trust frequently tested the pressure, but the overriding factor was fluctuating demand that could affect how much water was available in any part of the system at any one time. The trust argued its program of improving the distribution mains was retarded by the acute shortage of materials and labour.

An inability to improve supply from virtually the beginning of the 1930s had a significant impact on the trust's capacity to meet high summer demand. The war passed without water restrictions although, in September and October, 1944, the trust issued stern warnings that if people did not show restraint restrictions would be imposed. A year later, there was less water in the storages and bans were imposed from October, 1945, until March, 1946. The following year the trust again asked consumers to conserve water and restrictions were avoided. They might have been avoided again in 1948; there was sufficient levels in the storages, but high domestic and industrial demand sucked water out of the supply basins around Geelong more quickly than they could be refilled. In the early morning of February 2, 1948, the feeder main from Waurin Ponds to Montpellier burst and had to be shut down for repairs, taking from 10 in the morning until 2am the following day before supply was restored. The trust imposed 72-hour restrictions because reserves at Montpellier were already low, but public response was poor and by the time the pipe had been repaired the basins were empty. The result left higher levels of the city without water. Only strenuous efforts by members of the engineering staff, including Jack Dillon and Alan Cooke, ensured a supply to the hospital. Criticisms of the trust was stinging, but commissioners decided to leave the critics unanswered.



Stony Creek Storage No 2 during a drought in 1939. The water is 200 yards from the ordinary high water mark. The towers at No 2 and No 3 storages at Stony Creek have Sharland's trademark turret that appeared on most of the buildings he designed, from Korweinguboorra to sewerage pumping stations and valve houses at service basins such as Bell Post Hill.

Restrictions were imposed again from December 20, 1948, but the supply had improved sufficiently by early February, 1949, and people were allowed to use hoses and sprinklers on the weekends. The bans were lifted in early March. The only bright spot in the supply crisis was at Lara. In October, 1945, the government agreed to contribute £10,000 for construction of the supply system. But with the plans approved and finance arranged, the contractors were unable to obtain the necessary pipes. Eventually that hurdle was overcome and the water was turned on at 2.30 in the afternoon of December, 17, 1947.

The only solution to the threat of almost continuous restrictions seemed to be in harvesting more water from new watersheds, building new storages, more mains to bring the supply to Geelong, more service basins to hold it and improving the distribution system. It was not an insignificant task and the 'Supplementary Water Supply' scheme planned in 1943 was only part of it. In 1946, the trust decided to turn its attention back to the Moorabool system and revised the Bostock Reservoir proposal shelved in the late 1920s. Investigations led to selection of a new site that would have greater capacity than the previous location and the rest of the 1940s was spent developing plans and negotiating with the SR&WSC, which took a great interest in the project.

The plans also included three new mains: a 15-inch main from Anakie to Lovely Banks to replace the old 14-inch pipes, a 30-inch main from Waurin Ponds to the planned service basin at Highton to carry the additional water Geelong would take from the Bellarine Peninsula system and a third from Highton into the centre of the city. Work on the third main started in 1946, but planning the other two, gaining approval from the government and finding the men and materials took from 1945 until August, 1949, when contracts were awarded at a total cost of about £78,000.

This was more money than the trust had seen for new construction work in almost two decades. The Great Depression, the war and its aftermath had had such an effect



Construction of the Bellarine main in April, 1946. The hoist seems to be constructed on the rear of a vehicle and may have been fabricated by employees using whatever equipment was available. This kind of improvisation was common during shortages after the war.

that an engineer like Alan Cooke, who joined the trust as a cadet in 1926, spent several years around construction work and then almost the next 20 years doing nothing more than maintaining the system. During this time, the trust continued to borrow money, but almost all of it was to redeem previous loans rather than start new work. From 1934 to 1950, it borrowed £214,000, comprising £184,000 for waterworks and £30,000 for sewerage projects. Of the loans for water, only £51,000 was borrowed up until the end of the war, with the remaining £133,000 after that. Most borrowings were for gradual expansion of the system in and around Geelong, so allocating £78,000 for only two projects was a major investment.

A good turn reported in the
Geelong Advertiser,
December 16, 1945.

LOST AND FOUND

A Belmont ratepayer will get a pleasant surprise today when he receives a receipt from Geelong Waterworks and Sewerage Trust for a sum of money which he lost in Malop Street on Monday. An envelope containing £4 and some silver was picked up in the street by a pedestrian, who discovered that the money was accompanied by a Waterworks and Sewerage Trust account for the precise amount in the envelope. The finder, being a pressman, decided that it would make a better story if he paid the account and left the owner of the money to read how it came about in the columns of the paper.

Over the decade and a half from 1934 to 1949, the trust's operating costs gradually increased, with revenue rising from £89,000 in 1934 to £134,000 in 1949. This growth related to usage of the water and sewerage systems, not from rate rises. In 1934, the water rate was 1/1 in the £ and in 1948 1/3. General sewerage rates were 1/3 in the £ in 1934 and 1949, but dropped to 1/2 in the £ during the war. The trust introduced the Barwon River Improvement Rate in 1940, but the limit of a halfpenny in the £ brought in only £1,640 a year. For several years thereafter, it had no resources to spare on the river and it did not even charge the levy.

After the war, the trust faced many urgent problems and the Barwon River through Geelong continued to languish. Public debate about the river was widespread and in 1946 the Parliamentary Public Works Committee visited Geelong and held a number of hearings. A popular proposal was that a single authority should be responsible for the river, from source to mouth. The trust told the hearing it had drawn up improvement plans in 1941 that included straightening the waterway for rowing and constructing a scenic boulevard. When people realised the trust was not ignoring the river but had been unable to act, the heat went out of the debate. The solution was not to create another entity but give the trust the ability to make improvements. In June, 1949, the trust asked the government to amend its river legislation and an amending Bill was rushed through Parliament and given assent on November 22, 1949. The legislation gave the trust power to borrow up to £20,000 for improvements and to levy the river

DEMAND INCREASES

The report of the Engineer-in-Chief (Mr R G Pearce) to a meeting last night of Geelong Waterworks and Sewerage Trust referred to the increased demand for water early in evenings. Mr Pearce stated:—

"Valves are being overhauled throughout the reticulation system to assist in maintaining reasonable pressures during peak periods, but each year of war conditions is making that increasingly difficult, owing to lack of materials and manpower to effect needed improvements. The increased use of water for vegetable and other gardens, together with daylight saving, also has greatly increased the draw-off during the critical hours between 5 and 8 o'clock on summer evenings. In order to improve the conditions in Newtown and Manifold Heights areas, a commencement has been made with the scraping of the 6 inch main between Noble Street and Asylum Road. That section is being machine-scraped in order to cause as little inconvenience as possible to the ratepayers affected. On completion of the work other mains in the vicinity will be scraped and flushed."

Commenting on the report the chairman (Mr A Belcher) suggested that the position could be improved by the co-operation of the public in lessening the demand for water during the hours mentioned. He said that when warmer weather was experienced there would be a greater demand between the hours named. The trust was not worried about the quantity of water which was being consumed, but he wished to point out that consumers would derive better results if the draw-off were extended over a longer period.

It was not possible at the present for the trust to spend money on providing a better service, Mr Belcher added, but that would be done in the post-war period.

During the war the trust struggled to keep services running. This report is from the Geelong Advertiser, November 27, 1943.

rate at up to one penny in the £. This paved the way for capital works, with borrowed money and rates paying for annual running and maintenance costs. With this money, the trust would improve rowing facilities, reduce flood damage, beautify the banks and provide some recreational facilities.

Relations between the trust and the government were less harmonious on other matters. The trust submitted to the SR&WSC plans for the Bostock Reservoir and the Highton service basin and the necessary mains and was subjected to what it considered unnecessary meddling in its affairs. The government did not like the Bostock proposal and, rather than approving the work, responded with an alternative — a large storage of 300 million gallons at Ceres. The trust did not like the suggestion and insisted on the Bostock plan, resulting in

By 1948, commissioners had become annoyed at the way the government treated them. Geelong Advertiser, October 23, 1948.

MR CARR ON RED TAPE

The retiring Chairman (Mr J W Carr) thanked his colleagues for their co-operation during the past year. He also paid a compliment to the staff for the assistance they had given him. Mr Carr said that in the past year, owing to the shortage of labour and materials, the trust had not accomplished what he had set out to do. He claimed that red tape in government departments had frustrated many efforts of the trust. The trust was an elected body, but after it had made decisions it had to go "like a lot of schools kids" to those higher up. The trust knew what had to be done, but that did not matter.

further requests for details and further delays. Both parties agreed there was need for a service basin at Highton, but when the trust asked for permission to construct a 30-million gallon storage the government would only agree to a basin of six million gallons. The trust and the government also disagreed over the proposed new main from Waurin Ponds to Montpellier, and again things stalled. After a frustrating period in 1948, the trust recorded that, as things stood, the work of maintaining a reasonable and continuous supply to consumers during periods of high consumption created "months of nerve-wracking worry and strain on the staff each summer".

The public, or at least enough of the public, did not see it that way. Consumers were always under water restrictions or being told to conserve water to avoid them. The trust had announced a grand plan to provide Geelong with as much water as it required in 1943, but the only improvement work was construction of the main from Highton into the city. The community knew the supply system was in a bad state and required an urgent overhaul and, after several years of peace, someone was to blame for the inaction. The most obvious target was the trust. But the only way it could avoid condemnation was by providing a secure, quality supply and it could not do that without the support of the government. This was not forthcoming.

In the early months of 1948, there appeared to be a stalemate. Local councils asked what they could do to help and the trust replied that they could create political pressure. Commissioner Wallace told them that before he had been

elected he had felt the trust could handle matters more energetically, but now he considered every avenue had been exhausted. An interview with the Minister for Water Supply in March left them equally frustrated because, again, they had to talk about proposals, such as the storage basin at Ceres, and ask the SR&WSC to assist by increasing Geelong's supply. But the whole issue stalled. Then, on December 3, 1948, there was a re-organisation of government ministries and Henry Bolte became Minister for Water Supply – his first Cabinet post. The next meeting of commissioners on December 17 resolved to write to the new Minister setting out the urgent needs of the trust and requesting a conference to discuss details. Local parliamentarians were asked for their support.

Within a week, on December 22, the Premier announced the State Development Committee would conduct a special enquiry into the operations of the trust, with terms of reference to examine what it had done and what it proposed to do. Commissioners expressed their pleasure at the news and thanked the local Members of Parliament for arranging the review. The way events unfolded suggests that, far from being subject to a far reaching enquiry of the trust's failings, the investigation had been specially arranged at the commissioners' request. And, as is often said in political circles, an enquiry like



The Geelong press treated the arrival of the State Development Committee with some cynicism. This cartoon was published on February 22, 1949.

this is only set up by someone if they are sure of the outcome. In this case, it was to be the exoneration of the trust for all the criticism it had endured.

The committee conducted public hearings in Geelong in January and February, 1949, and took evidence from the SR&WSC, the trust, the City of Geelong, which represented other bodies, business people and others. The committee also organised a meeting between engineers of the SR&WSC and the trust to discuss the technical difficulties of providing Geelong with an improved water supply. The meeting apparently did much to clear the air between the two bodies and smooth the way ahead.

The committee tabled its report on May 11 and it was all good news – with one exception. The committee's eight recommendations generally supported the trust's existing plans for improving its infrastructure network, taking more water from the Bellarine Peninsula system, constructing the Highton service basin and building Bostock Reservoir. The report also recommended the government should give the SR&WSC and trust every possible support in achieving these goals. Just as importantly for the trust, the committee said it believed the authority had at all times given sound and conscientious public service and developed its water supply system on sound lines. It was everything the trust wanted.

The only part of the report that did not please commissioners was the recommendation that it should be reconstituted with additional members and a Chairman appointed by the government. Commissioners said the recommendation had been put forward by people who did not have the full facts about the operation and organisation of the trust and would give the government a role it did not deserve. They argued if the government had ever helped the trust financially, it might be fair to claim an involvement. But as this was not the case, it was not entitled to a seat at the decision-making table.

Despite the trust's objection, the government moved quickly to reconstitute it. While most of the recommendations could

not be enforced through legislation, a reconstituted trust would have more freedom and stronger links with the government that would assist it in reaching its goals. The Bill that went before Parliament in November, 1949, achieved several useful things, such as lifting the limit on the cost of contracts approved by the SR&WSC from £100 to £500 and, for the first time, allowing commissioners to hold stock or debentures in the trust. It also increased the number of commissioners from five to seven, with two representing the City of Geelong, one each representing the towns of Newtown and Chilwell, Geelong West and the Shire of Corio, one jointly elected from the Shires of Bellarine and South Barwon and a government-appointed Chairman. Commissioners would hold their seats for four years, with elections only necessary every second year. The only amendment to the legislation was to exclude from voting residents in parts of the Shires of Bellarine and South Barwon who did not take water from the trust's system. (In a recent election, a person who was supplied by the SR&WSC rather than the trust had stood on a platform of ensuring Geelong got as little water as possible from the Bellarine system so there was more for residents of the peninsula). The appointed Chairman was necessary, the government said, because under the existing arrangement he did not have sufficient time to adjust to the role; no sooner was he ready to undertake useful work than he had to relinquish the post. The transition to the new arrangement would take about a year and a half and the legislation became law on November 28, 1949.

The way ahead for the trust was now clear. Where there had been resistance and bureaucratic delays, the enquiry had brought assistance and co-operation. Approvals for major projects came quickly and, while the SR&WSC was still cautious about giving blanket sanctions, there were less delays. The beginning of the 1950s and the election of the new Menzies Liberal Government in Canberra seemed to signal an end to the austerity and problems of previous years, and what later became known as the 'Long Boom' began.

Geelong began expanding rapidly and it was unusual for commissioners to be presented with meeting agendas with no requests for water supply or sewerage service extensions. In January, 1950, commissioners considered five applications, the following month 12 and in March another nine. In July, there were 17 applications, in August 16 and 20 in September. In March, approval was given to supply the new Migrant Hostel, off Melbourne Road, and the following month approval was given to spend £5,200 on completing concrete lining at the Bell Post Hill service basin and installing a booster pump there. Things were booming so rapidly the trust found it difficult to keep water supply maintenance staff and from the end of March, 1950, the wages of outdoor workers were increased by up to 12/- a week.

Approval to construct the Highton service basin had been given before the committee enquiry and the contract for earthworks costing £6,364 was awarded in August, 1949. The remainder of the project was to be completed by the trust's own growing day labour force. Work began on August 15 and it was officially commissioned by Engineer-in-Chief Pearce on June 30, 1950. It was to be his final task.

Pearce had transferred from the government service in February, 1910, when he was 24 years old. He had seen the trust grow from serving a population of 29,700, who consumed 335 million gallons of water a year, to 57,805 people who used 1,562 million gallons annually. His health had begun to fail and with great reluctance the Chairman recommended he be relieved of his position with its many duties and the burden of large projects ahead. The trust was reluctant to lose a man of such experience and knowledge and he was retained as a consulting engineer for several years on £700 a year. This appointment continued until October, 1952, and he died in August, 1956. To commemorate his contribution, the No 3 storage at Stony Creek was named Lake Pearce in his honour.

Applications for an Engineer-in-Chief were widely advertised and there were 27 applicants. Remembering the



Richard Pearce's last duty as Engineer-in-Chief was to open the water valve to begin filling the Highton service basin. The official party is standing on the gangway with Pearce at the front turning the valve handle. The water is starting to gush into the service basin below.

difficulty several years earlier in appointing an assistant engineer because of lack of accommodation, the trust rented a flat for the chosen applicant. Six candidates were invited for interviews, which were conducted after commissioners entertained the men at dinner at the Carlton Hotel. The successful applicant was J M Macintyre, an engineer trained in Scotland who had worked in India and come to Australia in 1947 when the British left that country. He worked with the SR&WSC and took up his new appointment on July 3, 1950. Within six months, commissioners commended him for quickly grasping trust matters.

Increased demand for water and sewerage in Geelong led to rapid expansion of the trust's staff and equipment. In January, 1949, the authority took delivery of a mechanical trench digger that was able to do the work of several men with greater speed and would overcome previous labour shortages. In November, 1949, approval was given to buy three trucks, two trailers, two cars and a utility truck. In September, 1950, a second trench digger, mechanical excavator and a second air compressor were purchased as well as additional office furniture for the engineering branch. At the same time, the trust decided to appoint more staff; an assistant engineer, two surveyor/draftsmen, an assistant designer, two tracers, an assistant storekeeper, a mechanical foreman and a senior female assistant.

The government would choose the new Chairman, but Bolte had promised he would be selected from the current commissioners. When they met to make a recommendation, they all wanted the new position and could not agree on any election process that would ensure the best man was appointed.

Excavation at the Highton basin. Mechanisation began overshadowing manual labour so a loader fills a truck without a man in sight doing manual work.



To solve this dilemma, they sent the government all their names and waited on its decision. The government's choice was Jack Carr. The final meeting of the old trust occurred on September 22, 1950; it was the 513th ordinary meeting in a history extending back more than 42 years.

The sitting commissioner was returned at the elections in 1950 and two new commissioners joined the board – B E Purnell, the Mayor of Geelong, who took Jack Carr's old seat, and A S Thomson, who was the first elected member for the Shire of Corio and a local councillor. The first meeting of the new trust would take place in less than a week.



CHAPTER SIX

WORKING FAMILY

1951-1967

At the first meeting of the reconstituted trust on September 28, 1951, Chairman Carr told a new commissioner the trust was “a happy family” that had a job to do in difficult times. Sixteen years later, he told another new commissioner the service provider was “a big show” that would take him some time to understand.

In that period, the trust grew from a relatively small operation to a large multi-million dollar organisation serving a rapidly growing prosperous community. In 1950, it had served a population of 60,400 that grew to 107,940 by 1965. There had been 14,998 buildings in the trust’s drainage area in 1950; 15 years later that had doubled to 30,110. When the trust celebrated its 50th anniversary in January, 1958, it had 500 miles of water channels and mains that would, if they were laid out in a straight line, reach as far as Sydney. There were also 200 miles of sewers, 18 pumping stations and a staff of nearly 200.

By the mid-1960s, Geelong was the perfect example of a modern city – affluent, prosperous, comfortable and perhaps a little dull. In the previous decade and a half, it had attracted a succession of major industries and many smaller businesses that had drawn a large workforce, including migrants from around the world. Almost all the migrants came from Europe; people displaced by the chaos of war and those attracted by Australia’s post-war policy of building its strength and wealth by increasing its population. Unknowingly, the government also began radically reshaping the traditional Australian culture because these migrants brought with them their own languages, customs and ways of doing things. Geelong’s proximity to Melbourne made it attractive to large companies that had to be close to government and capital. But the city also was a centre for industries that processed rural produce and, like the rest of Australia, it rode ‘on the sheep’s back’. In 1966, wool auctioned in Geelong was worth \$75 million and it was Australia’s fourth busiest port.

Despite this, Geelong remained a large country town with a pace of life and friendly atmosphere to match. It was an ideal environment in which to marry and raise children.

Early work on construction of the Bostock dam, October, 1953.

There was the bay, the river and the southern ocean for people who liked water sports, such as fishing, swimming, rowing, boating and the new sport of surfboard riding. The Otway Ranges, the coastal resort towns and the rest of the Western District attracted people who had become mobile as private car ownership and tourism grew in popularity. After the misery of the depression and the anxiety and chaos of war, a sense of optimism grew quickly because whatever was to come had to be better than the past. By the mid-1960s, new suburbs stood where open farming land had been and Geelong followed the trend of other large cities with people moving out from the city centre to the new suburbs.

The trust was vital to all this. A good water supply was the prime requirement for industrial and residential development. One of the first questions of an industry planning to establish in Geelong was how much water could the trust supply. The trust also gave Geelong jobs, building up a workforce of several hundred by the 1960s.

The trust became one of the most important public institutions in Geelong. Unlike municipal councils that governed their own little parts of Geelong, the trust served the whole community. Residents felt it belonged to them because they elected the commissioners, invested their money in it and paid for its services.

In 1951, Chairman Carr described the trust as “a family” because that was how it seemed to many. Most employees worked in the same small area between Ryrie Street and Little Malop Street and the office staff of around 50 knew each other. Like all families, some had more status than others and there were jealousies and special friendships, sometimes leading to marriage. In this hierarchical structure, commissioners were the most important family members. They were the core of the organisation and controlled what it did, but they were also outsiders because they did not work there. They came for meetings and some may have involved themselves in the operational routine, but they were mainly men connected in

local politics with interests and skills different from the people they employed.

Elected commissioners, who faced the ratepayers every four years, usually were returned unopposed. But occasionally a sitting member was defeated. In the elections of October, 1959, two of the three commissioners standing for re-election, Wallace and Neunhoffer, who had both served for 14 years, were defeated by Wal Whiteside and Len Sprague. In 1961, H Robertson defeated Commissioner Purnell. Commissioner Freeman, who had served since 1936, died in November, 1961, and there were five nominations for his seat, which was won by L Jacobs. These changes gradually replaced the old with the young and when Commissioner Jacobs attended his first meeting Chairman Carr said the trust was fortunate its new commissioner was such "a young and able man". In 1966, Commissioner Robertson retired and was not replaced because the opportunity was taken to reconstitute the trust with less commissioners. Wal Whiteside knew more about the trust than any new commissioner because he had been employed by it for about 18 months in the mid-1950s as a senior engineering assistant. He resigned to commence his own practice as a consulting engineer and contractor based in the Geelong region. Commissioner Carr, the government-nominated Chairman, was re-appointed in 1954, 1956, 1960 and 1964. He took his re-appointment as an affirmation of the government's approval of the trust's work. Elected commissioners took turns to be elected Vice-Chairman for a year.

Commissioner Robertson's resignation gave the trust the opportunity to undertake a minor reconstitution that reflected the changes in Geelong's population. Traditionally, the City of Geelong had had two commissioners, but by 1966 a shift in population to other areas reduced its representation to one. The number of commissioners was reduced from seven to six when Robertson, who was one of Geelong's two nominees, left.

For decades, commissioners held their meetings in the evenings. In 1959, however, they decided to hold all

Bob Jordan recalls the strict division between the two branches of the trust and how it later changed.

THE TWO-HEADED MONSTER

When I was cost accountant, for want of a better term, I had some concerns about a particular project and how it was being costed. So I wandered upstairs to the next floor and had a chat to John Macintyre, the Engineer-in-Chief, about this project and how it was going. We ended up and I wandered back downstairs to my cubby hole. Later in the day, I got called up to Henshaw's office. I was told in no uncertain terms that it wasn't my role to go and talk to the engineering people. They were up there and we were down here and I would talk to him, not to the engineers.

It wasn't just a two headed-organisation on a chart; it was a reality and it was alive and kicking where people tried to be the number one person in the organisation. But as management style changed and we became less formal, those barriers broke down. They needed to be broken down and they gradually did come down. Len Spitty, who was the next Secretary, was much more approachable and brought a more humane side to the Secretary's branch. With him there we liaised to a much greater extent with the engineering people.

Len and Geoff Vines took the organisation's culture a long step forward from Henshaw and Macintyre and when it was Geoff and I, I think we took it forward another step again. In the old office the Engineer-in-Chief was on the floor above the Secretary; in the new office we were on the same floor.

ordinary meetings in the afternoon while many special meetings began at nine in the morning. This change would have made it almost impossible for anyone who was not a self-employed professional to attend, but it had been understood when the trust was established that they were the calibre of men who would become commissioners.

The Engineer-in-Chief and Secretary were the executive officers and the twin patriarchs of the family who set its tone. Their recommendations to commissioners were almost invariably adopted and they put into action commissioners' decisions. John Macintyre and Brian Henshaw were newcomers to the trust in 1951, but their experience, knowledge and qualifications overlaid its traditional organisation with a high level of professionalism. Despite their apparent equality as the heads of the trust's two branches, the Engineer-in-Chief was the superior officer and paid more. From the beginning of 1954, Macintyre received £2,250 and Henshaw £1,900 a year. This

difference became fixed with the Secretary receiving 87.5 per cent of the Engineer-in-Chief's salary.

Always looking over the trust's shoulder was the government, which could veto almost any decision of commissioners. In daily practice, this control was exercised through the SR&WSC, which had to approve decisions worth more than £500. This ranged from constructing a huge dam to buying a car. It was not uncommon for the commission to grant six to 10 approvals a month and almost all requests were passed. The trust found this continual supervision irksome and an implied criticism of its capabilities. In 1952, the SR&WSC asked for detailed plans for a major project. The trust responded testily that the plans and details were available for examination in the trust offices if it cared to look and that continued supervision prevented commissioners from representing the people who elected them.

The Secretary's branch was the smaller of the two, but vital because it brought in the money the Engineer-in-Chief's branch spent. The daily operations were funded from revenue raised through rates and water charges. Rated properties were allowed 900 gallons of water for each £ of the property valuation and charged an excess rate of 1/6 for each additional 1,000 gallons. Charitable institutions, such as orphanages and hospitals, paid a reduced rate or received water free. The trust's legislation did not allow it to offer reduced rates to pensioners or people on low incomes, but it tried to help by allowing them to defer payment longer than usual without charging interest.

In 1950, the trust switched from collecting rates and charges twice yearly to once a year, probably to reduce the effort that went into issuing notices to a rapidly growing user population. By 1966, however, computers were on the scene and the trust re-introduced twice yearly rate notices and collections. It cost around \$5,000 more a year, but seemed popular with ratepayers and some of the expense was offset by putting money from earlier payments into short-term investments.

Australia's conversion to decimal currency in February, 1966, passed without serious problems for the trust. Just before the changeover, it took delivery of new cash registers and accounting machines and the computer-printed rate and water charge accounts sent out immediately before and after conversion cited both currencies.

The rapidly increasing spending of the Engineer-in-Chief's branch created major challenges for the Secretary's branch. Construction of two new reservoirs and a new sewerage system, as well as serving an almost doubled population, cost millions that were raised through borrowings. By 1952, the trust had borrowed £0.9 million for water supply works and £0.7 million for sewerage. By 1963 (the last year with figures in the old currency), it had borrowed £6.2 million for water works and £2.6 million for sewerage. The interest on these loans became a significant part of its expenditure. More than 68 per cent of revenue went in interest payments in 1967, leaving just 32 per cent for management and operational costs. The only way to meet this heavy burden was by increasing charges. Water rates almost doubled, from 1/3 in the £ in 1950 to 2/2 in 1965, while the sewerage rate remained almost constant at 1/3 in the £ in 1950 and 1/4 in 1964. But two large reservoirs had been constructed during that period and the cost of the new sewerage system started to bite in following years. In 1966, the rates in the new currency were six cents in the \$ for water and five cents in the \$ for sewerage.

Part of the revenue office, probably dating from the 1960s. Apart from the furniture and the typewriter, however, it is not much different from how it had appeared decades earlier. At the back of the room is the large door to the vault in which the rate books and other irreplaceable documents were stored.



Such large debts and repayments meant the smallest detail on any large loan had to be carefully examined and negotiated as every fraction of a per cent could cost thousands in the long run. This work kept the Secretary and his staff busy. In 1953, trust representatives went to Canberra to renegotiate maturing loans worth more than £300,000 with the Commonwealth Superannuation Board. In 1955, the mere hint that borrowing for local authorities might be restructured encouraged the trust to increase its borrowing applications to ensure it obtained the amount it needed.

Although the trust did not actively advertise the fact, it became a popular target for Geelong investors. In the decade to 1967, it borrowed \$19.2 million, of which \$8.3 million (43.3 per cent) came from public investors, most in Geelong. Many investors had subscribed to the trust's loans for 40 years and appreciated the personal service provided. Peter Hammerli, the registrar of inscribed stock, was the public face of the trust to many people who visited him in his office to make their investments. It was specially decorated to put people at ease and reassure them the organisation was a sound investment while Hammerli's personal touch and attention to detail attracted and kept many investors. The minimum investment was £50, but over time many people built up sizeable deposits. Interest was paid twice yearly, a long and complex process that occupied several staff members for several weeks. The only mechanical assistance was a typewriter used to prepare the cheques.

The trust's first major project after the war was construction of Bostock Reservoir on the East Moorabool River, near Ballan. It would hold 1,500 million gallons. It had been planned 20 years earlier and the trust returned to it when it needed a new supply for the rapidly growing city. The new storage was located further upstream than the original plan so it could hold more water, and it was an earthen embankment because that was more economical.

Construction of the embankment of the Bostock dam. Out on the embankment is a scraper dumping material and in the foreground is a trust Landrover and some surveying equipment. Photo courtesy of Bob Lucas.



The design philosophy was not significantly different from the Upper Stony Creek or Korweinguboora embankments, but it was bigger and used more modern construction ideas. The first stage was a diversion tunnel to carry the water while the embankment was being constructed and then serve as the outlet when it was completed. Work started on June 15, 1953. Construction of the main embankment began in September, 1953, with tree clearing followed by excavation for the foundations in the river bed. The trust's engineer on site was Victor Seitz, a German national who had been detained while working in Persia during the war and transported to Australia as an internee. He was a tough man with a stern Teutonic presence who demanded excellence in everything, but he taught a lot to those under him. Material for the embankment was loaded into big dump trucks by hydraulic shovels at pits around the site and the trust's engineers checked that placement, critical moisture levels and compaction were correct. Mistakes could result in failures similar to those at Stony Creek.

Work went on for more than a year as the embankment grew to its full height of 84 feet. Meanwhile, another contractor constructed the channel that would carry water from the storage into the supply system. It was completed in

September, 1954. The trust bought a house nearby and fitted it out as a site office and a place where it could entertain important visitors.

The official opening was held on December 15, 1954, at the top of the embankment. It was attended by 400 dignitaries and virtually all the trust's office staff travelled there in a hired bus. The day was beautiful and the only thing that marred the event was the dust raised by the cars on the track leading to the storage. It was the first large official opening the trust had staged. When other works such as Korweinguboorra and the new storages at Stony Creek had been commissioned, most people did not have cars and, anyway, the roads were too bad for people to get there easily.

The official opening of the
Bostock Reservoir,
December 15, 1954.



Bostock Reservoir and the associated works cost £312,000. The rains were good that year and it filled rapidly, with the first water going over the spillway in August, 1955. It was a triumph for the trust, but while it had been planned to meet Geelong's future water needs demand had risen so quickly there was no time to rest before turning to the next major project.

In October, 1953, the trust asked the SR&WSC what additional supplies were available from the upper Barwon system, when it could be obtained and how much it would cost. By March, 1954, discussions with the SR&WSC had reached a point where the trust understood it would have to take over the supply system and develop it if it wanted more

Earth-moving equipment beginning the first cut of the Wurdee Boluc enlargement on September 21, 1954. Modern equipment made large earthworks much cheaper because they did not require as much manpower.



water. The clear message was the SR&WSC was busy across the whole of Victoria and could not do the necessary work. Negotiations continued into 1955 and at a special meeting of commissioners on July 12, 1955, the documents were signed to take over control of the upper Barwon water supply system as far down as Geelong. At the stroke of a pen, the trust had virtually doubled the capacity of its water supply system from 4,300 to 8,400 million gallons, although it had to supply the SR&WSC with up to 700 million gallons of water a year for the Bellarine Peninsula. The SR&WSC commenced a long program of improving the supply system there, with new and enlarged basins and mains and a rapidly expanding reticulation system.

Between 1945 and 1952, the SR&WSC studied how the upper Barwon system could supply more water and proposed a scheme to construct a major dam on the West Barwon River, double the capacity of the Wurdee Boluc inlet channel, enlarge the Wurdee Boluc Reservoir and increase the capacity of the outlet channel to carry the additional water to Geelong and the peninsula. These works became the trust's responsibility and another round of even more expensive construction work began. Most of it was beyond the capabilities of the authority's day labour gangs so it was done by contract.

Even before the agreement had been signed, the trust undertook supervision of the Wurdee Boluc storage enlargement from 2.75 million to 4.1 million gallons. The original storage had been created by constructing embankments three or four feet high on the east and west sides of the Wurdee Boluc swamp. The enlargement involved constructing embankments about 10 feet high and extending them around to the south. The SR&WSC had designed the enlargement similar to others, with a central core preventing water from escaping, supported by earth and rock to provide strength and stability. Commissioner Carr turned the first sod in September, 1954, and the work was completed in April, 1956.



Duplication of the Wurdee Boluc outlet channel in 1961. The old channel is flowing on the right and the new channel is being constructed on the left. Construction was completed in a series of alternative slabs because concrete contracts as it sets.

The Wurdee Boluc inlet channel was 37 miles long from its starting point on the East Barwon River down to Wurdee Boluc. Like the Ballan channel, it conveyed water from an off-take weir to a storage. The SR&WSC had completed designing the enlargement by 1954 so it could carry 50 million gallons a day. The project included concreting some sections of the channel and duplicating or replacing syphons to transfer water across valleys. The trust oversaw the work and used a caravan as a mobile site office. The work was finished around 1957 and cost £597,000.

The final link in the improved system between the upper Barwon River and Geelong was duplication of the 16-mile long channel from Wurdee Boluc to Pettavel basin to double the daily flow to Geelong to about 40 million gallons. Construction of the concrete-lined channel commenced in January, 1959, and it was officially opened on July 6, 1961. It cost £305,000.

The West Barwon Reservoir was the centrepiece of the upper Barwon system because it would store water from the upper Barwon catchment, giving the trust two storages in the system. The SR&WSC began site investigation in 1951

and did most of the design work, which the trust took over and completed in late 1958. Construction began in November, 1959, and it was completed in 1965. The project cost about £2.5 million.

The SR&WSC had investigated a number of sites around the upper West Barwon area, taking into account factors such as where the most water could be stored for the smallest embankment, where the dam could be constructed on solid rock foundations and where the right materials were close at hand. About the time the design was handed over to the trust, the final site was chosen immediately downstream of the junctions of the West Barwon River and Monday Creek. An engineer with experience in dam design, Geoff Earp, was employed to prepare the final design and specifications. He did all the calculations by hand, using only a slide rule, and was happy for the SR&WSC to review his work to ensure no errors. In October, 1960, the SR&WSC gave final approval for the project specifications.

Financing the project was almost as complicated. The trust had extensive experience in raising loans, but this was by far the most expensive project it had undertaken and needed approvals from Commonwealth and State



The West Barwon Reservoir under construction. Looking upstream from the embankment, the land has been cleared and the outlet tower is partly constructed.



West Barwon completed.
The spillway is in the
foreground, the tower in
the centre and the
embankment on the right.

Governments. In October, 1958, commissioners met the Premier to discuss funding and began talks with Treasury and the SR&WSC to finalise the financial details. The major issue was that the reservoir had to be paid for when it was constructed, but its full potential would not be realised for many years. Borrowing had to be arranged on the basis the reservoir would be paid for in the future by residents, who would get the full use of it then. Even so, there would be a significant increase in rates to begin meeting the cost.

The first work was construction of a tunnel 511 feet long and 11 feet in diameter that acted as a river diversion while the embankment was being built. The embankment was similar in concept to the trust's previous dams, but limited amounts of clay on site meant the structure had more rock and a relatively thin barrier of clay (about 25 to 30 feet thick) at the base tapering toward the top. The ground on which the embankment was to be built was excavated down to bedrock. Construction was planned to take two years, but it took three because wet winters brought work to a virtual standstill. The moisture content of the clay put into the embankment was critical and rain made it difficult to meet



the necessary specifications. Work on the embankment was completed in March, 1966, with only the spillway and outlet tower remaining to be completed.

Victor Seitz again was the supervising engineer. He drove his own small team on the site hard and drove the contractors even harder. The trust acquired a house near the site that it redecorated for entertaining visitors and constructed a works office closer to the site, just down from the embankment. Old hands in dam building said a life would be lost for every million pounds of a project and two men were killed on the West Barwon. One was the contractor's office manager, who lost his life in a freak early morning accident on Christmas Eve, 1962, when a big truck ran out of control down an embankment, demolished the site office and killed him. Had the accident occurred half an hour later, three or four more people could have been killed. The second fatality involved an employee of the contractor, who was killed in February, 1962, when struck by earth-moving equipment. Forty years later, a plaque in memory of the two men was erected at the site.

The official opening of the West Barwon Reservoir on November 17, 1965. The official guests are seated overlooking the tower and the partially filled reservoir.

The new reservoir could hold 4,800 million gallons and increased the total capacity of all the trust's reservoirs and storages to 9,093 million gallons. The Governor of Victoria officially opened it on November 17, 1965, and 600 people attended.

The trust also became responsible for providing water from the upper Barwon system to towns along the route of the Wurdee Boluc channel – Forrest, Birregurra and Winchelsea. In August, 1965, it agreed to sell water from the Moorabool system to the Shire of Bannockburn to supply Meredith, Bannockburn, Lethbridge and, possibly, Teesdale. In April, 1957, a deputation from Bellarine Shire Council asked the trust to consider taking control of the entire Bellarine supply system. The trust was not opposed to the idea, but the government said it was a political decision and not for the authority to make.

The third major project during this period was a duplicate main outfall sewer through Geelong. Problems with the original sewer had become so serious by the 1950s that initial repairs cost more than £3,000. By 1958, the situation had deteriorated and a maintenance gang was created to manage the outfall. The aqueduct also continued to be an unsolvable and expensive problem. In 1951, the trust spent £3,000 on repairs, in 1957 major work on some of the main structural members cost £22,000 and more repairs in 1967 cost \$3,000.

The sewer began approaching the limit of its capacity by 1955, but it would still be some time before corrosion and capacity problems had to be solved. The problem of trade waste began to emerge, however, with major industrial development taking place around Corio Bay to the north of Geelong. The Geelong Town Planning Scheme of 1959 set aside 16 acres at Oyster Cove on Corio Bay for a sewage treatment and disposal plant to take trade waste, but by the 1960s the public and trust began to become aware of the effects of effluent on the environment. Any plan to pump even highly treated effluent into Corio Bay began to seem like



Construction of the duplicate sewer. In many places the work could be done quickly because of the methods used. Here, the worker at the bottom of the picture is standing on a pipe that has just been laid while at the top (out of photo) a large excavator is digging the trench. In between, workers are preparing the trench to lay more pipes.

a bad idea. There were also questions about the effect of the outfall sewer on the waters around Black Rock and the trust began acknowledging there might be some “slight problems there”. It indirectly acknowledged concerns in 1961 when it was given control over a reserve extending for half a mile on either side of the ocean outfall and erected a chain wire fence seven feet high to protect the area. But it soon discovered anglers considered Black Rock the best location in the state for snapper and the lock on the gate was occasionally broken to gain entry.

Although a new treatment plant at Oyster Cove would be the quickest and cheapest solution to Geelong’s sewerage problems, it did not resolve issues such as the rapidly decaying outfall sewer and creating two separate systems. The idea was dropped, leaving only one option – that of continuing to send all Geelong’s sewage to an ocean outfall. The old sewer was only decayed south of the city; the rest remained in excellent condition and there seemed no reason why it could not remain in service. This gave the trust three problems: the capacity of the old system, the decaying final section of the old sewer and trade waste, mainly from North Geelong. The trust also considered the possibility that in the future the ocean outfall might be used by sewerage authorities on the Bellarine Peninsula and coastal towns, such as Ocean Grove and Torquay.

The trust finally decided to replace the deteriorating section and construct a duplicate sewer through the city and to the north. The duplicate sewer would begin in North Geelong and run south through the city and suburbs to the coast. In the city, it would pass under Latrobe Terrace, reaching a maximum depth of 115 feet, emerging to cross the river at Riverview Terrace on a new aqueduct and then continue through Belmont. On leaving the city, it would run roughly parallel to the old sewer main to the ocean outfall. The plan allowed for a treatment facility, but for the moment it only included a comminutor plant to break up solids before they went into the ocean. The pipes would be



Installing pipes in the tunnel beneath Geelong. When the tunnel was completed, supports for the pipes were carefully installed to ensure the correct grade and the pipes were fitted using a simple lifting device. Crushed rock was blasted into the narrow gap between the pipe and the tunnel wall, holding everything firmly in place.

circular reinforced concrete with a special interior plastic lining making them impervious to most chemical reactions. This would ensure the sewer could accept trade waste. In North Geelong, it would begin with 18-inch diameter pipes and became progressively larger as it headed south, culminating in 66-inch pipes where the new sewer would replace the old. The result would effectively be two systems, the old six miles long and the new eight miles long. Both would be gravity operated, but there would be 17 pumping stations and five ejector stations to pick up sewage from low lying areas to be fed into the main. Both would feed into a new ocean outfall that extended seven miles to the coast at Black Rock.

Finalising this design took years. Macintyre gave commissioners a full report on the problems with the old sewer in May, 1958, and they asked him to prepare a report on the major work that would be needed to overcome them. In May, 1961, commissioners decided to discuss plans with the SR&WSC and the Health Department and begin surveys for the favoured scheme. The trust also began making the arrangements necessary to borrow about £2.7 million. This was



The completed sewerage aqueduct that crosses the Barwon River in the centre of Geelong called the 'John M Macintyre Bridge'. The sewerage pipe is hidden underneath the footpath so the bridge's true function is difficult to determine.

a significant issue because it was already spending more than a million pounds a year on the West Barwon Reservoir and work in and around Geelong. The government gave approval for the project in December, 1964.

At the end of January, 1965, Geoff Vines, an engineer from the MMBW in Melbourne, was appointed senior design engineer and given control of the project. At the same time, work started on the first stage of the project in North Geelong where one of the trust's gangs began laying pipes. They used a mechanical backhoe to dig the trenches and laid the pipes using a large mobile crane. The method was so successful work expected to take six weeks was completed in nine working days. The cost was calculated and compared to the estimates to enable a revision for later sections of the project and provide a comparison between the cost of day labour and contract work.

Two thirds of the construction was undertaken by contract and a third by the trust's labour force. Two gangs worked on sections where the pipes were laid in trenches and in some smaller tunnels. Contractors did the deep tunnelling and bridge construction because they had the experience,



employees and necessary equipment. All the pipes were made specially by Humes Ltd in a fabrication plant moved to Geelong from South Australia.

Contractors dug the major tunnel under Geelong along Latrobe Terrace, starting with shafts in the road that would later become inspection pits every 200 yards or so. Then the tunnel was driven between them. It was about five and a half feet wide and a little higher, supported by timbers held in place by horseshoe-shaped steel bracings. By December, 1967, the pipes had been laid and completed four and half months ahead of schedule.

The project did not raise much interest because most of the work was carried out away from the public gaze. But when it was close to people and homes, staff smoothed the way by explaining what was happening and what was being done to reduce the impact. The one part of the project that sparked public debate was the bridge to carry the sewer pipe across the Barwon River. Unlike the old aqueduct, which was well away from people, the new bridge would run right across a popular section of the river. The trust proposed a simple tubular steel arch bridge, which did not receive a good response, and

The outfall plant at the end of the duplicate sewer at Black Rock. In the foreground are the three comminutors and behind them the Archimedean screws and control room.

The duplicate sewer was officially completed with little ceremony on November 13, 1968. This report of proceedings was published in the local press the following day.

COMPLETED

Geelong's new multi-million dollar outfall sewer system was officially opened yesterday by the chairman of the Geelong Waterworks and Sewerage Trust (Cr J W Carr) in the presence of representatives of various councils and shires in Geelong and district as well as other trust commissioners and officials.

Work on the new system took three years and nine months to complete and the complete cost of the works involved was \$5,500,000, which is \$300,000 cheaper than the original estimate.

The new system has the capacity to serve at least 216,000 people with a possible capacity of serving 250,000 people and should meet the needs of the community for between 40 and 50 years in the future.

Councillors from all Geelong and surrounding municipalities were taken by two buses together with trust officials firstly to the new pipeline suspension bridge over the Barwon River at Geelong and later to the new treatment plant at the sewer outlet at Black Rock.

Declaring the new bridge open, Cr Carr said Greater Geelong was indebted to the trust's Engineer-in-Chief (Mr J M Macintyre) who was in charge of its construction.

He also thanked the project engineer (Mr G J G Vines) and the assistant Engineer-in-Chief (Mr A W Cooke).

The chairman then named the bridge the John M Macintyre Bridge amid applause from the other trust officials and councillors.

The new bridge is a post tensioned, pre-stressed concrete stayed girder supported on two reinforced concrete pylons and two bank supports. There are two 180-foot approach spans and a 270-foot central span which forms a crossing about 30 feet above the normal river level.

The bridge was designed to carry the new sewer pipeline from Fernleigh Street, Chilwell, to Riverview Terrace, Belmont, and is part of the project designed to carry sewage from the Geelong district along 14 miles of pipeline to Black Rock.

After inspecting the bridge the party walked across it and rejoined the buses to continue the journey to the new treatment plant and outfall sewer at Black Rock.

At Black Rock the chairman of commissioners declared open the new comminutor treatment plant and pressed a switch to set one of the two Archimedean screw pumps in operation to pump the effluent into the sea.

After the official ceremony the party inspected the plant and watched the sewage entering the plant from the pipelines and travelling through the comminutors which break up the sewage.

The effluent pours into the sea at low tide and at high tide a penstop is activated which prevents sea water from entering the plant.

The Archimedean screw pumps are activated automatically at high-tide to lift the effluent to a higher level and discharge it into the sea.

After inspecting the plant for a short time in the bad weather of yesterday the official party returned to Geelong where a short address was delivered at the trust's auditorium in the South Geelong depot by Mr Macintyre.

tenderers were encouraged to put forward their own suggestions. The successful design was the cheapest and perhaps the most innovative; so far as anyone knew it was the first pre-stressed stayed girder bridge to be built in Australia. Construction began in September, 1967, and at the opening ceremony for the entire duplicate system, including the bridge, it was named the 'John M Macintyre Bridge' by unanimous decision of the commissioners.

The final part of the system was an odd looking building constructed at Black Rock. It lifted the sewage up using Archimedean screws so tidal waters could not flow into the sewer pipe, and comminutors that broke up any remaining solids before the sewage ran out into the ocean.

Blessed by good weather and experienced workers, the project was always on or ahead of schedule. In the winter of 1966, contractors could switch their work from the open where heavy rain caused delays to the city where conditions were more favourable. The winter of 1967 was exceptionally dry and in June there were 180 men working on various sections.

The first stage was commissioned on August 2, 1968, when Chairman Carr turned a valve at Marshall that directed the sewage from the old ovoid pipes into the new duplicate sewer. The new system was officially recognised in November, 1968, with the opening of the John M Macintyre Bridge and the new treatment plant at Black Rock. The entire system was not put into use until November, 1969, when the pumping station at Cowies Creek, north of Geelong, was altered and sewage from Bell Post Hill flowed into the system for the first time.

In addition to these major projects – Bostock and West

Barwon Reservoirs and the duplicate sewer – the trust was just as busy keeping up with demand for water and sewerage services. Indeed, it was deluged with requests and most months there were applications for several new subdivisions and requests for water main extensions and sewer connections. There were also other requests from community facilities, such as schools, churches and shops, that sprang up to serve the swelling population. In May, 1950, for example, commissioners approved water supplies to 1,250 homes in the Housing Commission's Norlane development. In January, 1952, they approved connections to a 200-house estate constructed for Shell employees.

At one time, there were 65 men working in seven gangs installing pipes around Geelong. A team of five men with a backhoe and operator could lay 260 feet of cast iron or fibro cement pipes in a day. They rarely saw the storeyard and facilities at South Geelong; they took around with them a shed in which they kept their tools and sheltered if it rained. Everything they needed was delivered. A truck or semi-trailer transported new pipes to the work site and dropped them off in a line next to the proposed trench. The correct line was set out by the ganger or an engineer and the backhoe dug a trench along that line. Smaller pipes could be dropped in by hand while larger ones were lowered using a small crane. When the pipes were in place and sealed together, they were covered, the trench filled and the team moved to the next job. The men in these teams developed a great sense of camaraderie. While it was hard work, it gave them a sense of achievement.

Growth placed demands on the system that led to old problems re-emerging. For example, so many people were taking water from the system that pressure became poor. In 1952 in particular, the trust was severely criticised because poor pressure made it difficult to fight fires. During many summers to the early 1960s, the trust had to impose short periods of restrictions, usually on garden watering, for about three days at a time. Geelong was not short of water, but the



Construction of the fourth service basin at Montpellier. This 27-million gallon capacity basin was constructed using modern machinery and few people are visible on the work site.

supply system around Geelong could not cope with peak demand and water was being drawn out of the service basins faster than it could be brought down from the storages. These short restrictions were intended to allow the service basins to recover, but the public became less supportive as time went on. In 1956, a letter to a newspaper said the trust had not planned ahead and that a car with a big petrol tank but only a small fuel line would be useless, as was Geelong's water supply.

Shortages were overcome in two ways – by increasing the capacity of the service basins and improving the mains and channels to transport more water more quickly. Completion of the duplicate channel from Wurdee Boluc in 1961 did the most to end these restrictions, and reconditioning and completing concrete lining of the Ballan channel helped improve flows down to Stony Creek.

Transfer mains were equally important. In January, 1953, the trust commissioned a new 14-inch main from Anakie to Lovely Banks to carry more water down from the Stony Creek storages. It was the beginning of a major program of mains replacement and enlargement to link service basins around the edge of the city – from Pettavel to Highton, Montpellier, Bell Post Hill and Lovely Banks. From them, the distribution mains into Geelong were progressively enlarged and new mains constructed to newly developing areas. Improvements in manufacturing meant concrete pipes and concrete-lined

steel pipes replaced older mains, including the wooden variety that had been laid in the 1920s and 1930s.

The service basins were improved to cope with the increased water flow. In 1961, outlets from the Lovely Banks basins were enlarged to increase their capacity to 11 million gallons a day. At Montpellier, plans had been made to construct a fourth service basin. But delays caused by a proposed ring road meant construction did not start until 1968 and the basin, with a capacity of 27 million gallons, was not completed until 1970. Meanwhile, the first and second basins were enlarged to increase capacity by eight million gallons and some of the inlets and outlets were enlarged. The Highton basin was enlarged to a capacity of 20 million gallons in the late 1960s and a booster pump was installed to increase the flow to Montpellier. At Pettavel, where water from Wurdee Boluc entered the Geelong system, the outlet was enlarged to carry 60 million gallons a day.

The Bell Post Hill basin was difficult to manage because it leaked and was relatively small. Its location between Lovely Banks and Montpellier meant it could be bypassed without affecting the overall system and for many years it was not used. In 1962, however, when the trust needed as much storage capacity as possible, it was brought back into service. It was lined with concrete in 1963 to stop the leaks, but the water continued to escape and sealing paint was applied.

In the 1960s, the trust began concrete lining many old pipes to bring them back to a good standard without having to replace them. In 1951, it scraped and lined 13,000 feet of pipes in North Geelong, but did not begin a concerted program of work until 1961. Concrete lining increased the flow of water in old pipes by about 70 per cent, removed a source of water discolouration and prevented further interior incrustations. The program of pipe reconditioning cost around £40,000 a year from 1963 and peaked at more than \$146,000 in 1966 when the work was virtually completed. The concrete lining was carried out by



Laying new sewer pipes in built-up areas was labour intensive. Here a gang is digging a deep trench and using a windlass to lift material from it. The hard work is hidden below ground. Photo courtesy of Mike McCoy.

contractors using special equipment that first cleaned a pipe, then spread a thin layer of cement about a quarter of an inch thick inside and finished it to mirror smoothness. This stopped water from getting to the metal, opened up the pipes and reduced friction that slowed the passage of water.

Pressure to keep abreast of development had forced the trust to put water supply before sewerage. New developments could not proceed without water, but they could wait for sewerage and use the sanitary pan service in the interim. Sewerage connections did not stop, however. Between 1951 and 1960, Geelong's sewerage system grew from 156 miles to 217 miles – an increase of 61 miles – but from 1960 to 1967

it increased to 302 miles, or 85 miles, in less time.

The expansion came from a decision in June, 1958, to increase resources dedicated to the sewerage system by building up its sewer construction to enable £200,000 worth of work a year. A year later, 100 houses were being connected every month and 80 per cent of Geelong had been covered. In 1965, the gangs extended the system to 1,486 houses and overall 88 per cent of the population served with water also had sewerage. It was one the highest percentages in Australia. Toward the end of the 1960s, a decade of hectic work was coming to an end and 91 per cent of properties in Geelong had been sewered by 1967.

The catch-up sewerage program was more labour intensive than extending the water supply system because most of the work had to be done in developed areas where modern equipment could not be used. The men who had laid Geelong's first sewerage pipes in the 1920s might have fitted in well in the 1950s and 1960s. They would have known the tools and techniques, but they would have wondered at the men who did the work. Some came from traditional Australian backgrounds, but of the 120 or so who worked in the gangs many had originated from Europe after the war; Italians, Germans, Dutchmen and eastern Europeans. The trust organised them into gangs of 25 to 30 men with common backgrounds. There were two Italian gangs, one comprising eastern Europeans, a gang of northern Europeans and other mixtures. Each was led by an experienced leading hand or ganger, who was usually tough with the men under him and organised the work and dealt with the trust's engineers who oversaw the projects. Many of these men had relatives in Australia, so it was not uncommon for brothers, fathers, sons, uncles and nephews to work together.

The first significant catch-up began around Bell Park, north of Geelong, and although people might have appreciated being connected to the sewer, they complained about the gangs who invaded their backyards. They protested that fences, gardens and private streets were damaged. Macintyre replied that the

A LESSON IN TRENCHING

Fred Cahill's gang was working out in Belmont. It was one of the first jobs where we had the new hydraulic backhoes. I was anxious to see how well it could perform and how well the gang could keep up with it, timbering the trenches and laying down the pipes. The area had quite reactive clays; they look good when you open up the trench but the clay has slip planes so it can slip straight in without warning.

I went crook at him because I didn't think he was making enough progress. So I said, "It's only a metre and a half deep, you're not making much progress. Why have you got all this timber in there?" I went through all the reasons why I thought things were going pretty slow.

He said, "This is bad clay. I know this area. I've worked here before and we've nearly had a couple of bad accidents."

I said it looked all right to me; they had their heads above ground. He said, "No, it's not good. I'm leaving the timber the way it is." (You could change the spacing depending on what you felt was right. They could put the timber close together, called close timbering, for bad ground and you could space it out for better ground.) He had it in close and I said he should space it out a bit because it was slowing down progress and holding up the excavator.

He said, "Do you really want me to do that?" and I said I did. He said, "All right, I'll spread it out. Come back after lunch and we'll see how it's going."

I came back after lunch and the guys were all at the top of the trench. They weren't in there working and the excavator was stopped. He said, "There you go, we've spaced it out now, come and have a look." He'd spaced them out to about six feet apart, which was called light timbering and, sure enough, between three of those sets the clay had slipped in. The braces were still there but the clay had slipped in. It would have been enough to injure somebody.

He said, "That's what you told me to do. What do you want me to do now?"

"I take your point," I said.

He said, "We've lost two days work now, we'll have to dig it all out again."

"Yes I know that."

"Close timbered?"

"Yes," I said.

He had a smile on his face and the rest of the guys were grinning.

Mike McCoy recalls a lesson he learned in how to dig trenches and how to listen to advice.

workers took all reasonable steps, but it was not possible to construct sewers and leave everything the way it had been. Gang leaders and overseeing engineers developed the skill of placating people who had been upset by holes being dug in their backyards and workers trampling over gardens.

The interior of the new night soil disposal facility at Marshall constructed almost immediately over the outfall sewer. Trucks drove through on either side so the pans could be emptied quickly and efficiently.

When a gang arrived on a new job, they began digging a series of shafts along the sewer line two feet wide, about seven feet long and each about three feet apart. It appeared they were digging a line of graves across people's backyards. It took a man about a day to dig one of these shafts. They had air compressors and jack hammers to break up rocks and clay and they sometimes used explosives. Most of their work was done with a Trojan Number 2 shovel, with a relatively small blade and long handle that made digging easier and gave the leverage needed to throw dirt up and out the trenches. They dug down to just below the level at which the sewer would be installed, with the ganger or engineer checking depths using simple surveying equipment. When the shafts were finished, the bottom few feet between each one was knocked out, the levels checked again and the pipes laid. Then, when everything was in place and checked, they filled in the holes and moved on.

In 1939, the SR&WSC forwarded regulations designed to prevent accidents during sewer construction. The trust accepted them, but at that time worker safety was an informal and individual thing that relied on the experience of foremen and a sense of self-preservation. The greatest danger came from slippages in trenches so great care was taken to ensure the sides were properly shored up and that men did not go outside those areas. But it only took a small mistake or a momentary lapse of concentration to cause a serious accident. In August, 1961, Martin Askiatas, a 30-year-old labourer working in a trench 17 feet deep, ventured just outside the protected area. The wall of the trench collapsed, covering him in two feet of heavy clay and mud. His workmates dug frantically for half an hour, but the falling mud had pushed him face first into a small pool of water and by the time they pulled him out he was dead.

Engineers, timekeepers and pay clerks who visited the gangs on site were their link with the trust. Young engineers came regularly to check on progress, ensure the jobs were being done correctly and that the gangs had the tools and



supplies they needed. It was challenging being responsible for so many men who knew much more about the work. The smart ones learned from those men. In charge was Brian Deakes, who had been with the trust before the war and taken extended leave to join the air force. He had become a fighter pilot and still drove his car as though it was a Spitfire. Reportedly, most people avoided catching a ride with him if they could.

The sewer workers were a close knit group. They established their own social club and organised their own social functions. At one of these, they sang a song one of them had composed to the tune of the old hymn *Onwards Christian Soldiers*:

*Onwards Christian sewerage men
Swing those shovels high
Digging holes for someone's shit
'Til the day you die.*

While the sewer gangs linked more houses to the system, the trust continued to provide sanitation services to places not yet connected. By the mid-1960s, this amounted to about 1,400 sanitation pans a week. In 1934, the trust had leased land for a sanitary depot at Grovedale, but by 1954 it was close to new housing development and a new depot was planned over the outfall sewer at Marshall, south of Geelong. It could handle 2,500 pans a week, with facilities to clean and disinfect pans. But South Barwon Shire tried to block construction and the new depot was not ready until 1956.

As Geelong's industries grew, so did the problem of what to do with their trade waste. The old sewerage system had not been designed to accommodate it, and while the special sewerage areas on the north shore of the Barwon River were a special case the trust rejected most applications from industries in other places. Those it did accept had to treat their waste to neutralise it and remove solids that could clog up the sewers.

During the 1950s, industries applied increasing pressure to

gain access to the sewerage system. At the same time, industries in the special areas along the Barwon wanted the special levy to be dropped. By 1956, it was inevitable trade waste would be accepted into the sewers and the trust began examining the options. In 1957, it realised the main outfall sewer was deteriorating at such a rate that accepting trade waste was unlikely to make matters much worse. Accordingly, it decided to accept some trade waste and drew up comprehensive regulations to control what could be put into the system. The decision to construct the duplicate sewer allowed the trust to reconsider its entire trade waste policy. As a first step, the special sewerage areas were abolished at the end of June, 1964. The new policy was that every industry had to make an individual agreement that controlled the composition of trade waste put into the sewers, including chemical content, solids and temperature. It introduced charges by volume rather than rates based on property values. By April, 1964, there were 58 trade waste agreements and in 1967 revenue from trade waste totalled \$13,904.

To monitor waste, a small laboratory was established in the

THE LABORATORY

The first trust laboratory was located in the old Temperance Hall in Little Malop Street, an impressive building of sandstone. It was not, by today's standards, a designer-built laboratory but served the organisation's needs. The building was divided into two, with the laboratory making up one half. It was split into two functional rooms, one room being for wet chemical testing and the other was called the technical area at the front of the building.

The technical area housed the AAS (atomic absorption spectrometer) and a GC (gas chromatograph) used for determining heavy metals and heavy oil finger printing, respectively. The AAS was a key instrument in determining the heavy metals in trade wastes and sewage. This room also housed the microbiological filtration systems and incubators used to determine coliforms and E-coli in potable water and environmental waters.

The senior chemist in charge of the laboratory, Ian Lowther, was responsible for establishing the monitoring of the potable water, trade wastes and sewage discharge. He was President of the Australian Waste Water Association in the 1970s. The monitoring regime involved many people collecting samples from industries, the outfall sewer and nearby beaches as well as samples from the Moorabool and Barwon Rivers in many locations.

Peter Ashton talks about the trust's laboratory in the old Temperance Hall.

old Temperance Hall. Testing was part-time until 1966 when the trust and the Geelong Harbour Trust set up a joint laboratory, appointed a full-time chemist and equipped it to conduct analysis for both organisations with the cost shared. This arrangement allowed the trust to test the quality of its water supplies and monitor the trade waste that went into the sewers.

Maintenance was one of the most important activities. Many men constantly monitored, maintained and repaired equipment and facilities, such as the service basins and sewerage pumping stations. In the country, men based along the Moorabool and upper Barwon systems travelled daily watching, reporting and carrying out repairs. Maintaining and cleaning the channels was a never-ending cycle; most summers when the water had stopped flowing, men removed silt and weeds. Channels were concrete-lined where they were weakest or where they leaked and this also reduced weeds and the need for regular patrols.

In Geelong, teams of men were on constant call, ready to repair broken pipes. Water spouting up into the air was always a source of great public entertainment and by the 1950s many of Geelong's pipes were old and prone to breaking. In 1959/60, maintenance workers responded to 1,334 bursts. Macintyre began a concerted program of pipe improvement, replacement and cement lining that helped reduce bursts by half. In 1965/66, there were only 471 bursts, or one or two a day, when there had been four or five a day in 1959. Cast iron pipes seemed the most prone, but cement pipes also burst. In 1966/67, there were 605 bursts attributed to dry weather. In fact, there were more bursts in the summer than winter because the ground moved when it heated and dried out. The trust tried various counter measures, but nothing seemed to be the complete solution.

Other maintenance teams responded to sewerage incidents. Because there was no pressure in the system, sewage did not spout but leaked where a pipe had broken or flowed back into people's houses and shops if there was a blockage.



Water spouts high into the air from a burst water main in Church Street, Geelong West, in October, 1965. Photo courtesy of the Geelong Advertiser.

These problems were nasty rather than a public spectacle. But unlike water that could be turned off, the sewerage system could not and the work was constantly messy and usually unpleasant.

The total catchment area under the trust's control was about 17,000 acres and it was guarded closely to protect water quality. At various times, some storages were stocked with fish and anglers were allowed entry. Generally, though, people



The trust constructed ramps for boat users on the banks of the Barwon River. Here, sheet piling has been driven into the bank and the ramp excavated behind it. A nearby pump keeps the water down in the work site.

were not allowed access to prevent pollution and the trust had a policy of not providing public amenities at its reservoirs. But reservoirs are picturesque places that attract visitors and commissioners decided to provide facilities at West Barwon despite Macintyre's protests. In 1967, the gates that had remained firmly locked for most of the year were replaced by a new tourist entrance and toilets were erected near a car park.

In 1951, it was decided to put some of the catchment to profitable use by growing pine plantations that could be sold for packing cases. The first land was cleared at Stony Creek in 1957, with vegetation blocks being replanted with pines. The trust, remembering it had established a koala colony in the manna gums at Stony Creek, excluded that area from its re-afforestation program. The work continued steadily. Every year, another 30 to 50 thousand seedlings were planted and by 1963 there were about 400 acres of radiata pines growing in the catchments at Bostock, Stony Creek and West Barwon. This work was a long-term investment and some sales began in the early 1970s. In 1993, 635 cubic metres of logs and 385 tonnes of pulpwood earned a royalty of \$13,280.

The trust remained responsible for the Barwon River from the point where it met the western boundary of the City of Newtown downstream to the eastern boundary of the City of Geelong. It maintained and developed the river and its facilities and attempted to control river use. The waterway became a place of recreation; for relaxing, enjoying nature, running, walking, picnics, fishing, rowing or boating. The trust began purchasing and planting trees and shrubs at selected places on the south bank to break up its drab appearance. To further beautify the river, the trust began acquiring land in the old industrial area on the north bank and co-operating with municipal councils on various improvement programs. It constructed and kept clear a rowing course two kilometres long and wide enough for four crews, built boat ramps with financial assistance from the Tourist Development Authority and carried out other improvements, including curbing, park benches and barbecues.

The trust's main problem with the river was not improvements and beautification, but satisfying the demands of users. When commissioners received an application in 1954 for a boat powered by an outboard motor to use the river, they seemed at a loss to know what to do because there were no relevant by-laws. So they gave approval. The popularity of fast motor boats grew rapidly, as did water skiing. In late 1954, the Victorian Water Ski Association was given approval to hold a charitable demonstration of water skiing on the river. But power boats and skiers began causing problems to other users and around 1961 the trust began issuing special permits for boats to exceed six miles an hour. For the Geelong water skiing tournament in January, 1962, 150 permits were issued for boats to exceed the speed limit.

The trust's policy was that the river should be enjoyed equally by everyone, but in reality rowing had the highest priority because rowers had used the river for many years. Further, the Public Schools' annual Head of the River

competition was one of the highlights of Geelong's social and sporting calendar. When power boats and water skiing became popular, the trust had to balance the needs of both groups as well as accommodate anglers who claimed their right to the waterway. The latter said speed boats disturbed the fish and that rowers came too close to the shore while rowers and the anglers claimed speed boats were eroding the banks. In 1965, the Geelong Water Ski Club secured the rights to hold the State Championships without checking with the trust to see if the dates were available. Fortunately there was nothing scheduled, but the rowers had a major competition coming up and insisted they needed the river to practice. Eventually a reasonable agreement was reached.

By early 1965, arguments and complaints about river use had become an important local issue. The Geelong Advertiser reported that animosity between the groups had reached the stage where disagreements did not always stop short of violence. Chairman Carr criticised the report and said that as far as he was aware all issues about river use were being settled amicably. Other commissioners might not have agreed. As the government nominee to the trust, Carr did not have to concern himself with these squabbles. But elected commissioners, who were closer to public opinion, knew that apparently petty issues could influence voting.

Rapid expansion led the trust to employ a growing labour force. In 1951, it numbered 63, in 1957 it passed the 100 mark and reached 313 in 1961. In 1965, the total number of employees was 318. It reached a peak of 357 in 1967 and then fell away to 325 in 1968.

Despite this growth, there were times when the staff was unable to keep up with demands. For example, when it received requests to extend the water supply to the nearby towns of Fyansford, Batesford and Little River, the trust replied it simply did not have sufficient people to investigate the proposal. In 1959, the Engineer-in-Chief told commissioners he had not been able to present them with three of the 13 plans the trust had received for subdivisions



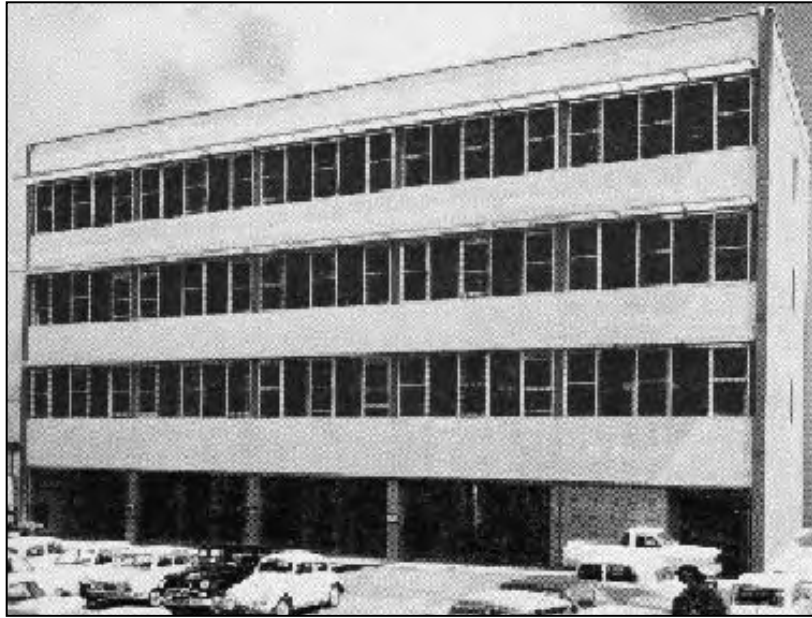
The trust's new facilities at South Geelong. The building on the left is the maintenance depot and on the right is the store. The vehicles suggest this photo was taken in the mid-1950s.

because he did not have the resources to complete them in time. At the meeting in February, 1965, he told commissioners there were 106 outstanding applications for house connections to the sewerage system. Again, he reported he did not have the staff necessary to plan them.

In fact, the staff had so much work some could not take annual leave. By 1955, 17 employees had not taken long service leave and in 1957 seven staff were given additional pay in lieu of accumulated leave. The Engineer-in-Chief was authorised to bring in his engineering staff on Saturday mornings to help catch up the backlog and so the public would see the trust was making every effort to keep pace with demand. Macintyre also was guilty of working too hard and in March, 1961, commissioners directed him to take some of his accumulated leave for the sake of his health.

The trust continued employing people after they had reached the nominal retirement age of 65 to overcome staff shortages. In 1953, commissioners decided that people over 65 when the superannuation scheme started would be exempt from having to retire until they were 70. But in the following years the trust continued employing people who had reached 65 and should have been retired. In 1965, the issue surfaced again. Commissioner Whiteside said he believed people should retire at 65 while Commissioner Sprague suggested an

The new office building constructed on land at the rear of the trust's existing buildings in Ryrie Street. This photograph was taken for the official opening ceremony in November, 1964.



upper limit of 68 because that was when people began to lose their vigour. Despite this, the trust continued to re-appoint people over 65, with Whiteside saying this was wrong because they were taking work that should have gone to younger people. When the staffing crisis was over and the workforce was being reduced around 1967, commissioners agreed the first to go should be people over 65 – unless they had skills the trust needed.

When Commissioner Whiteside attended his first meeting, he said he had fought his election on the issue that civil organisations like the trust should not compete with private enterprise. He often insisted the trust should give more work to contractors and reduce its own labour force because, as things stood, the trust was in competition with private contractors. In 1963, Whiteside tried to have a new pumping station constructed by contract. He said there were companies in Geelong capable of the work and if the trust used day labour it was spending more than necessary. The trust continued to do much of its work using day labour, however. One advantage was that it allowed the authority much greater flexibility than would have been possible with



contractors. The trust kept detailed records on cost comparisons between contractors and day labour and in 1967 work undertaken on the duplicate sewer project showed day labour in a favourable light.

Because of rapidly expanding staff numbers, the trust bought vacant land on the corner of Bellarine and Lonsdale Streets, South Geelong, in 1951 where it built a workshop, storeyard, garages and small amenities block. Most of the staff who had worked in the old buildings in Little Malop Street moved there. Further major developments were constructed in 1965. This allowed some of the cramped staff in the Ryrie Street office to move into the Little Malop Street building.

In 1955, 61 and 63 Ryrie Street immediately west of the head office building were put on the market. Negotiations to buy them were concluded in September, 1958, with the trust paying £9,000. This enabled more staff from head office to transfer into the new properties, thereby creating more space in the old building.

Around this time, the trust approached the SR&WSC for approval to build a new office, but it was not supported. By mid-1961, accommodation was desperate and the SR&WSC

The lobby of the old office when it had been renovated, taken from the revenue office. The stairs lead up to the engineering department. All the people in this photograph are trust employees.

approved construction of a new office building on the vacant land behind the old office and new properties in September, 1963. This would provide vastly expanded accommodation without unduly disrupting work in the existing buildings.

The new office had four storeys – an open basement with parking space for 23 cars and three office storeys above, each of 5,500 square feet fitted with movable partitioning. There was a lunch room and a caretaker's flat on the third floor. The first floor connected directly to the ground floor Ryrie Street office due to the slope in the land from the front to the back of the block. The entire building cost £177,800. The ground floor of the old office also was renovated in keeping with the new office, including lowering the ceilings. The new office and the remodelled old office were officially opened in November,

Two punch-card operators.
Punched cards used to generate rates notices were initially sent to Melbourne to be processed. Later, they were used on the trust's own computer.



1964. Unfortunately, it did not take long for staff to discover the large north facing windows made the new office a hothouse in summer and the trust spent several years trying to find a solution.

New, better and more equipment improved the trust's efficiency. Developments in earth-moving equipment took most of the back-breaking labour out of construction, starting with tractors fitted with backhoes that could dig a trench quicker than a team of men. This evolved into an all-purpose machine that could dig trenches and then fill them in again, meaning a single machine could replace two or three and do the work more efficiently. Hydraulic power replaced the previous complex arrangement of cables, making these machines easier to operate and maintain. Initially, there were very few of these machines around Geelong and the trust hired them from contractors. But then it bought several for use in construction and maintenance work. Compressors and air-driven jack hammers improved the efficiency of the water supply, sewer and maintenance gangs, motor-driven grass cutters made it easier to maintain the grounds around service basins and trailers made it easier to store and transport tools. A pile-driver bought in 1954 allowed construction work on the Barwon River and sewerage extensions while a horizontal earth-boring machine bought in 1967 made it possible to lay short lengths of water mains without having to dig trenches. The trust owned a growing fleet of motor vehicles, ranging from small cars used by the Secretary's branch to take money to the bank or deliver pay to men out on jobs to large trucks used by construction and maintenance gangs to carry pipes and equipment. Improved telecommunications made it possible to remotely monitor water levels in the Highton service basin, and in 1958 the trust began installing two-way radios in maintenance vehicles to allow men to go directly from one job to another without having to return to their base in South Geelong. Two-way radio communication also allowed engineers to make arrangements for delivery of equipment and supplies to the gangs without having to return to the office.

Most construction planning was done at drawing boards and,



Drawing offices were the heart of the engineering branch. This is a drawing office in the new building and is more spacious than offices in the old building. The man on the right with his back to the window is Lindsay Vernon, one of the trust's senior engineers.

as the engineering branch expanded, so did the need for more drawing boards and machines, layout tables and plan cabinets. In 1959, the trust bought a semi-automatic engineering calculator that helped take some of the drudgery out of the necessary mathematical computations that went into major projects. The Secretary's branch made more use of calculating machines to assist in accounting and preparing notices of rates and water charges. The trust bought its first cash register in 1953 and in 1965 replaced two registers with two new decimal currency versions. It also began using computers in 1963 when punched cards (the most common form of data storage) were punched in the office and taken to Melbourne where IBM used them to print the rates notices. This made it possible to return to twice yearly rate notices after almost a decade and a half of issuing them yearly. This resulted in smaller rate bills that the average user found easier to pay. It also spread the trust's income more evenly over the year, although sending out two notices a year incurred additional cost.

An equally revolutionary change was the arrival of copying machines. Typewriters had existed when the trust was established, but did not become commonplace for many years.

The trust did not set up a typing pool; rather, it had a specialist typist or two in various places around the office. As well as preparing correspondence, typists also transcribed many documents and made duplicates using carbon paper. Most office work, however, was still done by hand with a pen and paper and the quality of a clerk's handwriting was an important attribute, particularly for vital records such as the rates and inscribed stock registers. In 1962, it was decided to buy a copying machine. The trust had been investigating them for several years, but the need had become greater and the machines and paper had become cheaper and better.

Drawings were the basis of all construction and maintenance. They were labouriously prepared by hand and, when necessary, could be copied in the dark room in the office loft or be copied by tracers, usually young women who traced over drawings to make copies of parts or all of a drawing. In 1956, a plan printing machine capable of making copies of all kinds of plans was purchased. In 1962, the trust began photographing all its plans and other important records and storing the negatives in cabinets. This ensured every plan could be printed quickly and relatively cheaply and did away with the need to keep thousands of old plans.

Various members of the trust who went overseas for personal reasons took time to visit other water supply and sewerage organisations. In 1959, Macintyre returned to Scotland and arranged to visit water, sewerage and trade waste disposal processes in the United Kingdom and United States. What he heard and saw would have helped him make decisions about the duplicate sewerage system. In 1960, Henshaw went overseas on a vacation and while away spent time studying the organisation of water boards, particularly in loan financing and raising methods, office organisation and coping with rapid expansion. When Cooke went overseas in 1962, he took the opportunity to attend conferences in London and Toronto and Victor Seitz attended a conference in Munich when he was overseas in 1966. In all cases, the trust gave the officers money to help recompense them for the time spent gathering knowledge of

value. Chairman Carr went overseas in 1966 and while in Britain attended a British Waterworks' Association conference and later inspected waterworks installations. When he returned, he told commissioners that what he had seen and learned convinced him he should have gone overseas on the trust's behalf at least 10 years earlier. He said the executives should be sent overseas at least every three years and what would be gained would repay the trust and the community ten-fold. As a result, Macintyre went overseas in 1967 on a tour designed specifically to learn about the water industry, and in 1969 Henshaw was sent overseas to discuss the latest financial and administrative practice in the industry.

The rapid expansion of Geelong and the trust began to make it more difficult for the authority to communicate with the community it served. In 1966, commissioners gave consideration to appointing a public relations officer. The MMBW in Melbourne had a publicity specialist because it had trouble getting out news about what it was doing, but commissioners thought they did not have that problem and did not believe a public relations officer necessary. They were partly right because the trust always made good news in Geelong. Each time the organisation made an important decision or achieved a major milestone, it was likely to be reported. When something went wrong, it often made even better news and the trust began to find it had less control over what was written and said about it. The problems about use of the Barwon River was a prime example. When the Geelong Advertiser's article about animosity between the different groups upset Chairman Carr, all he could do was say that if the press could not deliver a more accurate standard of reporting they would be excluded from commissioners' meetings. Another case occurred in 1967 when the authority in charge of laying gas pipelines said natural gas would not be extended to Geelong because of the limitations of the water supply. Commissioners responded by inviting all the Members of Parliament connected with Greater Geelong to lunch and a discussion of plans for additional water supplies. Several months later, when the Governor-General attended a

civic reception in Geelong, commissioners were affronted because no mention was made of the trust's role in Geelong's development. They responded by inviting the State Governor and Premier to visit Geelong to inspect the trust's works for themselves.

The trust also was poorly equipped with knowledge of how the media worked and lacked the resources to deal with it. In 1963, commissioners decided to issue regular notices following their monthly meetings, but that was difficult to continue because of limited resources. The trust only discovered by accident that the advertising rates of the Geelong Advertiser were cheaper for different types of advertisements and the way in which the local radio station, 3GL, organised its advertising. On another occasion, the inability of commissioners to agree over a pamphlet meant it was not distributed.

Despite these problems, the trust had several advantages that allowed it to keep it in touch with the community. One was that it still had a relatively short chain of command, from the lowest staff member to the executives, which made it easier for people to obtain a quick decision. Elected commissioners also provided a direct link between the community and the trust. They attended meetings of local groups, such as progress associations, to present the trust's point of view and receive feedback. When they were debating whether or not to change the number of rates notices issued in a year, they sought public opinion before making a decision.

The trust and commissioners excelled at ensuring they were well known and regarded in civic and political circles. From the beginning, commissioners used their political contacts to gain access to the government in Melbourne, either to obtain something they wanted or to ensure the trust's activities and requirements were remembered in the larger political world. They also entertained extensively in the trust office. Deputations to commissioners' meetings were often invited to stay for refreshments afterwards when things could be discussed more informally. In 1953, they bought a refrigerator to help in entertaining visitors. In addition, the vacant caretaker's flat in

the new office was converted to a VIP entertaining area.

The convivial atmosphere of this kind of entertaining flowed on to the rest of the trust. Carr made a habit of holding annual dinners at which other commissioners, executives and sometimes a few guests were invited. The annual picnics remained a focus of the trust's social life until 1961 when several "unfortunate events" at the Anglesea Hotel brought them to a quiet close.

The feeling of family existed because people enjoyed the atmosphere and their work, and shared a common loyalty. The sense of family also came from a sense of tradition and a shared past. The tradition stretched back to the very beginning, with long-time staff sharing with newer members stories about some of the personalities and eccentrics who had preceeded them. Rapid expansion that gave opportunities for advancement and new challenges meant most people remained satisfied with their working lives. Rivalries and jealousies were reduced by growth and people could see the physical results of their activities, which instilled a sense of achievement. Most were not directly involved in large projects, such as the Bostock or West Barwon Reservoirs, but they were taken to see for themselves the fruits of the trust's labours.

When most of the outdoor staff moved to South Geelong, the casual social links with the staff in head office were broken. At South Geelong, sewer and maintenance workers established their own social club and held annual Christmas parties – one in the evening for adults followed by a party for their children where Santa Clause distributed presents. Social activity at Ryrie Street around Christmas was more informal, but probably no less enjoyable.

In 1963, commissioners decided there should be a unified social club. Macintyre was delegated to hold a joint meeting of the members of both social clubs at the Newtown Town Hall and the trust supported the formation of the Employee Social Club in August, 1964. The real impetus for this move came from the decision to include an auditorium, with adjoining kitchen and dining area, in extensions at South Geelong.

Chairman Carr handed the key of the clubrooms to the social club committee on December 2, 1965. The facilities were available for the occasional conference, but more frequently for social events involving the families of employees. The trust entered badminton and carpet bowls teams in local competitions and they used the auditorium as their home base.

The creation of the new social club and the trust's support and provision of rooms embodied the sense of excitement and group achievement that pervaded the period. The trust comprised many people doing many different things, but together they created an organisation that achieved great things, made Geelong's rapid expansion possible and gave them a sense of belonging. When Chairman Carr began 1967 by saying he hoped commissioners would find the year ahead "an interesting and fruitful one", he was expressing a sentiment about the achievement and loyalty of the trust that he had been repeating in different ways for more than a decade and a half. Unknowingly, he also invoked the oft quoted Chinese curse of living in "interesting times".



Engineer-in-Chief J M Macintyre speaking at a Social Club function in the auditorium around 1967. Harry Goodgame, on the right, was the first Social Club President.



CHAPTER SEVEN

INTERESTING TIMES

1967 – 1983

A slow and almost imperceptible shift in the Geelong Waterworks and Sewerage Trust's focus began in the 1970s. It was not the trust's intention to change, but new forces at play in the wider world began to alter society and the organisation adapted itself to meet the challenge. Some of the forces were the economy, a new environmental awareness and new practices. Where once the trust had made its contribution to the city's progress, it now took part in nation-wide change.

By 1980, Geelong's population was 145,000. The inner areas were almost fully developed, so most of the growth occurred in what had been open rural areas in the Shires of Corio and Bellarine and in South Barwon, which was declared a city in 1974. Heavy industry continued developing around Corio Bay to the north of the city while to the south, on waste land between the residential areas and the river, a new industrial zone emerged. It contained mainly smaller industries that gave Geelong a diversity of products and jobs. Geelong also grew closer to Melbourne and came more under its influence. Completion of the West Gate Bridge created a freeway from the centre of Melbourne to Geelong and made it possible for more people to commute easily between the two cities.

The rapid expansion of the trust's services matched Geelong's progress. Between 1968 and 1980, the number of properties connected to the sewerage system grew from 32,506 to 40,522. The trust's services experienced the same pattern of good

Water from the trust's groundwater test bore pouring into the Wurdee Boluc inlet channel.



North Highton, part of Geelong's expanding suburban area that was being sewered in 1971.

progress in the early 1970s, rapid growth in the late 1970s and then a decline to more modest growth thereafter. Some 1,185 new properties were connected to the water supply system in 1974, connections continued at that rate until 1977 when they jumped to 1,501 and then remained at that level until 1979 when the figure fell to only 731. They then continued around that level. In 1973, sewerage gangs laid 16.3 miles of new sewers, in 1975 they set a record of 30.6 miles and then another record of 36.8 miles in 1976. This dropped to 30.6 miles the next year and back to 8.3 miles in 1980. In 1984, only 7.78 kilometres of new sewers were laid, the lowest total for more than 25 years.

The rise and fall in the trust's level of new water and sewer connections reflected changing economic conditions. The long period of economic boom dissolved into economic chaos from the late 1960s as the engines of growth began to lose momentum. A short war in the Middle East led to the escalation of the price of oil that had fuelled much of the progress. Within years, the optimism of the boom was overtaken by inflation, stalled growth, the rapid rise of unemployment and widespread despondency. Hard times seemed to have returned; hard at least in comparison to the prosperity and progress that had gone before.

In June, 1968, commissioners discussed ways of providing more work for the unemployed, just as they had in 1928. Finding work in 1928, however, had been easier because earthworks were done by hand. In 1968, the trust needed men with experience in using complex equipment rather than picks and shovels. The social security system of the 1960s protected most unemployed people from the absolute destitution of the 1930s, but governments still sought ways to reduce unemployment statistics. They devised a succession of schemes to employ young people, provide unemployment relief in rural areas and give people work experience. Where possible, the trust applied for grants through these schemes to generate employment in and around Geelong. In 1972, around \$30,000 from the Rural Employment Program provided some temporary work, notably on upgrading water channels and

PROSECUTIONS FOR ILLEGAL WATER USE

A woman charged with a breach of Geelong's water restrictions told the City Court yesterday that she would have thrown a bucket of water over the inspector who detected her had she had the opportunity.

Mrs W, of Ryrie Street, said this after she had attempted to make accusations against an officer of the Geelong Waterworks and Sewerage Trust.

Mr C J Thomson, SM, would not allow her to call evidence against the inspector, but earlier she had claimed that the inspector had hidden beneath bushes to catch offenders.

"That may be so, but inspectors have to resort to unusual methods to stop excessive wastage of water," Mr C J Thompson, SM, replied.

The inspector told the court that he had seen Mrs W water shrubs with a hose about 5.15 pm on February 11.

Twenty householders received summonses to appear in court yesterday for alleged breaches of the restrictions.

Mr Thompson dismissed two cases during the sittings.

Fines imposed in various suburbs were...

During water restrictions, the press regularly published lists of people prosecuted for using water illegally. This report is from January 19, 1968.

improving the Barwon River. In 1978, a \$8,000 grant allowed improvements to the banks of the Barwon River and the following year the Youth Employment Training Program gave five young people job training in the engineering department.

In 1967, though, the problem in the minds of Geelong's people was not unemployment but drought. The city's growth and increased water usage led to unprecedented consumption, and on a very hot day in February Geelong set a record of 33.46 million gallons in 24 hours. It would have been enough to supply the town for more than a month 60 years earlier.

The year 1967 was about the worst drought Victorians had experienced. The first three months were the driest in history, but by August the storages still held slightly more than Geelong's needs for a year with what were usually the wettest months of the year to come. But they did not come and restrictions on sprinklers in gardens were imposed on October 27.

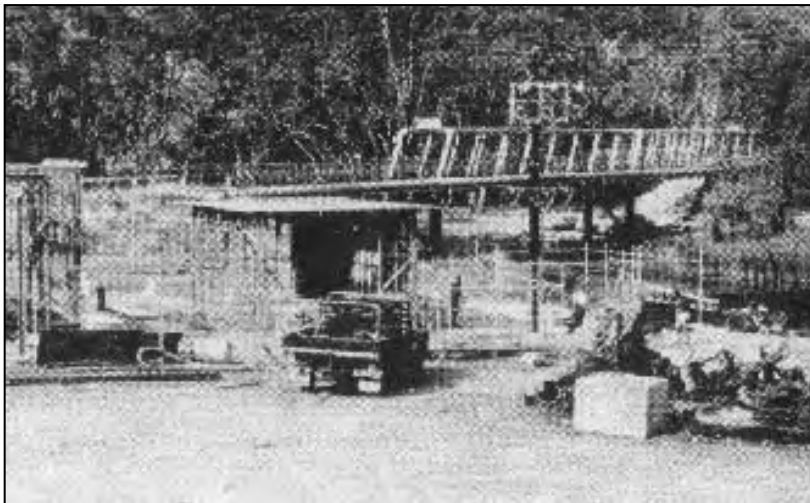
The restrictions did not save enough water and from the beginning of November gardeners were limited to using hoses for only two hours a day. The situation deteriorated further and at the end of November restrictions were increased to only

an hour a day of hose watering, although buckets and watering cans were still allowed at any time. Many gardeners tried to hide their illegal use of water under cover of darkness and the quiet swishing of sprinklers could be heard across Geelong late in the evenings. In response, the trust sent out its inspectors in force. Eighty-four violations were detected by early December and from then on the newspaper regularly published lists of who had been prosecuted, where they lived and some of their excuses.

The trust was forced to return to the Barwon River in Geelong as a water source. It set up a pumping station on the banks of the river near Queen's Park Bridge to pump supplies into the storage basins through a nearby transmission main. Pumping began in January, 1968, but the quality was poor and it was chlorinated, monitored for salt content and mixed with other supplies to make it more acceptable. The two diesel-powered pumps running at night disturbed people nearby so a third was added in April to provide 900,000 gallons during the day.

By the beginning of March, only 2,769 million gallons remained in the storages. Buckets and watering cans previously allowed at any time were banned and only one hose could be used for one hour a day. Gardens that had survived to this time shrivelled up.

The pumping station being constructed on the banks of the Barwon River in January, 1968. By the time pumping began, the river had stopped flowing and it was virtually a very long lake. Water quality was poor and salty so it was pumped to Montpellier where it was mixed with water from other sources to dilute it.





The Barwon River in flood through Geelong.

By April 25, 1968, the storages held only 2,197 million gallons and the trust drew up plans for even more drastic restrictions in the hope of reserving sufficient water for the barest necessities in the coming year should the rains not arrive. But they did. It began to rain on April 19 and on April 30 there were heavy falls for 60 miles around Geelong. It kept raining, boosting the levels in the storages and reducing demand. Still, there was so little water in the storages that even though the emergency had passed, the restrictions were not lifted until August 22, 1968.

The rain continued. On October 26, 1968, the West Barwon Reservoir became full for the first time and water started running over the spillway at the rate of 54 million gallons a day. At the beginning of September, 1970, all the storages were full but it kept raining.

In October, 1968, there was minor flooding in Geelong, the Breakwater bridge was closed and some land to the south on the floodplain was covered, although there was no significant damage. In September, 1970, the spring rains again flowed down the Barwon River, five miles wide in places, causing the worst floods since 1952. The river flooded again in November, 1971, February and August, 1973, August, 1974, and October, 1975. In Geelong, the floods usually inundated the Belmont

Common and adjacent areas but caused little real damage. Further up the river, however, they could cause severe damage and disruptions. In October, 1976, there was torrential rain over the Otway Ranges and thousands of hectares were flooded, roads were cut, bridges washed away and people isolated. The flood peaked in Geelong only a third of a metre below the level of the 1952 floods. June the following year was the wettest for 117 years and two substantial floods rolled through Geelong in July. This serious and regular flooding finally led the SR&WSC, local government and the trust to commission a study into the cause and solution, but work did not start until August, 1979.

The 1967 drought focused attention on the need to improve Geelong's water supply. The trust had three major sources of water for Geelong's future. One was a large dam on the West Moorabool River at Lal Lal, another was the possibility of tapping underground water in the Barwon Downs area and the third was harvesting water from the Gellibrand River catchment. The first two options appeared to pose only technical and financial problems; the Gellibrand option was more difficult because other communities to the west, including Colac, regarded the Gellibrand as their catchment into which Geelong was a late, large and unwelcome intruder.

Commissioners approved preliminary investigation for a new reservoir at Lal Lal in February, 1966, but in January, 1967, they learned that Ballarat's water commissioners also were looking to Lal Lal as a future source. The SR&WSC brokered an agreement between the parties to jointly build a reservoir there and share its water. Negotiations were not easy and at various stages the Geelong commissioners considered abandoning the idea and pushing ahead with the other options. But an agreement was concluded in February, 1968.

The trust, Ballarat Water Commission and SR&WSC agreed to create the West Moorabool Water Board to construct and operate the new storage, which would supply both cities using a flexible formula. The new board would borrow the money, oversee design and construction and be responsible for operations. It had five members, with three nominated by the



Chairman Carr pointing out features on a cross-section drawing of the Bungal Dam.

government, one by Geelong and the other by Ballarat. It met for the first time on June 14, 1968, with Chairman Jack Carr representing Geelong's interests. It decided to construct a large rock-filled and concrete-faced embankment – there was a lack of clay in the area – called the Bungal Dam. Although the trust expressed interest in assisting with the design and construction, the board decided the work would be undertaken by contractors. Construction commenced on February 5, 1970, when Premier Bolte set off an explosion to start the work, and it was opened on November 24, 1972, by his successor, Premier Hamer. It had a storage capacity of 13,100 million gallons and by the time it was completed the West Moorabool Water Board had borrowed \$4.855 million. The trust was liable for at least 50 per cent of that amount. Apart from that, the trust played no active part in the project.

The water-sharing arrangement initially allowed Geelong to take two thirds of the water, but as Ballarat grew it would gradually increase its allocation to that amount. Initially, the costs were shared the same way, but when Ballarat began using the water it decided to pay half the cost. Of course, this suited

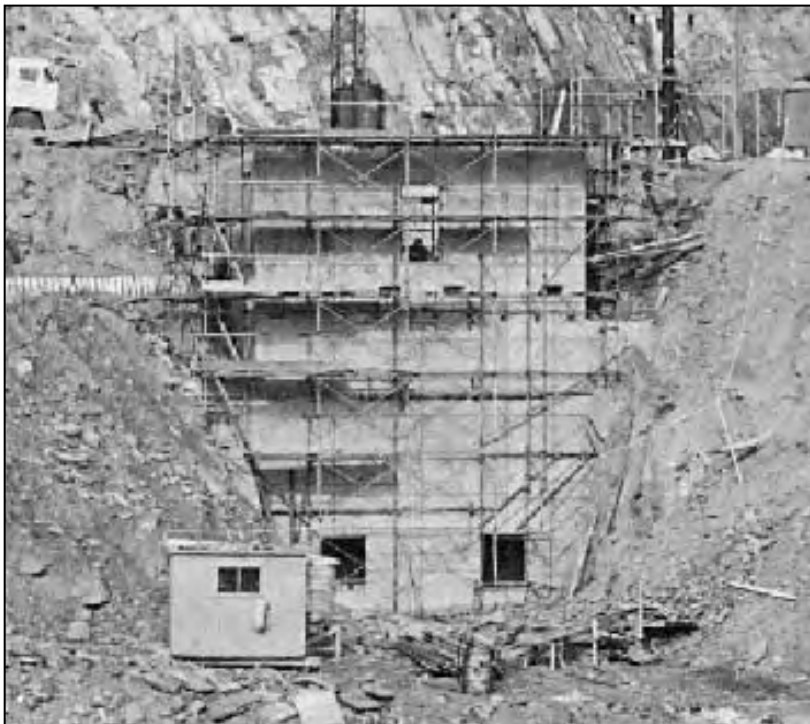
Geelong. But both cities were unhappy with the way the board was run, with its sole contributors and only customers being the minority voice. In February, 1976, the board was reconstituted with only three members – a government-nominated chairman and the chairmen of the Geelong and Ballarat water authorities, with the administration run from Ballarat.

The cities made their own arrangements to get water from the Bungam Dam to their supply systems. The trust decided its water would flow down the Moorabool River about 20 miles to She Oaks, where a diversion weir could be conveniently constructed in a narrow gorge. From there, the water would be pumped up to a small basin nearby and then through 27-inch diameter pipes a distance of 23 miles to the Montpellier service basins. Engineers calculated it would cost about \$2.5 million to construct the pipeline underground and \$2.093 million mostly above ground. The half million dollars difference would reduce the annual interest charge on borrowing for the project by an estimated \$34,000 a year,

The pumping station at She Oaks under construction.

When the weir was completed, water covered the station up to about a third of its height. The two large holes at the bottom were for water intakes for the pumps that were located at about the level of the window where the man is standing in the middle of the station.

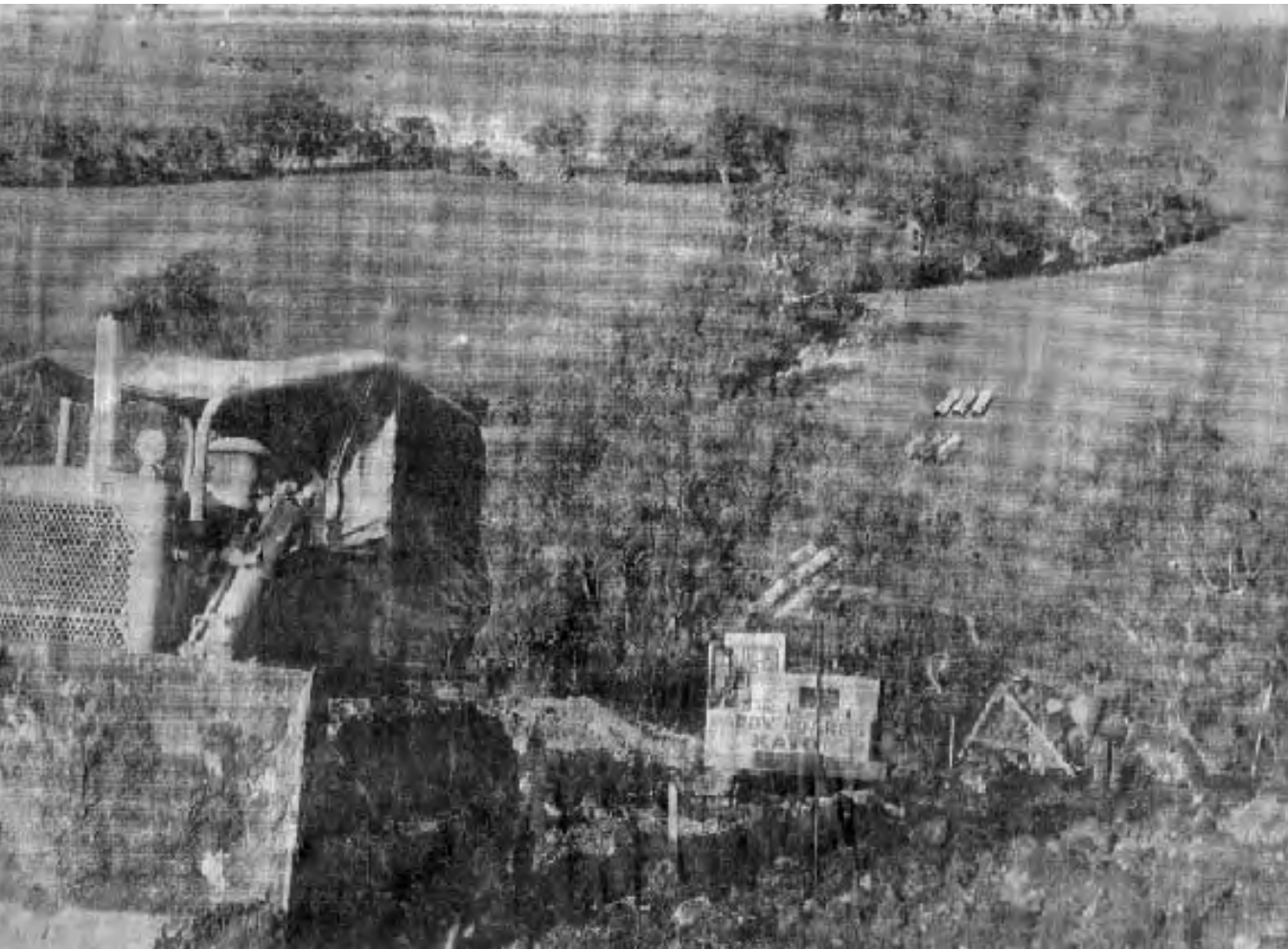
Water was pumped out through the pressure main on the left side of the structure.



which made the above ground option appear to be the most sensible. But it became one of the trust's more obvious miscalculations because of the additional cost, effort and bad publicity it created.

The plan was for the pipe to be constructed in four stages, with the first from Montpellier underground and the rest above ground. The pipe, mounted on small concrete pedestals, would cut across about 40 properties, dipping underground occasionally for roads and access points but dividing paddocks with what was virtually a three foot high obstacle. It would make it difficult for many people to work their land and the SR&WSC recommended the pipe should be put underground. But the trust resisted because every deviation or alteration added to the cost.

Construction of the pipe from She Oaks to Montpellier near the Moorabool River. The ground is so steep a bulldozer is attached to the digger to stop it running down the hill. Pipes are stacked on the ground below, ready to be installed.



Many affected by stage two protested and were paid compensation and allowed to tap into the pipe without cost. One objecting landowner dragged out the legal process, causing delays and giving the trust much bad publicity. The authority initially offered him \$502 compensation, but after almost three years of legal wrangling it settled at \$12,000, plus legal expenses of \$1,500. A year later, the landowner returned with a claim of \$7,000 compensation for a bull that had ruined its reproductive ability while trying to climb over the pipeline.

After stage two had been completed, the trust reviewed the cost variations of putting the pipe above or below ground and found there was little difference. As a result, the remaining two stages were quietly constructed below ground. The project was completed in late 1973 to coincide with the completion of the facilities at She Oaks. The first water was drawn from the system in January, 1974, and the official opening ceremony was conducted at Montpellier on April 11, 1974.

The trust became interested in underground water around 1966. The Department of Mines had conducted surveys and test drillings around Victoria for some years and located areas in the Barwon catchment that seemed promising. One was Barwon Downs, geographically like a large saucer about 50 kilometres across with layer upon layer of different kinds of soil, some impervious to water and some that collected it in large quantities. Where the porous layers reached the surface, water soaked in, filling them with water that could be tapped by drilling. In April, 1968, contractors started drilling a test bore six inches in diameter beside the Wurdee Boluc inlet channel at Barwon Downs. When it reached 1,157 feet water flowed, suggesting there was a large, good quality supply that could make a valuable contribution to the city's storages. In December, 1968, commissioners decided to sink a production bore that was expected to provide an initial yield of around 365 million gallons a year.

More tests conducted by the Department of Mines and the trust suggested a better bore site lay several miles north at Gerangamete and the government gave approval for a 12-inch

diameter bore to about 1,200 feet. Four small test bores also were drilled around it to test the bore's performance. Drilling began in June, 1969, and was completed in October. In a subsequent 14-day test, the bore produced 1.5 million gallons a day, with a total daily potential of about 2.5 million gallons. In February, 1972, commissioners decided to construct three more production bores and a treatment plant costing about \$660,000 that would produce enough water to take the place of a large reservoir. But they soon learned the SR&WSC would only issue a permit for 1.33 million gallons a day and up to a total of 240 million gallons a year, which was half what the trust was seeking. This cooled its enthusiasm for the project, which continued at a reduced pace.

Nonetheless, there were ongoing investigations into new sources of water and new storages. In 1975, the trust bought a small dam on the East Moorabool, between Korweinguboorra and the Bolwarra Weir, belonging to the Victorian Railway, but it was insignificant in the larger picture. It considered constructing another large storage on the Barwon River, between Winchelsea and Inverleigh, but with little enthusiasm because of the poor quality of the water entering the Barwon from Birregurra Creek. The Gellibrand River option looked more promising, but the towns already using that source objected. In 1972, the SR&WSC announced it would conduct a comprehensive survey into the water resources of the Gellibrand River; six years later, the government announced a Parliamentary Public Works Committee investigation into the use of Gellibrand waters. This was later taken over by a new parliamentary committee, the Natural Resources and Environment Committee (NREC). The new committee had not begun investigations by 1980, so the trust turned to the possibility of drawing groundwater from the Gellibrand region. But it could only afford a limited investigation and received little encouragement from the government.

The trust's frustration with the slow pace of government inquiries extended to delays in starting the study into the Barwon River floods. The river flooded again slightly in July,

1978, and more extensively in November. Work on the study finally began in August, 1979, and the final draft was ready by August, 1981. By then, however, the problem was not too much water but, again, drought.

After almost 15 years, Geelong had all but forgotten about conserving water and the continuing growth of population and industry made 1980 a record year for consumption at 30,905 megalitres. In December, 1980, the storages were 84 per cent full, albeit about 200 megalitres below the average for that time of the year, so the trust began planning a public relations program to promote water conservation. The situation improved little in 1981 and by August, 1982, the storages held only 41 per cent capacity. Commissioners decided to introduce a flexible eight-stage program of restrictions and asked the West Moorabool Water Board to increase Geelong's allocation from Bungul Dam. Stage 3 restrictions were introduced on September 10, but consumption remained at or above average. Accordingly, maximum penalties for breaking the restrictions were increased from \$100 to \$1,000 and inspectors became more vigilant. Reserves continued to fall rapidly and Stage 4 restrictions were introduced on November 12. At the same time, the trust introduced a publicity campaign to educate consumers about the need for conservation. These measures reduced consumption to safer levels and continued until June, 1983,

Bostock Reservoir, almost empty during the 1982 drought. The low level of the storage can be judged by the small figures of people close to the water.



when restrictions were lifted.

By early 1981, the groundwater project at Barwon Downs was far enough advanced that it could be in operation by March, 1983. But as the drought took hold, the trust increased the pace of work to commission three production bores as quickly as possible. Construction of a full treatment plant to deal with the water's high iron content would take longer, but a temporary treatment facility could be used. The first bore began flowing in late February, 1982, at 30 megalitres a day and the first water from the temporary treatment plant began running into the Wurdee Boluc inlet channel at the beginning of March. Three production bores were commissioned during the drought and later a fourth was completed. The permanent treatment plant at Gerangamete was commissioned during 1985 and officially opened on April 4, 1986. The SR&WSC gave permission to extract up to 12,600 megalitres from its bores in any financial year, with a 10-year limit of 80,000 megalitres. This protected the supply in the long term, but



Drilling a production well at the Barwon Downs groundwater project. The bores were much larger than most and special equipment needed to be brought from Western Australia.

did not allow the facility to be used as a continuous source of water. It would be a very valuable supplement to Geelong's supply when storages began to fall, however.

In and around Geelong, new feeder mains were constructed to serve growth areas and major transfer mains were constructed between the service basins to cope with increased demand. At Montpellier, where the water from the Bungal Dam arrived, a new service basin was constructed and put into operation in October, 1970.

The open channels between Wurdee Boluc and Pettavel were a weak link in the distribution system; the older earthen channel was costly to maintain and gradually fell into disuse while the newer concrete channel lacked the capacity to meet growing demand. In 1978, commissioners approved construction of a pipeline to replace the channels – 20 kilometres long, it would be constructed of 1,600mm diameter mild steel and concrete-lined to run almost directly between the two places and buried underground. The outlet from Wurdee Boluc also had to be improved to match the capacity of the new pipe. Starting in February, 1980, the project was completed in September, 1982, at a cost of more than \$14 million.

Sewer construction had continued at a hectic rate in the 1970s, much of it associated with new residential or industrial development on Geelong's margins. The Oyster Cove sewerage project that took place between 1976 and 1978 connected the Geelong Grammar School and some industries. The Corio interceptor main, constructed between 1978 and 1981, connected areas to the north of Geelong around Corio Bay that had been beyond the reach of the old sewerage system.

The two most important connection schemes carried out during this period were at Leopold and Lara. Leopold, to the east of Geelong on the Bellarine Peninsula, included about 600 houses and a similar number of vacant lots. It was the responsibility of the Shire of Bellarine, but it would have been many years before it could provide the area with a system and the trust took over the role. Work began in October, 1974, with contractors constructing the pipeline to the sewerage system and the trust's sewer construction gangs undertaking the remainder.



Sewering Lara. As with earlier sewer projects, much of the work was done in confined backyards. Here, workers are digging trenches on either side of a rockery so they can install a pipe beneath it without disturbing the plants. The digging, however, is being done with a small machine.

The project was completed in November, 1977, at a final cost of \$1,571,400, with the government contributing \$370,700.

The Lara scheme was one of the largest single reticulation projects undertaken by the trust. While Lara was well outside the trust's area of responsibility, no-one else was likely to provide the service and the trust stepped in. But it was not prepared to do the work without some government financial assistance. Eventually an agreement was reached with the government, trust and residents contributing to the cost. The official commencement ceremony occurred in October, 1980, and the project was carried out in three stages. The first was completed in April, 1982, the second in May, 1983, and the final stage in December, 1983. Some work was carried out by contractors and some by the trust's sewer crews, who used all the skills they had developed over the years to cope with difficult conditions.

The Lara project made up about 80 per cent of the total of 13 kilometres of new sewerage laid in 1984. It was almost the conclusion of the authority's long history of undertaking major projects using its own labour force. By 1979, it had caught up with the backlog of sewer reticulation work and all that remained was servicing new subdivision developments. The trust could no longer support a large labour force and, after negotiations with their union over redundancy entitlements, 14 long serving employees were laid off.

There was no let up in maintenance work, however, and the specialist teams continued non-stop repairs to burst water and leaking sewerage pipes as well as routine maintenance. In three months in 1982, duty officers received and dealt with 5,000 calls. At the peak of the drought (when the dry conditions placed high stresses on water pipes), they received 472 calls in one week and dealt with up to 30 calls a night. In 1983, the trust introduced a 24-hour shift roster to cope with the growing number of calls.

The Barwon River began to occupy more of the trust's resources. The trust established a small nursery near the north bank of the river where it grew seedlings to be planted along the waterway. In 1979, a glass house was added to extend the range of plants. Previously, the demands of other work had prevented the trust from focusing on the river, but by the 1970s a revival of public interest in, and enjoyment of, nature began drawing people back at a time when the trust was able to meet that resurgence. The more the river was improved the more people were attracted to it and so a cycle began.

At first, the transformation occurred haphazardly, but later the development became more systematic. The trust began buying property along the north bank and demolishing the old buildings there to create more open parkland. Local

Burst pipes are a fact of daily life in the water business. Mike McCoy recalls one burst water main in Newtown.

A BURST MAIN IN NEWTOWN

One of the worst ones I can recall flooded three houses particularly badly.

In that area of the city, the water main was an early steel main with welded joints coated with coal tar enamel to protect the pipes against corrosion. The enamel breaks down in some locations and once that happens the steel begins to get corrosion points. It's very hard to detect that extent of corrosion in a buried pipeline and quite often the first sign you have is a burst. But steel doesn't shatter the way a concrete pipe would so initially the leak would be a high pressure jet. But under such pressure it was almost like a lance and it would cut through the metal fairly rapidly. Again, with a steel pipe you get some warning in the way of a wet patch but in some circumstances, particularly water restrictions, a whole line of rivets would give way at once and you'd have an enormous flood of water.

This happened in Newtown. The maintenance crews are on call 24 hours a day, but this was an instantaneous thing and the switchboard went berserk. The duty officer found

himself inundated with calls, a mountain of water rushing down the street in Newtown, a geyser going up 30 to 40 feet in the air and all hell breaking loose.

While we know the location of the valves in the pipeline, shutting them down is a process in itself because, as you know from home, if you turn off the tap quickly you get a water hammer effect up the pipe, bang, bang, bang. But on a large water main under high pressure and flow velocities, if you close it down too quickly the result is even more disastrous because the water hammer effect would blow it apart, especially in an old main. So the closing down process is actually quite slow; it can take 15 to 20 minutes on, say, a 300-millimetre diameter main. If you closed that in less time, you'd be likely to have exactly that effect and so one disaster becomes multiple disasters.

It's difficult to explain that to people whose houses are being flooded. And having done that the main still has to be drained where it burst so the time delay is considerable. So people just stand around watching their gardens wash away or, worse, their houses filling up with water. In this case, the burst was relatively close to the overhanging eave of a roof and it lifted off part of the roof as well. It's quite spectacular and makes good news, but it's a costly proposition to repair it.

THREE INCHES OF RAW SEWAGE

One of the worst ones I saw was when a woman rang me. She was absolutely distraught. She owned this block of flats and the people in the bottom flat had come home from the pictures at about eleven-thirty at night and as they got there they noticed water coming out underneath the front door. When they opened the door, an avalanche of water and muck came out.

What had happened was the fish and chip shop up the top of the hill had been flushing their fat and stuff down the toilet and as it went down the pipes it gradually stuck to the walls (as it does with cholesterol in human veins) and built up so it blocked the pipe down to a narrow little hole. Then somebody put a bit of cloth or something down the sewer (you wouldn't believe what people put down the sewer) and blocked it and stopped the sewage from going out.

It built up in the line and then flowed down into this bottom flat. In these flats they've got little ground level vents with grates on them so air can go in and somebody had cemented them in so they didn't pop out as they should. It built up inside the flat in the toilet, filled it so it overflowed and there was three inches of sewage through the entire flat; in the lounge room, under the beds, through the kitchen, all the bedrooms. Three inches of raw sewage.

The water board teams came in straight away and worked all night until the early morning to clean the whole flat out. They shifted everything out, steam cleaned the whole house and put in new carpet.

What the fish and chip shop had done was highly illegal. They had to put in triple interceptors, put in check valves, they did all kinds of things to stop it happening again.

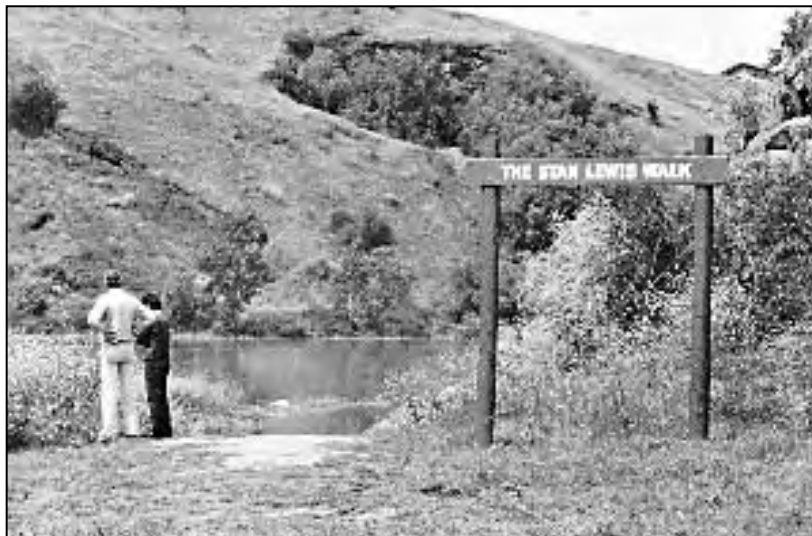
Bruce Webster remembers a particularly nasty sewage spill.

government also helped by buying parcels of land and creating parks. In 1974, students in the Department of Architecture at the Gordon Institute of Technology prepared a beautification plan of the river, including a path along the southern bank upstream of the rowing course, between Princes Bridge and Queen's Park. In 1975, it was named the Stan Lewis Walk in memory of the trust's superintendent of maintenance, who had been very highly regarded by all employees and died before he was 55.

By 1980, the work was beginning to bear fruit with the return of a large number of birds. That year the trust commissioned the Centre for Environmental Studies at the University of Melbourne to prepare a report recommending the future direction of development along the river. The result was the Barwon River Concept Plan, which was adopted in October, 1983.

Rate revenue continued to fund operations, but commissioners also began using it regularly as a tool to control water use. In 1968, they reduced the amount of water allowed to ratepayers before excess charges were imposed to cut water wastage, and in 1970 increased the cost of excess water to 30 cents per 1,000 gallons. In 1977, the trust revised the cost of water to match the actual cost of supplying it – i.e. about 11.97 cents per

The beginning of the Stan Lewis Walk on the banks of the Barwon River. The contrast between this 1975 photograph and how it looks today is remarkable.





1,000 litres — and in 1978 reduced the water allowance by 12.5 per cent.

Traditionally, all new capital works had been funded by borrowing money, but continuing to do that became near impossible. Increased spending on capital works and inflation increased the trust's debt burden from \$44.8 million in 1977 to \$74.1 million by 1983. A cause of endless complaint by the trust was that it was not included in government assistance to Victorian non-metropolitan water authorities. This aid came in the form of subsidies on interest repayments whereby they paid the equivalent of only 3 per cent interest. While other water authorities received this subsidy, real interest rates were increasing and the trust had to pay more than 7 per cent in 1970 and 10 per cent by 1977. If the trust had received the same interest rebates as the other non-metropolitans, it would have saved \$1.1 million. The only crack in the government's obstinance occurred when the Premier opened the Bungal Dam and announced the government would give the trust a rebate on its interest payments for the works necessary to transmit water from She Oaks to Montpellier for a period of 10 years. This would save the trust around \$108,000 in the first year.

The trust also received nothing from a number of special

The trust established a nursery close to the Barwon River where it raised seedlings to be planted along the river as part of beautification work.

purpose schemes set up to assist the water industry. In 1970, the Commonwealth Government provided \$8.5 million for groundwater investigations, but the money was only for rural projects and the trust could not participate. In 1975, the Commonwealth launched the National Sewerage Program to fund the extension of sewerage services to unconnected areas. But since the trust had done so well in sewerage Geelong, it received only \$150,000 of the \$3.3 million for which it had applied. (In comparison, the MMBW received more than \$40 million from the program.) In the early 1980s, the trust applied for funding under the National Water Resources Program and State Development Program and was rejected again. It seemed to commissioners the trust was being punished for putting its own money into providing services for its ratepayers while those who had not been so conscientious were being rewarded with grants.

The financial situation became harder from the mid-1970s as governments began trying to control inflation by controlling spending. In earlier times, the government's approval of trust borrowing for the coming year had been almost a formality. But that began to change. In the 1981/82 financial year, the trust's estimated spending was \$16.35 million. Its borrowing approval, however, was only \$12.4 million and the following year the difference between expenditure and permitted borrowing was \$3 million. There were only two options for the trust – and it adopted both. One was to cut back its works program, but this was difficult because it had several expensive, albeit necessary, projects in progress or being planned. The other was to start spending its own revenue from rates and charges on capital works. It was a fundamental break with decades of tradition and the basic understanding of how public utilities operated. And other authorities, such as the Colac Waterworks Trust, were beginning to have to do the same.

Employees were the trust's most important resource. There were around 300 between 1967 to 1983 and they reached a peak of 384 in the late 1970s when workers were setting records with their achievements. The authority had been a job for life for a core group and by the 1970s some were reaching half a

TOO EFFICIENT

The Geelong Waterworks and Sewerage Trust was being penalised by the State Government because it was too efficient, according to Commissioner A H Foster.

Mr Foster said the trust had not received a grant under the national sewerage programme because the State Government considered Geelong did not have a backlog of unsewered properties.

The trust's meeting of commissioners was discussing a letter from the Minister of Water Supply, Mr Granter.

Mr Granter said the programme was based on the objective of overcoming the backlog of unsewered properties in major centres of population.

"It is recognised that your trust has by consistent application of funds been able to service [the] Geelong area very well, and had thus little backlog to overcome," the Minister said.

"The priorities for works under the national sewerage programme have thus tended to be concentrated in the most rapidly developing areas, particularly those affected by residential expansion within and just outside the metropolis."

Mr Foster said Lara and Queen's Park were backlog areas as far as the trust was concerned.

Mr L W Sprague said the people of Geelong were being victimised because the trust had used its own funds wisely.

Commissioners agreed to prepare an application to be presented to the Minister asking for funds to cover backlog areas in Geelong under the 1977-78 grants.

Commissioners complained that the trust was not receiving government financial support because it was too efficient. This report was printed on November 27, 1976.

century of service. In 1971, commissioners revived the practice of recognising and celebrating the work of long-term employees. In January, 1971, Jack Dillon was congratulated on 50 years' service and Marion McCrae, from the revenue office, was congratulated for 45 years. In August, commissioners presented eight employees with long service presentations: Miss Marjorie Walker, who had worked in the revenue office for 47½ years, Alan Cooke, Peter Hammerli, Brian Deakes, Eddy Brooke-Ward, Len Spitty, Paul Kavanagh and George Batty. From 1972, the trust chose 30 years service as the major milestone and every year a few more employees were given presentations and congratulated by commissioners on their achievement.

Retirements began as long-term employees reached the end of their working lives. Jack Dillon retired in June, 1972, after more than 51 years. (His contribution would be long remembered and

when a reserve was created at the entrance to Stony Creek in 2000 it was named in his honour.) In 1973, Victor Seitz retired after 22 years, in 1977 Brian Deakes retired after 42 years and Peter Hammerli, who had joined the trust in January, 1927, as a junior clerk, retired after more than 51 years. In 1979, Frank Carroll, another who had served the trust for 51 years, also retired. A few staff members died, including popular assistant treasurer Paul Kavanagh, who had been with the trust since 1941 and died at the age of only 53 in October, 1977.

After much debate, commissioners finally decided the retirement age for all employees would be 65. The only exception was Engineer-in-Chief John Macintyre who, if he remained healthy and efficient, would be allowed to remain in his post until he turned 70. But his health failed and after a long bout of illness he retired at the end of 1972. He received long and fulsome praise from commissioners and staff. Chairman Carr, who had known Macintyre from the time he started with the trust in 1950, said he had done an outstanding job and “the public of Geelong and the commissioners of the

Trust employees with 30 years or more service in 1972. (LtoR) B J Deakes, E G Brooke-Ward, A W Cooke, P R Hammerli, P S Kavanagh, L C Spitty, G H Batty and Miss M Walker (sitting).



trust [stood] in his debt”. Macintyre died in mid-1981 still very much in the memories of all those who had worked with him.

Alan Cooke, who had served as assistant Engineer-in-Chief for the whole of Macintyre’s reign, replaced him from the beginning of 1973. Cooke had joined the trust as a junior

draftsman in December, 1925, and risen to the top position through years of faithful service and an unequalled knowledge of its water supply and sewerage systems. But he was close to retirement and, at his final attendance at a commissioners' meeting in December, 1974, he was congratulated on 49 years' service and wished well in his retirement.

Commissioners knew difficult times lay ahead and they would need the best new Engineer-in-Chief they could find. The position was advertised widely across Australia, but when the choice was made it was one of the trust's own engineers, Geoff Vines. He had demonstrated his abilities in overseeing the sewer duplication project and, at the age of 41, had the energy and drive to carry the trust forward for many years. He was a big tall man, with an often booming voice, who could talk to anyone in the trust. He supported his staff fully to get results, but he also expected – and was rewarded with – high standards. Vines was professional, approachable and encouraging and brought a new sense of energy and purpose to the organisation. His contribution extended beyond the authority and from 1978 he served as a member of the Deakin University Council.

Trust Secretary Brian Henshaw had come to his position before Macintyre and commissioners congratulated him on 30 years' service, all as Secretary, in September, 1977. In early 1980, he became ill and, although his health deteriorated rapidly, it was still a severe shock when he died on May 28. His contribution had been linked with Macintyre and, although he left no feats of engineering as his memorial, the works built during his time could not have been constructed without the dedication of he and his staff. Between them, Henshaw and Macintyre had transformed a "small ordinary trust" into the biggest in Victoria outside Melbourne, according to Chairman Carr.

Len Spitty was appointed the new Secretary. Like Alan Cooke, he had spent a working lifetime with the trust and his knowledge and experience served him well in the post. He had

risen from a junior clerk through the administration but, like Alan Cooke, he was reaching the end of his working life. He was farewelled with congratulations on 41 years' service and best wishes for his retirement in June, 1983.

While each retirement was a loss, it was also an opportunity. When Len Spitty stepped down Bob Jordan, who had started working in the revenue office in 1964, was appointed Secretary. He represented a new generation who been at the trust for around 20 years, knew intimately how it worked and had the skills and knowledge needed to go forward. When he was promoted to Secretary, another young, energetic and experienced staff member, Ian Zierk, filled his post. The same change also took place in the engineering branch. When the chief engineer operations Archie Leitch retired in November, 1978, Mike McCoy, who had been with the trust 'only' 18 years, was appointed in his place and McCoy's position was filled by another young engineer.

Jack Carr had been Chairman since 1950 and an elected member since 1941. As well as Chairman, he was active in the family real estate business and on Geelong City Council. In 1968, he was re-appointed Chairman but time was beginning to take its toll and he retired as a real estate agent in 1969. In July, 1970, commissioners deliberated on a report on his health and reluctantly decided to tell the Minister for Water Supply they were "not entirely satisfied" he was fit enough to cope with the stressful period that lay ahead. They fully appreciated his great contribution, but his health had recently limited his capacity and they had reasonable doubts about his ability to continue.

He was able to stay in his post a little longer and in September, 1970, as he commenced his 21st year as Chairman, his term exceeded the length of time Isaac Hodges had served. But in April, 1971, he sent in his resignation. It was, he said, an opportune time to resign and his fellow commissioners lauded what had been achieved during his tenure. About 70 people attended his farewell dinner in September, 1971, and in the 1972 New Year Honours' List he was awarded the Order of the British

Empire. He lived on for another decade, dying in September, 1982.

For more than 20 years Carr, Macintyre and Henshaw had overseen the trust's part in transforming Geelong from a provincial town to a modern prosperous city. It had been a magnificent achievement, but the changes occurring in society also had to take place in the trust if it was to keep in step with the community it served.

The government nominated another commissioner, Wal Whiteside, as the new Chairman. Many years earlier, when he had spent a period working for the trust, he told his wife he would one day be Chairman. He had probably set out to achieve that goal when he first stood for election and, unlike most commissioners, had thrown himself into the job with enthusiasm and energy. He participated actively in most debates and when election time came he promoted himself as a young, experienced and knowledgeable commissioner taking care of those he represented. He spoke well, understood how things worked in Geelong, who to know and how to act. He had a likeable, sometimes impetuous personality and, in general, got on well with other people and impressed them. Something everyone remembered about him was that he loved and drove fast cars and, like Brian Deakes before him, many tried to avoid being his passenger for the sake of their nerves. He did his job well and he was re-appointed Chairman in 1979 and again in 1983.



Jack Dillon (right) at his retirement after 51 years with the trust in 1971. Carr (centre) retired after 20 years as Chairman in 1971 and Wal Whiteside (left) replaced him.

The tenure of elected commissioners became a little less secure during this period and 11 men served a term or more between 1967 and 1983. The longest standing commissioner, Arthur Thomson, who had been elected in 1950, was defeated in 1973 while Len Sprague, who had been elected at the same time as Whiteside in 1959, continued undefeated through the entire period. After them, the longest serving commissioner was Arnold Foster, who was first elected in September, 1969. Unlike the election of 1928 when several sitting commissioners had been punished for the severe water restrictions the previous year, the 1967 restrictions seemed to have no effect on election results. What seemed to count most was the ability to organise a team of dedicated supporters to distribute handbills, knock on doors, man polling booths and provide transport for voters on election day. Experience also counted. Arnold Foster lost the first time he stood for election and so did a later commissioner, Jim Jordan.

An election issue that did attract public interest in the early 1980s was fluoridation. There seemed to be three basic views about fluoridation – it was a valuable contribution to public health and therefore a good thing, it was a dangerous poison that should not be added to the water supply and adding fluoride to the water supply was an invasion of civil rights whether or not it

Wal Whiteside was well remembered for his driving. Peter Hammerli recalls one short ride.

A SHORT DRIVE IN A FAST CAR

He loved cars, loved them. He loved speed and he had some beautiful cars.

I had a GT and I had to go to Melbourne with somebody one day on trust business. A car went whoosh past me on the freeway. I was doing about 70 miles an hour at the time. I said, "Don't worry, that's our Chairman Wally Whiteside."

I was busy one day in the office and he put his head around the door and said, "Peter, have you got a minute to spare?" I said, "Yes, I've always got a minute for you Mr Chairman." He took me downstairs to his car and drove me around the block.

When I got back into the office I told my typist I'd be out for a while. She asked, "Where are you going?" and I said, "I'm going down town for a walk to get my nerves back."

He broadsided the corners and coming back into the lane behind the trust I knew we were going to hit the lamp post. I said, "That was close", but he said, "Oh no, we had about six inches to spare".

was good for public health. The move to add a small amount of fluoride to water supplies to improve the resistance of children's teeth to decay stemmed from a Health Commission decision in 1955. In 1958, commissioners decided against the move and some time later Macintyre commented that putting fluoride in the water was a very inefficient way of achieving a very desirable objective. By 1967, commissioners had resolved they were not equipped to decide whether or not to add fluoride to Geelong's water and it would only be introduced at the direction of the government.

As events developed, the government issued a direction to add fluoride to water and the trust began a series of experiments, inspected how fluoridation was administered in other parts of Australia and constructed a test plant at Anakie. There were

GETTING ELECTED

I ran a business servicing pumps and, out of devilment I suppose, I decided to have a go at standing for a trust election. I had business experience and pump experience and so I went in and put my name down. The next thing I knew I started to get telephone calls, so I thought I'd better start campaigning. But how do you do that? I had absolutely no experience in it at all. I got the help of some friends who knew something about it.

I was up against the deputy Chairman John Calvert and a high profile Labour executive, Eric Young. I thought to myself, I won't have a chance in the world but it will be a good experience. John Calvert was a strict Liberal and Eric staunch Labour, so I thought I'd go to the Labour bloke. He was also trying to get in so I went and shared my preference with him.

John Calvert got the highest primary votes, Eric got the next highest and I was a little bit under him in the primary vote, but the preferences from both came to me.

I had a scrutineer who was going in and out of the room. He went in first and when he came out he said, "You're well down in primaries." Oh well, I thought, it's good experience.

He came out about 15 minutes later and he said, "Hey, you're starting to creep up a bit, but don't worry yourself." I haven't got a hope against these two blokes, I thought.

He came out a bit later and said, "Hey, you're level pegging with Eric Young."

Then he came out again about 20 minutes later with Bob Jordan and they said, "You're in." I could have dropped dead on the spot. I told my wife, "Well, we'll give it a go."

The existing commissioners were very good. They had a night where I went along with my wife and we met the other commissioners and their wives and it soon developed. It was a very friendly atmosphere, and I soon fitted into it.

Bruce Webster talks about how he was elected to the trust.

public protests and an anti-fluoride group with a membership of about 50 formed in Geelong in 1969. It appears to have run out of steam because a new anti-fluoride group, convened by Norman Boyce, took up the cause in July, 1977. Although the trust would play a central role in fluoridating Geelong's water and constructed dosing plants at Wurdee Boluc and She Oaks as well as Anakie, the matter did not emerge as an issue until an extraordinary trust election in February, 1980, when a letter published in the Geelong Advertiser asked candidates to express their views on the issue. Peter Lang, who said he viewed it with "deep concern" but needed more information before he could form a view, won the election. Later in 1980, two commissioners who had not previously expressed strong views about fluoride, Bruce Webster and Jim Jordan, moved that trials at Anakie be suspended and the project was shelved. Attitudes for and against fluoride hardened among the commissioners, however, and in 1984 Chairman Whiteside said commissioners who opposed the government's direction to fluoridate Geelong's water supply could be removed. In other places, resistance to fluoridation took different directions: in Colac there was the same public protest, but the waterworks trust seemed to avoid the acrimony among members and the strenuous election campaigns that developed in Geelong in the 1980s.

Another distraction from the business of overseeing the trust's work was public use of the Barwon River. Previously, the matter had seemed settled, but as more people took to the water and more powerful boats began using it the level of complaints grew because of the noise. The commissioners' general view remained that everyone should be free to use the river, but from 1969 to 1972 they came under increasing pressure from all river users and people who lived nearby to find a solution. A very strong view was simply to ban motor boats and water skiing and that, of course, received very strong opposition. The pressure mounted and commissioners listened to depositions from all sides and took endless abuse from almost everyone through the press. In August, 1972, they made their decision. Power boats

would be banned from the river upstream of Princes Bridge where people lived closest to the river. But they were allowed to use the river downstream of the rowing course where their noise would cause less annoyance. The rowing course area was reserved for rowing except on Sunday afternoons and the Christmas-New Year holiday period when power boats could use that part of the river too. The compromise did not please everyone, but



After all the debate and acrimonious argument about who should use the river and when they would be allowed on it, this sign summarised the result.

it satisfied most people and was resolved in the 1980s by the appointment of honorary 'river officers' to police power boat use.

Changes in commissioners and staff presented opportunities to review and revise the way the trust operated. When Secretary Henshaw returned from an overseas study trip in mid-1970, his report included the suggestion that a monthly meeting of the top level officers would do much to improve communications and could deal with important issues not necessarily of concern to commissioners. The first meeting of the executive group did not occur until November, 1972, after Carr had retired and it quickly contributed to the effective operation of the organisation.

Within a year of Carr's retirement, commissioners hired management consultants to prepare an extensive report on how the trust operated and what might be done to improve it. Chairman Whiteside reassured staff there was no threat to jobs, salary or status and the re-organisation would help meet new demands. The engineering branch was re-organised so functions rather than areas of operation (water and sewerage) were brought together. The consultants recommended the establishment of a central registry (everyone had kept their own files previously), a typing pool and a drafting pool to consolidate resources. While the changes were designed for efficiency, they did not go to the basic structure of the trust or recommend a fundamental re-organisation. In fact, the consultants said they were favourably impressed by the staff and the level of work performed.

The untimely deaths of Paul Kavanagh and Brian Henshaw presented an opportunity to re-organise the Secretary's branch along more modern lines. Managers of Finance and Administration were appointed and their titles explained their responsibilities exactly. When Secretary Spitty retired, the trust took the opportunity to finally bring the engineering and administrative branches under the control of a single officer by appointing Vines as the Chief Executive in addition to his duties as Engineer-in-Chief. The executive group then comprised

seven members – the Chief Executive, three senior engineers, the Secretary and his two managers.

The trust's rapid growth led to cramped working conditions in all its buildings in the city and its depot at South Geelong. By 1975, there were 150 people working in the jumble of buildings around Ryrie Street, including the original office, a couple of old shops, the old hall in Little Malop Street, the office building constructed about 10 years earlier and several sheds. The trust had to find space to expand. A simple solution might have been to move everyone to South Geelong, but building regulations made that impossible and, in any event, the trust wanted to stay in central Geelong for the convenience of staff and ratepayers. Various ideas were considered, but commissioners finally decided to build a new office facing Ryrie Street by demolishing the old office and the shops it owned there. The first plan was to build a shorter office right up to the footpath, but building regulations would not allow that and the design was amended with a forecourt at the front of a taller building. The bottom level would be an extended car park and above that would be five floors of mostly open plan office space. While the trust did not need that amount of space, commissioners made provision for future expansion. Plans for the new six-storey building were approved in June, 1975.

Several problems had to be overcome before the project began. One was to find \$2.4 million to fund the new building. The other was to find accommodation for office staff while the new building was under construction. Some remained in the old hall in Little Malop Street and some moved to the South Geelong depot. Most of the staff moved from the four-storey office, but part of it was renovated for the laboratory and printing services, which stayed there during the entire construction period. Offices in Moorabool Street that had been recently vacated by the Geelong Football Club were taken over by the revenue department because the shop front gave people easy access for people to pay accounts. The CML building had two empty floors, one with a meeting room, so more staff moved there.



The trust's temporary shop front office in Moorabool Street while the new office building was being constructed.

Commissioners held their final meeting in the old office on December 17, 1975, and began using the temporary meeting room in the CML building. Staff moved into their temporary accommodation and the old buildings were cleared out. For more than half a century, all the records had been stacked in the basement of the old office; there was so much that commissioners decided all records from before 1966, except the Secretary's correspondence and the first rates book, would be thrown out. Fortunately, a few people saved some items they believed were of historical significance (if they had not, this history would have been much harder to write). The building was empty by Christmas, 1975, and on Boxing Day the hoardings went up and the demolishers pulled the old building down.

Staff worked from temporary accommodation for two years while the new office was constructed. There was a combined telephone system so people could easily talk to each other and a twice daily courier service between the work places. Even so, the arrangement was inconvenient and inefficient and people felt they were in limbo. To bring everyone together, the staff organised a mid-year cocktail party at the Royal Geelong Yacht Club in 1976; it was a roaring success and an opportunity for



people to see each other for the first time in a long time, and the event was repeated again in 1977.

The new building emerged gradually from the construction site and the rear office was renovated to enable the two to be fitted together as one complex. Staff moved in over two weekends in December, 1977, and commissioners held their first meeting there on December 14, 1977. The old hall in Little Malop Street was finally vacated and later demolished to make way for a new arts complex. The official opening took place on January 25, 1978, the 70th anniversary of the trust's first meeting in 1908.

Two works of art were commissioned for the new office. In the entrance foyer was Robert Ingpen's mural about the water cycle and its management in the Geelong region, comprising five panels depicting an aspect of water supply. Outside in the forecourt an innovative sculpture by Michael Young went up. It was highly abstract and conceptual, made of anodised and sand-blasted aluminium and appearing to be an extension of the building itself. The work puzzled many people, but encouraged them to walk in, around and under it so they could appreciate it from many perspectives.

After 62 years in constant use, the old trust head office was quickly demolished on Boxing Day 1975. Photo courtesy of Mike McCoy.



Construction of the new head office building in place of the old office is well underway. The building is at its full height, but much remains to be done. Photo courtesy of Mike McCoy.

The South Geelong depot also was developed to accommodate a swelling workforce. The trust bought land adjacent to the depot, allowing it to expand and move the testing and meter repair shop and the maintenance workforce there around 1974. Further developments approved in 1981 involved buying more land adjacent to the depot and closing a road running through the site. New maintenance and trade workshops were completed in August, 1983, and a new single-storey office and amenities block, which could have more floors added later, was completed around December, 1983.

Social functions arranged by staff while the new office was being constructed were only two of many held from the mid-1970s. Jack Carr and John Macintyre had participated in occasional social activities, but did not seem to take entertainment seriously. Wal Whiteside and Geoff Vines saw life differently and knew the value and pleasure of social events. From the time Whiteside took over as Chairman, and even more after Vines became Engineer-in-Chief and then Chief Executive, they took almost any opportunity to stage a social event. It became habitual for commissioners' meetings to begin in the morning and take a break for lunch. This gave



commissioners the opportunity to invite guests to discuss matters of mutual interest. On one occasion, the heads of local investment organisations were invited for discussions about the state of the money market. On another, councillors of several nearby shires attended to talk about possible sewerage schemes. And on another, local Members of Parliament discussed sewerage issues. It also became traditional to invite the executive group and their secretaries to the luncheon at the December meeting.

The trust was one of a number of important organisations in Geelong and each had its round of social activities. Each council held an annual Mayoral Ball and the Geelong Harbour Trust and local Members of Parliament conducted similar events. The trust Chairman and Chief Executive, and sometimes their wives, were invited. For many years, the authority held a major 'Christmas in July' event to which 150 to 200 people were invited to avoid the crush of engagements at the end of the year. There was also a smaller event toward the end of the year to which commissioners, their wives, appropriate staff members and some guests were invited. Perhaps 60 or so people attended.

Employees followed the commissioners' lead and developed

The lobby of the new office building taken from the revenue area. Behind the reception area is Robert Ingpen's mural in five panels that was moved from the lobby in a subsequent renovation.

a strong social calendar. Soon after staff were reunited in the new office building, they asked for permission to use the lunch room for Friday evening get-togethers, with food and refreshments provided at staff expense. Commissioners gave approval – provided the functions finished promptly at 6.30. The social club also continued to hold parties and dances and organise trips and sporting activities.

Anniversaries were another opportunity to celebrate. In September, 1973, the centenary of the first water supply to Geelong was acknowledged with a special dinner at the Geelong Hospital and in January, 1974, a staff Sunday picnic was held at Anakie. The trust donated a fountain to the City of Geelong to mark the centenary of water supply to the town. It was built only a short distance from where Gray's tank had stood and the State Governor turned on the tap on April 11, 1974. The same day, the first water flowed to Geelong from the Bungal Dam and the trust marked the occasion with a function at the Geelong Art Gallery and a dinner attended by local Members of Parliament and other dignitaries.

In 1983, the trust celebrated its 75th anniversary. Commissioners adjourned the meeting in the board room to walk a short distance down Ryrie Street to reconvene in the old post office where the first meeting had been held on January, 25, 1908. They moved a resolution re-dedicating the trust to its objective of maintaining a supply of potable water for the community. They added to their responsibilities the removal of waste through a sewerage system and management and beautification of the Barwon River. They then walked back to the trust's office to conclude their meeting and enjoy a buffet luncheon with former commissioners and past and present employees.

This kind of conviviality that mixed business and enjoyment in varying degrees also led, by the early 1980s, to quarterly meetings between commissioners and local Members of Parliament. Previously, the trust had called upon them when it needed their help, but as the economics and politics of the water industry became more turbulent commissioners saw the value of holding regular



To celebrate the 75th anniversary of the trust, commissioners held part of their meeting in the building where the first meeting had been conducted. It was the stone building in the foreground so they did not have far to walk. When the trust became the board, the blue and green GWST neon sign on the side of the building was converted to read GDWB using two letters from the first sign to save expense.

meetings where they could ensure the politicians understood – and were hopefully sympathetic to – the authority’s position and needs.

The trust also was able to exercise influence through the Association of Provincial Sewerage Authorities and the Waterworks Trust Association of Victoria, which were political forums for the water industry. They held annual meetings attended by influential people from the water industry all over Victoria and Chairman Whiteside’s enthusiasm soon saw him actively involved in both. In 1977, the two associations held their annual meetings jointly for the first time in Geelong and by 1981 Whiteside had served terms as Chairman of both. When they met for the first time as the Victorian Water and Sewerage Authorities Association in 1992, he was elected to the executive committee. He also served terms as a member of the Water Research Foundation of Australia, the Water Resources Council, the Australian Water and Waste Water Association and the Geelong Regional Commission. Other trust members also participated in water industry organisations; Cooke attended the inaugural meeting of the Australian National Committee of the International Association of Water Pollution Research in 1970 and in 1984 Spitty was installed as president of the Institute of Water Administration.

Change, even unavoidable change, could become an opportunity to improve. Metrication was a good example. The change from the imperial to the metric system of measurement began in the early 1970s, but changing measurements was complex and difficult. All measurements in gallons had to be converted into litres, all dimensions had to be converted into metres and weights had to be converted into kilograms. Converting water meters was a lengthy process because it was impractical to convert them all at once. Rather, they were converted when brought in for repairs or replaced with a new meter.

Although plans and drawings had to be converted to new measurements and new scales, it was an opportunity to re-draw them to a few common scales and use basic reference points on a grid that had been agreed around Australia. This meant all drawings could relate to each other. Previously, many of the trust's maps did not correlate so drawings of the system in one part of Geelong had no fixed relationship to plans of other areas. The new system would eventually make it possible for all plans drawn by the trust, local government and other service providers to be in the same scale and based on the same datum points. Therefore, maps of different places could have a relationship to each other, affording advantages in planning and operating systems like waterworks. But like the conversion of water meters, the process of making all the necessary changes would take years.

Other changes saw system improvements, but maintenance became more tricky. Asbestos cement pipes that had become common after the war became brittle as they aged and more likely to burst. The new plastic pipes, however, were more flexible and appeared to offer a longer life. From the late 1960s, they were used almost exclusively for most smaller sewerage mains and connections and for some smaller water pipes. As new varieties of pipes needed new connections and fittings, construction crews had to learn new techniques. Changes like this also made life more complex for the maintenance teams because they had to handle and repair different pipes laid over

many years. For this reason, the trust maintained a stockpile of all kinds of old and odd pipes and fittings.

Other technical changes helped productivity. For example, lasers and electronic measuring instruments revolutionised surveying. Work that had once required a team of men, who kept meticulous survey books using measuring tapes and theodolites, was taken over by the new equipment. New office machines increased efficiency and saved money. An offset printing machine bought for \$1,120 in 1968 promised to save about \$1,500 a year in the cost of printing forms. In 1969, the first shredding machine was purchased.

But new equipment and new methods could easily lead people to think they could forget some of the old but important lessons learned the hard way. When men dug trenches and laid

As well as new field equipment, the surveying branch acquired new computing equipment to help process the results of its surveys electronically.



pipes by hand, they spent significant time working in dangerous conditions and developed an almost instinctive sense of self-preservation. But when machines dug trenches and laid pipes, men spent less time in the ground and easily forgot how to recognise treacherous circumstances. The efficiency of new machines and methods also tempted people to take risky short cuts. Usually nothing went wrong, but when it did the results could be tragic. In September, 1968, a plumber was buried alive when a 14-foot trench collapsed on him. He was saved by the initial quick response of the men with him and rescued in a major effort directed by Geoff Vines, with men working into the night in relays using only picks and shovels. In 1973, a man was killed in a sewerage trench at Anglesea, and in 1978 one man was killed and another injured when a deep trench in unshored dangerous damp clay collapsed. After this accident, the trust issued a special note to all plumbers and drainers that imposed very harsh penalties on anyone found working in conditions outside the safety regulations.

Collapsing trenches were only one threat in the workplace and by the 1970s accidents became regarded as unnecessary injuries that seriously affected efficiency as well as inflicting unnecessary pain and hardship. In 1970, the trust and the National Safety Council began developing safety programs to reduce the number of accidents and their severity. The authority adopted the measure of the number of working days lost through accidents as a way of gauging its safety performance. In the first two years, the program reduced the number from 350 days lost a year to 208. A safety committee was appointed in 1973 and, with the assistance of the National Safety Council, began holding monthly meetings to review accidents and safety procedures. By 1975, the number of days lost through accidents had been reduced to 131. The trust introduced a safety incentive scheme and in 1976 and in 1977 it received an award of merit from the National Safety Council for working 100,000 hours without a lost time accident. But maintaining safety depends on constant vigilance and the number and severity of accidents began to increase again. The

safety program introduced new ways of promoting safety that brought down rates again, but it would only take a moment's inattention or inexperience for an accident to occur. So the program was continually improved.

Above everything else, computers promised to bring the greatest change. In 1968, it was decided to buy a small computer for the Secretary's branch, but there was a degree of hesitancy on the most appropriate equipment. In 1975, however, some staff visited the Hunter District Water Board in Newcastle, which had been using a computer for several years. This gave officers the confidence to lease an IBM System 3 computer that was installed in the trust's temporary office in Moorabool Street in July, 1977. Its central processing unit had a capacity of 3.2 kilobytes, it had a disk storage of 91.4

Bill Benson holding his broken safety helmet. He had been working in a trench when a rock fell in, breaking his helmet. The helmet – and following safety procedures – avoided serious head injuries.



megabytes, a line printer and a monthly rental of \$3,735. Three staff, an operator and two programmers, were appointed to take charge.

The computer's first application was employee payrolls and rate notices. Later, metering records were added and then the inscribed stock register. The old heavy leather bound registers kept in the strong room became a thing of the past. In 1978, work began to computerise job costs and stores and purchasing records, and by 1979 the computer system was being used for most of the accounting work. An attachment made it possible for the computer to sign cheques as well as print them. The trust came to rely on the technology so much it decided to buy an IBM System 38 machine, which was installed in the head office in February, 1981. By 1984, it was storing and calculating most of the financial records, issuing 55,000 rates notices twice a year, keeping records on property valuations, analysing excess water charges, issuing accounts and paying bills. All this was co-ordinated by a revenue office staff of only 14, three of whom were meter readers.

There were suggestions the engineering branch could make some use of computing, but little happened. In 1975, the trust bought a programmable HP Calculator and accessories for \$4,549 that could perform many of the mathematical calculations necessary in design work and the trust's IBM was used for some research associated with the outfall sewer. In January, 1979, a consultant was asked to report on future computer requirements of the engineering branch and things began to change. The trust approached Deakin University to become an external user of its computer and bought a remote video terminal and printer for the engineering staff.

Computers using early spreadsheets and forward planning software began to revolutionise how the trust planned its work. One of the most difficult financial problems – one which had plagued the organisation from the beginning – was that larger projects could take years to complete but the government only approved the trust's borrowing a year at a time. This meant the trust could never be sure, when it commenced a major project,

if it would be allowed to borrow sufficient funds in following years to complete the task. To highlight the problem, commissioners asked Vines in November, 1976, to compile a list of works for which the trust expected to borrow money through to the 1979/80 financial year. They sent the completed report to the State Treasury to show its borrowing needs for the following few years.

In June, 1978, Vines presented commissioners with a report on the construction program for the next 10 years, including probable costs and borrowings. The report was principally a propaganda tool to show what the trust was doing, what it needed to do and how much money it would need to raise over a decade (\$34.9 million). Local Members of Parliament were invited to the next commissioners' meeting and informed about the works program, with copies sent to various arms of the government. The following year the Ten Year Major Works Program was revised and copies again sent to the government advising of the trust's work and financial needs. From that time, the program was revised annually and became a major feature of the trust's planning and promotion. From around 1980, the program also became the source of information government organisations required to prepare their own forward plans. The Treasury (later the Department of Management and Budget) annually requested forward program information that became part of its six-year Forward Look Works Program. The SR&WSC also began asking for similar information for its own forward planning as did a number of other authorities. The nearby Colac Waterworks Trust adopted a 10-year capital works program in 1982.

While computing was being developed to control the future, people with a passion for the environment were changing community views about what the future should be like. They began to successfully promote the need to protect and conserve the natural environment for the long-term benefit of society. For example, in 1972 one of Geelong's noted field naturalists, Trevor Pescott, publically entered the debate about power boats on the Barwon River with the argument they caused erosion of

After it was first introduced, the Ten Year Major Works Program became an integral part of trust planning. Bob Jordan summarises the complex process of finalising the program each year.

THE CAPITAL WORKS PROGRAM

It was all about what we needed, what was our recurrent budget, what did we need to do within our strategies and then what we could afford to do? We had numerous staff meetings on all different levels. Each Executive Manager had to bring forward documentation from his area and all his managers had input into it. We had a rolling capital works program and we'd argue about the priorities within that; what needed to be done and what had changed since last year.

There were sub-committee meetings and people would come in to give presentations on their projects. A person doing something about a wastewater storage facility might come in and he'd say, "In my view the project is priority two."

We'd say, "Yes, that's pretty good. But we don't think it needs to be done for another five years," or, "We think we need to do that tomorrow." That way we were honing our works program each year.

When we had developed our capital works program and before the board adopted it, we'd talk to the State Rivers and Water Supply Commission about it. They weren't necessarily interested in the technical side of a project. They'd be looking at the financial implications, the impact on the balance sheet and the financial statement and the debt servicing. They wanted to approve all that kind of thing. They had a State budget and they were co-ordinating other authorities too. There'd be, say, \$100 million of borrowing funds available and everyone in the State went in trying to get their share. It wasn't rocket science, you had the envelope of what you could do and as long as you stayed inside that things were all right.

After all that, we ended up with an appropriate capital works program for the year and that went to the board for its final approval.

the banks and despoiled the river environment.

Swelling community concern about the environment created political action that led to the creation of the Environment Protection Agency (EPA) in 1972. It was given responsibility for protecting and improving the air, land and water environments. It took the trust some time to work out its relationship with the EPA and learn the ways in which this new agency would restrain and reform its activities. The trust already considered itself environmentally aware because it knew about the relationship between the environment and the quality of the lives and health of the population. It had dedicated itself to preservation of its catchments and its sewerage system had been the most environmentally sound disposal process available at the time.

Macintyre had known in 1967 that environmental change was inevitable when he said there would be a time when the outfall sewer would be improved and sewage cleansed before being released into the ocean. In 1969, he said pollution in the upper reaches of the Barwon, Leigh and Moorabool Rivers could retard or stop Geelong's development. The trust, however, always had to balance this environmental awareness against the harsh realities of the cash book. A debate, often heated, that emerged in the wider community during the economic turbulence of the 1970s was whether it was more important to protect the environment or maintain employment.

One of the first changes the EPA initiated was a requirement for relevant organisations to test water and sewage to ensure they met EPA standards. The trust already monitored its water supply

Ross Williams working in the laboratory. The equipment on the left is an atomic absorption spectrophotometer and on the right is a graphite furnace analyser used in trace metal analysis of trade waste.



The quality of Geelong's water came under greater scrutiny and caused community concern. This report from September 12, 1974.

MUDDY WATER MAY COST GEELONG \$3M

A recent gusher of muddy stormwater into Geelong's water supply may force the city into installing filtration plants costing \$2 to \$3 million

Geelong Waterworks and Sewerage Trust Engineer-in-Chief, Mr A W Cooke, admitted yesterday: "I think the time is coming when we have got to face up to this."

The muddy water got into the system late last month when a stormwater protection drain flooded after heavy rain and overflowed into the supply channel between Wurdee Boluc and Pettavel basins near Moriac.

The dirty water, which has sparked complaints from householders throughout Geelong, gushed into the city's reticulation system before it could be shut off.

At the time, the main cement-lined channel between the two basins was undergoing pre-summer maintenance, and an old earthen channel was being used.

Mr Cooke said yesterday: "It was an unusual set of circumstances. It shouldn't have happened and we are rather embarrassed about it."

The trust's acting Chairman, Mr A H Foster said, "There's no health hazard. It's only the colour."

He said the bacterial count was "within safe limits".

Mr Cooke said it was only during the winter months when consumption was at its lowest that maintenance for the summer season could be carried out.

He said the water supply should be back to normal within the next two or three days.

After discussing the problems at a meeting yesterday, commissioners called for a report on the cost and method of filtration.

to ensure it was safe, tested trade waste to ensure it was within agreed limits and tested the water around the ocean outfall sewer. By the 1970s, the amount of testing the laboratory did for the trust far outweighed the work it did for the Geelong Harbour Trust. Indeed, the harbour trust became a client rather than a partner in the laboratory. The laboratory also was needed by other water and sewerage authorities to meet EPA requirements and the trust upgraded the facility so it was registered by the Council of the National Association of Testing Authorities, Australia, in 1978. This ensured it was qualified to undertake work on contract for other authorities. In 1979, it tested more than 650 samples of water and sewage for local and Western District authorities.

Water quality was one of the trust's most important long-

term problems. It investigated constructing another storage on the Barwon River, but the quality of the supply forced it to look elsewhere. The problem was salt that came mainly from the drainage area to the north of Colac, including Lake Corangamite, Lake Colac and Lough Calvert, all of which drained into the Barwon River through Birregurra Creek. No one authority oversaw the entire river and different authorities with often conflicting priorities generally were able to do what they wished. The result was surges of salty water caused by releases by the Lough Calvert Drainage Trust, which had been created in 1951 to administer the drainage system.

The trust believed problems were caused by too many people having responsibility for sections of the river system. From 1967, it advocated the creation of a Barwon River Authority to assume control of the entire Barwon catchment area. In 1979, the trust and the Geelong Regional Commission engaged consultants to carry out a preliminary study into the management of the

ENVIRONMENTAL CONCERN

In the early 80s, the trust hired a marine biologist to undertake a preliminary review of the impact of the shoreline outfall at Black Rock on the immediate marine environment. Whilst the onshore impact was relatively obvious with the presence of opportunistic species of flora and fauna to a small and confined area either side, the offshore impact was not so obvious.

After diving just 100 or so metres offshore, it was obvious the aesthetic impact was significant in the kelp forests present at the time. The introduction of plastic and other similar non-biodegradable material placed a lot of pressure on the existing screening technology and escaped into the environment. The thoughts were then that something definite needed to be done.

Even though this material could accumulate in the immediate area during periods of calm weather and therefore become very unsightly, the nature of this local environment is that it is not calm for very long and much of the waste material was flushed away to somewhere else.

As a result, the organisation embarked on improving on this impact. A detailed marine monitoring program was developed around research on the impact of the outfall on four different marine habitat types – animal and plant communities on the rocky shores; animal communities (infauna) living in the sands of the surrounding beaches; plant communities on reefs offshore; and animal communities (infauna) in the sandy sediments offshore. This project developed into pre and post monitoring of the communities to aid the understanding what the impact of taking the discharge from onshore to offshore was on these communities. It ran for about eight years.

Peter Ashton recalls what he saw the first time he dived at Black Rock, and what was done about it.

Barwon River. The following year, a public discussion paper was distributed to 45 authorities and organisations involved in the river's management. A Barwon River Management Study was produced and the Barwon/Leigh Advisory Committee was created. But the trust had only one representative on it.

In 1981, the Australian Water Resources Council and the National Health and Medical Research Council prepared a report on the Desirable Quality for Drinking Water in Australia. The trust adopted it as an acceptable standard for drinking water. Water from the three storage systems generally met the World Health Organisation's (WHO) standards for untreated water, but by 1974 it seemed inevitable it would have to construct treatment plants because of increasing pollution of the natural environment, higher standards set by organisations like the WHO and higher expectations by the people of Geelong.

The outfall sewer, however, became the biggest environmental dilemma. When McKay had selected the site in 1912, Black Rock was a desolate location far from any human activity. But by the 1970s this had changed with the area popular among beach users and surfers, who were sometimes confronted by sewage. Public protests became strident. While water quality testing had been conducted at the site for many years, the EPA demanded more regular and rigorous monitoring to track the rise and fall of pollution levels around the outfall and at nearby beaches. Tests usually showed pollution levels were within acceptable levels, but there was a difference of opinion about what was acceptable. The issue of public perception went beyond the control of scientific testing and standards.

The EPA had powers to control emissions into the environment by issuing licences linked to standards and this included the ocean outfall sewer. The EPA granted the trust a licence in June, 1977, but the restrictions imposed were so severe (from the trust's perspective) that it lodged an appeal. This sought to allow use of the existing system until an investigation could be conducted into how the EPA's standards could be met. The trust did not radically disagree with the EPA

or local feelings, only the cost. It examined various treatment options and had acquired 400 acres of land at Black Rock for any eventuality.

In 1979, consultants reported that the combination of a treatment plant and underwater outfall sewer needed to meet the EPA's requirements would cost about \$17.6 million. The amount was so great both parties agreed on a modified proposal – costing only \$12.5 million – to screen, then discharge the treated effluent through a shorter submarine pipe. In mid-1980, however, commissioners, believing the proposals were for the benefit of the entire state rather than only Geelong, decided not to proceed unless the government paid a large proportion of the cost. In November, 1982, the government advised it would not make any contribution because Geelong's sewerage rates were an average \$82 a year, which was well below the Victorian average of \$122 and Melbourne average of \$114. Geelong would have to take care of the cost itself. Reluctantly, commissioners agreed to undertake the work as soon as possible and resolved to proceed with construction of a fine screening plant to be ready by June, 1986, and a submarine outfall by June, 1988.

Public perceptions and bad publicity over the ocean outfall caused the trust to believe it needed to improve its image and relationship with the community. It continued to put displays in the shop window of 63 Ryrie Street, which had become drab by the 1970s, and sent out pamphlets with rates notices to inform ratepayers about various activities. But they usually read as though they had been written by a committee (which they were). One successful form of promotion was bus trips, usually to West Barwon Reservoir, to give groups an interesting day out – as well as educate them about water supply. Commissioners put them on for people in their electorates and they had become so popular by 1981 the trust had to limit how many trips each commissioner was allowed in a year. Perhaps the most successful promotion was a film of about 20 minutes duration produced in 1970. Its intention was to explain the trust's roles and responsibilities to planning bodies, councils, schools and the public. In 1974, the trust entered a float in the Geelong

The trust's first float in the annual Gala Day parade. The theme of the float was the motto and crest with a painting of Hygieia. The original painting showed the goddess bare breasted as she appeared on the trust's crest, but the Engineer-in-Chief ordered her to be covered up before she went on display.



Hospital's Gala Day parade for the first time. The theme was the trust's seal and motto and its preparation was supervised by a professional artist.

Even when individual public relations activities were successful, they lacked co-ordination and a consistent message. In 1974, the trust drew up a program of activities to improve its image but none appeared to have been put into action. In early 1978, when the trust was having difficulty with its environmental image and felt its side of the story was not being heard, one commissioner said it was perhaps time to employ a public relations officer. The executive officers resisted the idea, however.

By 1978, the social and political environment in which the trust operated had become much more hostile. Pressures on public spending made it harder to plan and carry out construction programs and the rapidly growing environmental movement began to portray the trust as destructive. In November, 1978, the trust sought professional advice on a public relations campaign and a year later decided to engage a consultant to provide assistance. But two years later commissioners felt what had been achieved fell well short of expectations and they finally had no

TRUST PONDERES IMAGE

Geelong Waterworks and Sewerage Trust will consider engaging a public relations consultant to improve its image.

The trust commissioners asked senior executive officer Mr G J G Vines (Engineer-in-Chief) and Mr B C Henshaw (Secretary) for a report about trust public relations.

GWST Chairman Mr R W Whiteside said he would like to see a promotional display in the foyer of the new trust building in Ryrie Street.

Commissioner F C Moore said he believed the trust was lacking in public relations.

Commissioner L W Sprague said public relations was an expensive hobby at present, but he would like to see a submission.

Commissioner A H Foster said although he was "not knocking the idea", and there was need for a trust "PR" man, he could not see how the trust had anything to sell.

But Commissioner J S Calvert thought the trust was not a "glamour service" and did not need "PR".

Mr Whiteside said the "trust has a million things to sell".

Commissioners discussed the need for public relations, but not all thought it was necessary. This report from August 26, 1978.

alternative but to employ a public relations officer.

Eileen McMahon was appointed in October, 1982, and quickly set about organising a public relations and education program. This included brochures and a display at the Geelong Show in October, 1983, featuring the bicycle Jack Dillon had ridden when he started working for the trust in the 1920s. Her first major achievement was an education program called 'A Good Turn for Geelong' that had been prepared in conjunction with the Education Department. Its aim was to help school children learn about the water cycle and the values of water conservation. It was launched in March, 1984, and distributed to about 200 schools in the Barwon region.

One of the most strident complaints about the Black Rock outfall sewer was that it polluted the beaches and the water that made the area so attractive to visitors. The large influx of tourists increased the population of the area five-fold over the January holiday period and it had become a popular place for holiday homeowners and retirees. There was something ironic in this because all the people who came to the area to use the beaches and the water also contributed to the sewage. Sewerage authorities along the coast at Queenscliff, Point Lonsdale, Barwon Heads,

Ocean Grove and Torquay decided that connecting to the Black Rock ocean outfall was the most efficient and environmentally acceptable way of disposing of their sewage. By 1976, most Bellarine Peninsula sewerage authorities were connected and there were discussions about Geelong taking over and running the entire coastal system. Nothing came of them, however.

There were also suggestions the trust might take over the SR&WSC's water supply to the Bellarine Peninsula. Indeed, many people thought it was the next logical step after the trust purchased the Barwon headworks from the SR&WSC in the 1950s. The Bellarine system was only a small part of the SR&WSC's state-wide responsibilities and it did not receive the close attention the trust was able to lavish on its ratepayers. Many people on the peninsula looked to the trust as a way of getting a better water supply service.

The standard of the peninsula water supply was highlighted in 1975, 1976 and 1977 when water restrictions were imposed whereas Geelong's usage was not limited. There was sufficient water in the peninsula's storages, but the distribution system could not cope with demand because the transfer main from Pettavel needed duplication. In 1973, the trust learned the new main was not being constructed as planned, probably because of lack of funds. It offered to complete the project for the SR&WSC because it could borrow money while the SR&WSC had to wait for allocations from the government. Approval was given and construction of the first stage started in June, 1978. When the contractor went into liquidation in September, the project was taken over and completed by the trust's own construction teams. The first water flowed in December, 1978 – just in time to avert water restrictions. The trust then went on to extend the main in a second stage, commencing in August, 1980.

This project was a prelude to Geelong's closer association with the Bellarine water supply system. In 1973, the possible transfer of the system was discussed by the trust and the SR&WSC and they agreed to conduct a feasibility study covering all aspects of a possible change of ownership. The trust commissioned Alan Cooke, who had recently retired as Engineer-in-Chief, to prepare a detailed report and he presented it in April, 1976. He said the

Bellarine works were in a very run down condition and the trust should be cautious. The system would be no gift from the government and the trust should only take control if doing so would not be to the detriment of its ratepayers. The report said that before a change of ownership, the government would have to make significant improvements.

Between 1975 and 1982, the government spent \$6.2 million upgrading the system to a standard acceptable to the trust. In December, 1980, commissioners formally approached the SR&WSC and in March, 1981, both parties set up a joint steering committee to report on the feasibility of the transfer and draw up a program for the change, including all aspects of administration and engineering. The committee met for the first time on May 8, 1981, and presented its report in September, 1982. It recommended the transfer should take place on July 1, 1983, and offered ways of dealing with the relevant administrative and financial matters. The people most affected would be the SR&WSC staff on the Bellarine Peninsula and the report provided ways in which most of them could be redeployed within the trust, offered other employment in the Victorian public service or offered redundancy payments. Commissioners accepted the report in October, 1982, and the government agreed in February, 1983.

The transfer went smoothly. For several months before the changeover, trust employees accompanied SR&WSC workers as they operated the system. A number of SR&WSC maintenance, revenue and accounts staff transferred to the trust, bringing with them years of knowledge and experience. When the changeover occurred on July 1, 1983, it was almost an anti-climax after all the pre-planning and preparation. With hardly a ripple, the number of trust ratepayers increased from 54,500 to more than 80,000 in a day, extending it well beyond the original area the trust had been created to serve.



CHAPTER EIGHT

REFORM

1984-1993

After a decade of economic and social confusion, a new way forward began to emerge. It went by several names and in Australia it was called 'economic rationalism'. It said that the business of business was to make profits and the business of government was to assist business. This left organisations like the Geelong Waterworks and Sewerage Trust in an undefined state until the idea began to form that they were government-owned enterprises and should operate like businesses too. They should become more efficient, provide a better service to customers and, as the theory developed, become profitable. As these ideas began to take hold, governments turned them into policies that reformed the way government services were organised and run. The Victorian water industry was one of the areas in which this reform began unfolding.

At the same time, other forces were gaining strength. The environment became a major public issue, with community involvement having an impact on the trust while the EPA and the environmental bureaucracy seemed to intrude into most of the authority's activities.

It was also a period when information joined water and money as the major factors in Victoria's water industry. It had always been there, but collecting, processing and disseminating it had been costly and time-consuming and it had only been used when the cost justified the effort. The rapid growth of information technology in the 1980s began making it possible to use information on much larger scales, thereby allowing managers to control whole operational areas that had earlier been beyond their reach. It also allowed government to impose greater control and demand greater performance reporting.

Newly elected governments tend to be the most enthusiastic reformers and two changes of government in Victoria, one in April, 1982, and another in October, 1992, became the sources of the most significant reforms. To meet these challenges, the trust transformed itself from a passive recipient of reform into an organisation that actively participated in and welcomed change.

Wal Whiteside
demonstrating the size of
the new Wurdee Boluc
outlet pipe.

The certificate signed by those who attended the party held on June 29, 1984, to see off the Geelong Waterworks and Sewerage Trust and welcome in the Geelong and District Water Board.

In the late 1970s, the Victorian Government started seeking efficiency in the hundreds of small local government groups that had sprung up in the previous 100 years. More than 300 separate water bodies operated across the state. They had been established in earlier decades when money was easier to find and this multiplicity of little bodies did not unduly disturb the politicians of the day. But as the economic climate declined and efficiency became a cornerstone of policy, the government sought significant reform.

On the evening of June 29, 1984, many employees gathered to mark the passing of the Geelong Waterworks and Sewerage Trust. The following morning they would be employees of the Geelong and District Water Board. This reform had begun when the government appointed a Board of Review on the Role, Structure and Administration of Local Governments in Victoria. Its report in March, 1980, led to the creation of the Public Bodies Review Committee that had wide-ranging powers to review the efficiency, effectiveness and structure of Victoria's public bodies. Its first reference was to review Victoria's water industry. How bodies reacted depended, perhaps, on how vulnerable they felt to the expected result. The trust saw the review as an opportunity and it vigorously co-operated with the committee. This was probably because the trust was in the process of taking over the Bellarine water supply system and had confidence in the benefits that could be achieved through the careful investigation and preparation of possible augmentations. Smaller bodies such as the Colac Water Board saw the committee as a threat, particularly when its fourth report suggested that of the existing 375 water and sewerage bodies many would be wound up, merged or taken over by local government.

The government that took power in April, 1982, did not delay this process and the committee was reconstituted and continued its work. The government recommitted itself to the objective of giving Victoria a more effective water supply and sewerage service and adopted as the basis of a blueprint for change the committee's sixth report released in December, 1981.

signed:~

dated this twenty-ninth day of June,
nineteen hundred and eighty four.

The first stage of widespread reform began in September, 1983, when the government abolished 70 water and sewerage boards, many by the simple expedient of merging separate water supply and sewerage bodies that served the same places. By March, 1984, 170 bodies had been abolished and replaced by 45 newly constituted water boards while 30 municipal councils took control of water and sewerage services that had been run separately. A new Colac District Water Board took over the functions of the Colac Waterworks Trust and the Colac Sewerage Authority and absorbed the Gellibrand Waterworks Trust and the Forrest Waterworks Trust. The water bodies at Apollo Bay and Skenes Creek merged to form the Otway Coast Water Board. The old SR&WSC was disbanded to form a government water policy department that passed through various permutations in following years and a new Rural Water Corporation took over the SR&WSC's water operations.

Geelong's turn came in March, 1984, when the government enacted further reform to bring Mildura, Ballarat and Geelong into the restructuring program. At government direction, the Torquay, Anglesea, Barwon Heads and Queenscliff sewerage authorities merged with the new Geelong board on October 1, 1984, the Winchelsea Sewerage Authority and Waterworks Trust on January 1, 1985, and the Bellarine Sewerage Authority on

The Bannockburn water supply depot and water tower with the new sign showing it had come under the control of the Geelong and District Water Board.



January 1, 1986. Discussions also commenced with the Bannockburn Water Trust in 1982, but this merger did not take place until July 1, 1988. When the amalgamations were complete, the Geelong and District Water Board's area of responsibility covered 3,800 square kilometres and a permanent population of 184,000.

A series of meetings between commissioners and representatives of the other bodies made arrangements for the change. Chairman Whiteside said the new board would continue the traditions of the old trust and endeavour to seek

RUNNING THE ELECTIONS

It was a massive job! We believed we held the largest non-government elections in Australia when we moved to compulsory voting. I remember going with Len Spitty when it was optional voting and there were half a dozen polling booths. You'd have 200 voters, and that was only because the candidate had dragged them from the local RSL to vote for him.

When it went to compulsory it was staggering. We had 150,000 potential voters and 70 or 80 polling booths. We started planning six months in advance and we ended up engaging the services of the Australian Electoral Office because they had all the contacts for all the polling booths used for the Commonwealth elections and had all that kind of information.

I had some very good support from the staff. Jeff Wall was my administration manager and he was brilliant. While I was taking care of the political side of things, he was taking care of the key administrative side and making sure things flowed smoothly. We had to police how the candidates behaved and authorise advertising and any inappropriate brochures they handed out, all that kind of thing. On polling day you'd be dragged out because there was a blue at a polling station with candidates chesting each other and that kind of thing.

The vote counting was staggering because it was fully preferential voting. We used the top floor of the building in Ryrie Street before there were any offices in it, the whole of the top floor just to count the ballot papers and sort out the preferences. If you had eight candidates, you had to eliminate the eighth candidate and distribute their preferences and balance it all up and then eliminate the seventh person and redistribute their votes, continuing on until all but the two successful candidates had been eliminated.

Although voting was compulsory, there was no process for fining people who didn't vote. The day before the last election the Geelong Advertiser ran a front page story saying 'No fine if you don't vote', that was their headline. I went birko at them because we'd put all this infrastructure in place and there they were telling people they didn't have to vote, so the election turnout was down dramatically. I attributed that to the Advertiser and that led to another big story.

Bob Jordan, who was responsible for organising the board's elections recalls their size and complexity.

new horizons for the benefit of the whole region. There would be little obvious change for staff, but all existing board members would finish their appointments and a new single interim board appointed, comprising all the commissioners and the chairmen of the other bodies. The new organisation needed a new symbol and Robert Ingpen's simple and elegant design, based on the zodiac symbol of Aquarius (the water carrier), was chosen.

The first meeting of the interim board was held on July 11, 1984. It had to oversee overall operations, but it also had to make a recommendation to the government about the new board's electoral arrangements. After long and often difficult debate, the final decision was for four electorates of two members each. Elections would be held every three years and the first election was set for May 7, 1985. Chairman Whiteside would remain the government's appointee to the board.

Over the next 10 years, the board held three elections: in 1985, 1988 and 1991. All adults of voting age were eligible and voting was compulsory, in theory. Elections were not cheap to conduct, with 1988 costing \$238,000. In 1991, 71 polling stations were staffed by 284 officials and board staff counted the

Bruce Webster, a candidate, remembers the frenetic activity surrounding the election.

BOARD ELECTIONS

Changing from a trust to the board had a great effect on me because the electorates were so much larger after the amalgamations and voting was compulsory. It went from almost nothing much to a fully-fledged political campaign. The 1991 campaign might have cost around \$8,000 but we still did a lot of the work ourselves. It was an enormous job.

It meant I had to get a big campaign group together, I had to get people at Birregurra, Winchelsea, Anglesea, Torquay and Barwon Heads, all the South Barwon area. There were five polling booths in Geelong and all these other places. The travel, trying to get around during the day during the voting ... I ended up having to find people in those places. I'd say, "Look, I'll give you a contribution towards your cricket club if you'll man the polling booth for me," so I actually paid people to man the polls where I had trouble getting people.

The whole house was taken over with boards. I had a record of the number of ratepayers in each area. I had to work out rostering; some people could do two hours, some could do an hour, some could be there all day. I had to work out the 'how to vote' cards and the preferences. It was like a political election, there was no two ways about it. It was exhausting. I said I hoped I would be thrown out because it was too much. But I got back in again.

votes and distributed the preferences. By then, it had become clear the board was unable to enforce compulsory voting and just under 50 per cent – or 84,916 eligible voters – turned out.

Fluoride was the big issue in 1985. Norman Boyce, its most energetic opponent, won a seat in District One. In other districts, men who also opposed fluoride, or did not say they supported it, won seats. In 1988, fluoride was just as important and Boyce, Webster and others of the same mind were in the clear majority. In District Four, Priscilla Pescott, who had not won a seat when she stood in 1985 because she had not been included in anti-fluoride publicity, swapped preferences with Bruce Webster to become the first woman elected to the board in the entire history of the authority. In 1991, Boyce swapped preferences with Harry Peeters in District One and they were both elected. But by then fluoride was no longer an important issue and Peeters was almost the only candidate to mention it. Rather, the environment was the important issue. Len Sprague, who was 75 and had served as an elected member for 31 years, did not stand for re-election that year.

Fluoridation was important in elections because it was a point on which to argue. It brought emotion and even passion to board elections, something rarely experienced in the past. After the 1985 elections, and again after 1988, the majority of board members opposed fluoridation. They successfully moved that the government be informed the people of Geelong had voted for them because they did not want fluoride. Despite this, fluoridation was government policy and nothing members did could change that – but they took every opportunity to promote their cause. Several times Chairman Whiteside refused to accept motions that were counter to government policy and pro-fluoride members sought legal advice on what powers the government had to direct the board. They found themselves powerless.

Despite the row, staff continued constructing three fluoridation plants at Anakie, She Oaks and Wurdee Boluc to treat water flowing into Geelong. The government paid the capital costs, about \$1.764 million, and the three plants were

This report, published in the Geelong News of June 10, 1988, after the first meeting of the newly elected board, shows the effect of the fluoride debate.

NEW FACES, BUT THE BOARD'S THEME IS UNCHANGED

There may have been three new faces on the Geelong and District Water Board last Wednesday, but the conversation hadn't changed much.

Even after the elections, the buzz word for the urgent business section of the meeting was still "fluoridation".

From the word go, Chairman Wally Whiteside moved straight in to avoid this touchiest of Water Board topics from hitting the table.

"Perhaps I should say something about the elections," the Chairman began.

"I notice all members here were elected on the anti-fluoridation platform.

"I have spoken to the Director-General about this, and he said the board may not hold a policy which goes against State Government policy."

He said the time spent on discussing fluoridation in the past three years could have been better spent on some issues which had not been given sufficient attention.

Mr Whiteside stated that if the board were to attempt to form such a policy, there would most likely be action taken against it by the State Government through the Health or Water Resources Ministers.

Therefore, he added, he might have to refuse some of the motions brought before the board.

But that wasn't to deter the board's most outspoken opponent of compulsory fluoridation, Norman Boyce.

"We are not against fluoridation," Mr Boyce interjected during the Chairman's speech.

"If people want to take fluoride, they can take it until it's coming out their ears.

"What we are against is compulsory medication."

When his turn came to announce his urgent business, Mr Boyce again turned the conversation to compulsory fluoride.

He proposed a motion that a deputation from the board approach Health Minister David White and Water Resources Minister Andrew McCutcheon to inform them of the situation in Geelong after the GDWB election, as had been done after the first public GDWB poll in May, 1985.

"The results of the May, 1988, GDWB poll are an indication that the Geelong public are even more against the introduction of compulsory fluoridation than previously," he said.

"If an Act of Parliament is wrong, it's got to be changed.

"If there's fluoride in the water the board becomes responsible for it."

Mr Boyce said that as it stood, the GDWB election was the only way the people of Geelong could voice their opposition to fluoridation.

Board new boy Jacob Halik, inspired by his fellow Corio representative, launched into his maiden speech, attacking the introduction of compulsory fluoridation, before the motion was put to the vote.

It was passed.



The fluoridation plant constructed at Anakie. It was paid for by the government and designed by an architect in a rural style. The board rarely bothered with such things for its operational buildings so this was, for its size, the most expensive building the board constructed.

ready to start operating by mid-1986. Anti-fluoride board members attempted to delay the start and board meetings in June and July, 1986, were torrid affairs. With the start imminent, one prominent anti-fluoride member, Bruce Webster, followed the example set by anti-fluoridationists in Ballarat two years earlier and asked the Municipal Employees' Union to impose a ban on operating the necessary equipment. The union agreed.

There was an almost audible sigh of relief, with the matter taken entirely out of the board's hands. The government agreed

THE BLACK BAN

When the vote came up to switch on the fluoride, there were five members for it, including the Chairman, and four against. I thought, "This is a black day for Geelong, this is terrible." The next day in the papers it said 'Chairman Wins Approval for Fluoridation of Geelong', and it went on ... I thought, "Right, you're not going to get away with this." I had a good rapport with the workers, particularly in the pumping stations. I knew one of the union reps down there and I rang him up and said, "Can you come out to my workshop after work?" So he did.

I said, "You blokes have got to stop this. You can't allow this to happen to the people of Geelong who are dead against fluoride. That includes you, your family, your children, it's just not on." I gave him a whole lot of details and the next morning they'd put a black ban on the fluoridation.

I was acting on behalf of my ratepayers. I believe I did the right thing, but if Wal had found out he would have had me strung up.

Bruce Webster describes how he stopped Geelong's fluoridation.

it was an industrial dispute, but it would be solved at state level and the board could do nothing. The three buildings stood ready but unused, and remained unused. The impasse has remained unresolved and no fluoride has been introduced to Geelong's water supply.

For Chairman Whiteside, it was an immensely frustrating period. "Sometimes I feel like taking some of the members down some of the sewer holes to show them just what we should be concentrating on," he said. Their single-minded determination did little to win them popularity among staff and it became a commonly held opinion some members had little interest in the board's activities outside their desire to prevent fluoridation and, perhaps, they were incapable of contributing to some of the more complex deliberations. Some members did little to enhance the board's wider reputation through their actions and attitudes. Some employees were amused by the sight of two members handing out anti-fluoride literature outside the annual meeting of the Victorian Water and Wastewater Authorities Association, but others found it humiliating to the standing of the largest and most influential water authority in the state outside Melbourne. Some also were entertained when one member scurried around at board functions collecting used cans in a plastic bag, but others found it demeaning to be associated with an organisation led by people with so little regard for the status of their position. These apparent failings led some employees to treat the board with less respect than it had once been due. As a result, when Harry Peeters joined the board he quickly formed the opinion many staff members tried to sidetrack the board from the important issues and keep members as far away from the real business of the organisation as possible.

Priscilla Pescott helped to restore some of the board's standing. She had experience in local government and had served a term as the Mayor of South Barwon. But when she attended her first board meetings, she found they were run very informally and the most forceful members could dominate discussion. She insisted common rules for running meetings be

observed so all members could participate. She also won the respect of many staff at a meeting of the Victorian Water and Wastewater Authorities Association when she objected to the gender insensitive comments made by one of the speakers. She stood up, told him what she thought of him and walked out of the meeting.

All this occurred when the board had never been busier. Its new expanded boundaries gave it greater responsibilities and changes taking place in the wider world forced it to face complexities greater than ever before. In June, 1983, customers numbered 142,000 while in June, 1993, they had grown to only 500 short of 200,000. In the summer holiday period, the population grew to an estimated 250,000.

The amalgamations increased the board's sewerage responsibilities. In 1983, it had 875 kilometres of sewers, in 1985 it grew to 1,054 kilometres and in 1986 it reached 1,294 kilometres. New housing estates added to the length of sewers. In the year to 1985/86, a record 41.9 kilometres of new sewers was laid. But as the housing market declined, so did the lengths of new sewers – to 30.7 kilometres in 1989, only 17.2 kilometres in 1991 and 16.4 in 1993. Contractors carried out about 75 per cent of the work, with the remainder by the board's workforce.

The board also expanded its water supply system to match development and upgraded supplies for towns that had come under its control. Along the Surf Coast, it upgraded the Anglesea system and replaced the old open channel to Torquay with a pipeline. It improved supplies to most towns on the Bellarine Peninsula and to inland centres, including Bannockburn and Winchelsea. A special government grant allowed it to construct a supply main to the You Yangs Forest Reserve. In Geelong, major improvements included upgrading the transfer mains from Montpellier to distribute water from the Barwon catchment and several major new supply mains.

Many of the old pipes in the water supply system around Geelong required replacing and most years between five and 10 kilometres were changed over. Digging trenches in heavily built up areas could be expensive and disruptive and the board began

A map from 1987 showing the area served by the Geelong and District Water Board, and its catchments beyond.



using trenchless technologies, such as ‘pipe bursting’ techniques, to replace old pipes without having to dig them out.

The wastewater system also needed constant attention. (‘Wastewater’ was a phrase that began to replace ‘sewage’ in the 1980s, perhaps because it was a nicer term but also because a high proportion of sewage was nothing more than used water.) Pumping stations had to be regularly maintained and some

needed upgrading when the areas they served became more densely populated. Staff routinely cleaned out wastewater mains to prevent blockages, but between 600 and 1,000 obstructions still occurred in a year. In 1986, the board began a series of studies and trials to control odour and corrosion in the wastewater system. It eventually found a combination of pumping oxygen or air into the wastewater and some other simple measures controlled the problem.

Drysdale/Clifton Springs on the Bellarine Peninsula was connected to the wastewater system in 1987. Portarlington, east of Drysdale, was not connected but had its own wastewater plant constructed in 1984. It had four ponds where the wastewater was treated and a large re-use area of about 130 hectares where the treated water was used to irrigate about 60,000 trees, mostly gums.

The board also became responsible for two more wastewater treatment plants, at Anglesea and Winchelsea. The small Anglesea plant discharged its treated effluent into the ocean like the Black Rock facility while Winchelsea was similar to Portarlington but with only about 12,000 trees growing in its disposal area. In 1995, the board also completed plans for a similar disposal facility for Bannockburn.

The major wastewater disposal site was the ocean outfall sewer at Black Rock that had to be upgraded to meet EPA licence conditions. The board had agreed to construct a long submarine ocean outlet and screening plant to remove anything larger than about a millimetre in size from the water before it was discharged into the sea. Investigation commenced in 1983 and in January, 1984, some staff members travelled to Western Australia to see a submarine outfall pipe being towed out to sea. Later, staff visited New Zealand to inspect screening equipment in operation. The Black Rock upgrade was the most expensive project the board had contemplated and was expected to cost \$29.1 million. The financial organisation required to raise the funds and negotiate terms was a major effort in itself.

The first and most spectacular part of the project was the steel submarine pipeline 1.2 kilometres long and 1.35 metres

The ocean outfall at Black Rock was constructed on land and then towed out to sea. Its great length dominates the work around it, including the new treatment plant on the right of the pipe just inland from the ocean.



The pipe on its way into the ocean. The end plate was removable so the pipe could be connected to the sewerage plant. Heather Vines was invited to break a bottle of champagne on the end of the pipe to launch it as it went out.



in diameter that would transmit the screened wastewater out to sea. It was constructed on land and towed out to sea in one long tow, with a heavy barge moored offshore pulling it with the help of winches and jacks on land. The tow was arranged with military precision because it required good weather, the right tide conditions and careful calculation of the force needed to pull the pipe off the construction site into the water. Everything was right by Easter and the tow went ahead over the holiday period. The pipeline went out about half a metre a minute and, since it was over a kilometre long, the

job took 48 hours. At one stage, the outlet came off its skids but that was fixed and, as the final segment went out, Heather Vines broke a bottle of champagne against it. Whiteside, Vines and board members were elated with the success of the exercise. Once the pipeline was in place on the sea floor, it was filled with water and protective rock placed over it.

The second stage of the project was the screening plant. It had three Archimedean screws to lift wastewater up into the plant, coarse and fine screens to take all but the tiniest particles out and the necessary electrical and control equipment. Everything was ready by late November, 1988, and a partial flow was diverted into the plant for the first time for about two hours on November 30. Over the next two weeks, the volume and duration of tests increased and the first

One of the large Archimedean screws being installed at the treatment plant. They were carefully installed and are almost maintenance free.



The rotary fine screening equipment being installed in the treatment plant. Sewage enters the screens from the left, the water flows out through the screens and the solids emerge at the end to be carried away by the auger in the channel.



screened wastewater went out into the ocean on December 15. For another two and half months, the commissioning team refined and tested the processes so that by the end of February, 1989, the plant could be run continuously under automatic control. The final cost of the project was \$32.9 million.

Despite the achievement, the board was criticised for the

new plant. The vast improvement to the quality of discharged water and the way it was discharged was still not good enough for the board's critics. There were still reports of 'nasty things' seen floating in the water off Black Rock and washing up on the beaches and continuing claims of the bad effects the effluent had on the marine environment.

Criticism had become a fact of daily life for the board. While the plant was being constructed, it complained that elements in the media were determined to paint the project in the blackest light. When the Chairman sent a letter putting the board's view to one newspaper, what was printed was different from what he had sent. This experience encouraged members to ignore most criticism. In the month after the new treatment facility was commissioned, the board received petitions against the ocean outfall and beach pollution signed by more than 2,500 people. In May, petitions with almost 4,500 signatures were received. In July, the board was able to draw at least some levity from the

THE EFFECT OF THE OUTFALL SEWER

The change from onshore sewage discharge to the 1.2 kilometre offshore discharge was phenomenal after commissioning the new fine screening plant and offshore outfall. The immediate surrounding rocky shore flora and fauna regimes changed from a dominance of opportunistic species back to normal community levels similar to those conducive to the general region.

So after discharging on the shoreline for around 70 years or more, the plant and animal populations returned to those normal levels in around six months. Similarly, the rubbish previously escaping through the screens of the shoreline outfall also ceased as the fine screening plant collected this material at the plant.

The grey-brown turbid waters conducive to the shoreline outfall, immediately either side of the outfall, at times stretching some 100 or so metres, disappeared completely. It was a nice change to see clean waves breaking over the basalt rocky outcrop once again.

The extended ocean outfall discharges the fine-screened sewage in an average depth of 15 metres over a couple of hundred metres. This significant increase in dilution aided in minimising the aesthetic visual impact of the sewage discharge.

Monitoring of the marine communities continued for a number of years to ensure no major impacts occurred over time. To this day, biological monitoring of these communities continues, again to ensure no longer term impacts.

Peter Ashton comments on the difference the outfall sewer made to the sea ecology at Black Rock.

signature of the President of the French Republic in another batch of petitions.

There were two ways the board could respond: use the media to tell its side of the story or ensure it met EPA standards, which were the benchmark of whether the new facility was performing as it should.

Public Relations was renamed Community Relations in October, 1989, as a reminder of the board's responsibilities to the people it served. The board believed it had a responsibility to inform customers of its policies, plans, projects and how it spent their money. It also believed the community needed to be made aware of the importance of water and the board's role in providing the supply. Bus tours to various facilities became so popular they had to be cut back. Open days also allowed people to see the operations. Over two days in May, 1989, more than 1,200 people visited Black Rock to inspect the treatment facility; on another two days in January, 1990, there were more than 1,700 visitors. Later, as new projects were undertaken, other open days were held.

More people could be reached by going out to the community. The board began publishing a range of material, from pamphlets sent out with rates notices to brochures and

A water board display at the annual Geelong Show.

Each year's display is different; this one featured an old backyard dunny, something the board had worked hard over the years to eradicate.



booklets on subjects such as water conservation and wastewater management. Community Relations also took over publishing the annual report, which became a more informative document. There were displays at the Geelong Show, the Garden Show and Fire Prevention Week and a float in the Gala Day parade promoting the board and water awareness. The education kit was re-designed and re-focused to suit different levels of school children and be more relevant to the curriculum.

Community Relations also promoted issues of immediate public concern and developed special information campaigns, such as water conservation, during summer. The board also undertook public consultation campaigns as part of the planning process. Community Relations information programs received awards from the International Public Relations Association and the Public Relations Institute of Australia and the 1991/92 annual report received a bronze award in the Australian Annual Reports Awards. Community Relations had rapidly gone from being an optional extra to a key part of the board's activities, and when public relations officer Jill Hollingsworth resigned in November, 1988, the board voted her a motion of hearty appreciation for her work. In 1991, the Geelong Advertiser approved of the community relations concept when it said: "One thing about the GDWB – they don't duck for cover when there's constructive criticism about."

At that time, many residents of Anglesea would not have agreed because of conflict over a proposed new wastewater treatment plant there. The town's old facility had been designed to cope with a peak population of 5,500, but by the early 1990s the influx of holidaymakers took the number to 12,000. In 1989, the board began investigating ways to meet demand and commissioned a consultant's report. This recommended an improved treatment plant and ocean outfall. The proposal was put on public display and an information meeting held at Anglesea to explain the proposal. But many people opposed putting more treated wastewater into the ocean and the board ran up against a local protest group called STOP (Stop the

Ocean Pollution). This community group made the board reconsider its plans and undertake greater community consultation.

The board convened a meeting to establish a working party to examine land disposal of wastewater at Anglesea, but there was a shortage of useable land near the town. The small community of Bellbrae, about 10 kilometres inland from Anglesea, soon learned the working party was considering a wastewater treatment plant there so they formed their own committee and asked the board to add their representative to the working party. The board agreed, but the working party opposed appointing a new member and matters became tense. All this effort achieved little, however. At first, the board adopted a land-based disposal option but found the only viable site was 200 hectares of bushland west of Anglesea. The stumbling block was the government would not allow use of the site because of its environmental significance. The only remaining option was an ocean outfall. To meet local concerns, the board provided a very high performance treatment plant that produced effluent suitable for re-use and an outlet pipe 180 metres long that ensured the effluent discharged below the low-tide mark. Construction commenced in August, 1994, it was commissioned in May, 1995, and opened on September 3, 1996, at a cost of \$4.18 million.

The EPA issued licences for all the board's wastewater disposal plants and part of the conditions was that the effluent would meet certain standards. To do this, the board had to conduct wide-ranging and rigorous tests in and around the Black Rock and Anglesea ocean outlets on water quality, marine life and the potential pollution of nearby beaches and environs. Test results were published to enable the public to judge the results for themselves. This information gave the board, the EPA and the public an objective scientific evaluation of the impact wastewater had on the environment, rather than subjective personal opinions.

The laboratory was the source of information about the board's environmental performance. Accredited by the National Association of Testing Authorities Australia, it could carry out testing required by the EPA. In August, 1991, approval was given for a new \$1.69 million laboratory at South Geelong and it was completed in April, 1992.

The laboratory also tested trade waste entering the sewerage system, from 673 places by 1994. Trade waste users had agreements about the amount and content of wastewater they could discharge into the sewers and many had to install their own treatment plants to remove unacceptable contaminants. This protected the sewerage system and ensured wastewater discharged into the ocean met EPA standards. A Trade Waste Users' Group comprising some of the largest customers was established in 1991 to help the board create closer contact with industries using the system and provide users with a forum to discuss their needs. It also set up a system of controls that relied more on self-regulation than inspections and testing, although the organisation still took samples of trade waste for analysis. These numbered 912 in 2001/02.

The Barwon River gave the laboratory more work and by 1994 it was testing water from 14 sites along both the Barwon and Moorabool. From the board's perspective, discharges upstream from Geelong, particularly salty water from the Lough Calvert system, was tantamount to using the river as a drain. The pollution was made worse by raised nutrient levels in the water causing occasional algae blooms. A community-based 'Save the Barwon' committee proposed a merger of Geelong and Colac water authorities, including control of the Barwon River, to prevent pollution. The board supported the committee on environmental grounds.

The board launched a Waterwatch program in the Barwon region in 1993 using a government grant of \$13,000. Waterwatch helped community groups, schools in particular, monitor the quality of the region's rivers by recording information on such things as colour, turbidity, water levels and erosion. Schools along the Barwon River began monitoring the river at six points and the

program was extended to the Moorabool River in 1995. By then, there were about 30 community groups participating in the program and that had grown to 55 groups with 735 members monitoring 98 sites by the end of the decade.

The laboratory also measured the quality of Geelong's water supply by monthly testing of samples from catchments and storages. In April, 1988, the board decided to extend testing to the domestic supply by installing sampling taps at selected houses around Geelong. Complaints about water quality were as old as the supply system itself. The board always maintained its water was safe to drink, but by the late 1980s it faced greater pressure to improve the physical quality of the supply. In 1990, it adopted the WHO standard for water quality and the Victorian Health Department's regulations for sampling domestic water supplies to ensure they met those standards. About 300 sampling taps were installed across the water supply zone and 60 samples a month were taken at random.

In 1991, the board reported that its compliance with the same parameters of the WHO standards was only 31 per cent and had to be improved. Staff had developed a water quality strategy in 1984 that led to consultants being appointed to report on what action needed to be taken. The report, presented in August, 1986, contained 24 recommendations, including construction of water treatment plants to improve Geelong's water quality.

A partial solution to bacterial contamination was to use chlorine to disinfect the water and chlorination equipment was installed at Anakie and Montpellier. This brought about an improvement, but the real solution lay in constructing full water treatment plants to meet WHO standards. Since Geelong took most of its water from the Barwon catchment through Wurdee Boluc Reservoir, that was chosen as the site for the first full water treatment plant. Consultants appointed to complete the preliminary design recommended construction in two phases, the first to treat 130 megalitres a day and the second to double that to 260 megalitres. Board members gave approval for detailed design to commence in July, 1988, and construction began in April, 1990.



The completed water treatment plant at Wurdee Boluc. The cylinders are the pressure tanks where the water is filtered, the large tank stores it before it goes to Geelong and the ponds in the foreground are the sludge-drying beds where the material flushed from the pressure tanks is dried.

The chosen design was innovative and the only one of its type in Australia. Like most water treatment systems, it involved passing water through a series of filters to remove impurities. But rather than the traditional large beds, this plant would have tanks about twice the length of a road tanker containing layers of gravel, sand and anthracite (a high quality black coal) through which water was forced under pressure. When the filters became clogged, they were backwashed and any collected sludge sent to ponds to dry out. The result was crystal clear water that had rarely been seen in Geelong. The treatment plant also had complex control systems to keep it operating efficiently and it could run overnight unattended. The first stage was completed and commissioned in January, 1992, and treated about half the water sent from Wurdee Boluc to Geelong. Within days, the board received a letter from Geelong Hospital saying how much it appreciated the improved quality of the water.

The board had originally planned to delay construction of the second stage so it would not be commissioned until 1995, but pressure from government health authorities and the public encouraged it to proceed immediately. Approval was given in October, 1990, and it was completed in October, 1991. The plant was officially opened in March, 1992, having cost \$25

million. It supplied 260 megalitres of clean water a day and exceeded expectations. Indeed, the project won the engineering excellence award from the Victorian Division of the Institute of Engineers, Australia.

When stage one had been completed, the quality of the overall water supply – measured against WHO standards – increased from 35 to 53 per cent. When the complete plant was operating, the level increased to 69 per cent. It was not higher because the water from the Moorabool system remained untreated and remedying that was the next major project on the capital works program.

The need to meet new water quality standards had similar effects across Victoria. At the beginning of the 1980s, Colac had one of the few supplies in Victoria without any form of treatment, such as chlorination. With upgrading essential, the Colac Water Board announced in 1983 it would construct a chlorination plant. But the prospect was as unpopular as fluoridation in Geelong and a petition of almost 3,000 signatures and public meetings opposed the plan. The Colac board ignored the protests and the chlorination plant was completed by 1995. In 1984, the Colac board adopted plans for a full water treatment plant costing about \$1.13 million and, after exhaustive investigations and tests, work started in February, 1990.

Changing environmental priorities had dictated what the board did, but new political ideas influenced how the board did them. The previous government had been content to amalgamate as many water bodies as possible to make the water industry cheaper to run. But the government that assumed power in 1982 had more ambitious plans and announced a new policy direction in December, 1983. Key elements included a new approach focusing on the water supply needs of users and adoption of a corporate approach. This meant water industry bodies would be managed in a corporate fashion and be evaluated by measurable and accountable performance benchmarks so that resources would be allocated in a “socially equitable and efficient manner”.

This fundamental change in direction took two forms. One was in the details of water body accounting practices to improve financial organisation and reporting. The second was in how they set performance goals and then reported on their success in achieving them. The major new accounting procedures took effect from July 1, 1985 and the board re-organised and re-focused its financial organisation to meet the new demands. The implications of the broader changes took longer to recognise and meet, but the board declared itself ready to become “a more efficient force in this region”.

In November, 1985, Vines told members it was time for an objective re-assessment of the organisation. Consultants were appointed to audit the organisation and recommend changes to improve efficiency. The first phase resulted in restructuring and strengthening the administrative and financial arms of the board that had once been the Secretary’s branch. As it was impossible to make a final decision about what administrative support functions were needed until the audit of the Engineer-in-Chief’s branch had been completed, it immediately followed the first stage. The board confirmed the final shape of the restructuring in September, 1986. The old two-headed structure of Engineer-in-Chief and Secretary had gone, to be replaced by a more modern approach. Geoff Vines remained the CE and there were four executive managers – of corporate

THE BOARD’S OBJECTIVES:

- *to harvest, store and convey water to provide a continuous, reliable and safe water supply to urban communities and rural districts within the board’s area of responsibility*
- *to collect, transport and dispose of domestic and industrial wastewater in an environmentally safe manner*
- *to maintain and improve the defined reaches of the Barwon River in order to provide an area of pleasure and recreation for the people of Geelong*
- *to plan for future developments of water and wastewater systems and meet demands for extensions of these systems*
- *to promote an awareness of water as a vital resource and encourage the careful use of water by consumers*
- *to provide these services at the least possible cost to the community.*

The objectives of the board from its 1987 Annual Report.

services, finance, engineering development and engineering operations. This structure placed for the first time the management and financial branches of the board on the same footing as the engineering branches.

A list of duties and responsibilities of the new executive group were drawn up. A new Personnel Policies and Procedures Manual was prepared and covered a wide range of personnel matters, including position descriptions. Previously, these matters had been taken for granted and developed over years. But now everyone understood their place in the organisation and what was expected of them. The board's objectives also were spelt out clearly and concisely.

This new structure recognised the increasing importance of information flows within and to and from the organisation. Shelves in the library, which had once been the exclusive reserve of books on the water industry and engineering, now began to hold documents and manuals about management and administration. The library also was the gateway into the expanding world of information technology, providing access to CD-ROMs, the inter-library loan network and the internet.

It would be almost impossible to underestimate the importance of information technology to the development of the board from the late 1980s. In 1987, several operational areas used computers, the IBM machine had been upgraded several times to cope with growing demand and other branches acquired stand-alone systems to meet their particular needs. As part of the management audit, the consultants recommended creating an electronic data processing branch to oversee computing and develop a co-ordinated policy. The board executive recommended this new unit should be part of one of the engineering divisions, but the board insisted it should be established as an individual division with its own executive manager. Joe Adamski was appointed to the position in March, 1987, and the new division commenced operations in April, 1987.

For Adamski, it was almost computer heaven. He had grown up and studied computing in Geelong, but worked for Telecom in Melbourne where he became involved in a wide range of

activities, including management and planning. His new job allowed him to work in Geelong and do almost anything he could imagine. It was a time when most executives and managers had little experience of computers and only a few people had access to them. Letters and notes were still hand written or typed and the possibilities of the fax machine were just beginning to emerge. The board and executive knew they needed to address the issue of computing, but they had little knowledge; Adamski had to work out what they needed, convince them of it and then deliver it. His first step was to win the confidence of those in charge by ensuring they were introduced to the new technology in a way that suited them and by preparing and presenting a thorough strategy. His task was aided by the fact he was easily able to adapt himself to the ethos of the board at the time and the way Whiteside and Vines operated.

GETTING NORMAN'S VOTE

We convinced the executive; it was three or four million dollars and it was more than the major projects engineers had. After that we had to get it through the board. I thought, how do I explain a document that's so thick, knowing that a lot of members were there on single issues and some had no idea of computers.

I had to be a salesman. I had this idea that data was like islands but the entire organisation couldn't benefit from the knowledge it had because it had these islands of data. So I had four or five overheads and the first one was islands with palm trees on them. Then I had these bridges and I said that was the network that linked all the data.

One of the board members, Norman Boyce, came to me before the meeting and said, "I've read all this and I don't understand it and it's a lot of money. I'm going to vote against it." I said, "That's all right Norman."

When you went to board meetings you used try to guess how the voting would go. This is going to be a four-five decision or I think this will go six-three, or whatever. I went through my presentation. I didn't talk about IT. I just talked about these islands, the system and the benefits. I could see in their faces that I had won them anyway but I said how much it was going to cost real casual. And it was unanimous.

Norman came out and he said, "You're the best salesman I've ever seen. Why aren't you selling cars, you're in the wrong business." I said to him, "You were going to vote against it." He said, "After I heard you, I didn't understand it, but I liked the islands so you got my vote."

Joe Adamski recalls when board members voted on the information technology strategy.

In February, 1989, the board adopted the Technical Computing Strategy costing around \$420,000. It set the direction the board would take for the next five to seven years and included computer-aided drafting and design, digital mapping, document imaging, water information management systems and a fully integrated computer communications network. In October, 1990, the board agreed to stage two of the project to acquire additional hardware and software costing about \$1.81 million.

By 1991, the board was sufficiently confident in its computing strategy that it was prepared to invest a further \$2.9 million over five years in a facilities information system. This ambitious program would bring together information from all over the organisation into one integrated set of data, including survey, planning, financial and construction information. It would allow employees to call up a range of information about any serviced property. Several years later, the system was known as ProFIS (the Property and Facilities Information System) and provided access to an astounding range of information of value to planners, surveyors and administrators. The ProFIS system allowed staff to view detailed information about a single property or about the entire service.

The board also adopted the latest and most appropriate accounting software, the most up-to-date word processing and office automation systems and world standard computer-aided drafting and design software. There was hardly a function that did not use the information technology system and by the mid-1990s most staff members had a computer on their desk and training in how to use it. Drawing boards, typewriters and calculators disappeared. Computers also began to reach out into the field and in March, 1989, meter readers began using hand-held devices that improved the efficiency of recording and billing and gave them directions for finding meters and warnings of potential hazards.

Knowledge of the scope and achievements of the information technology system began spreading beyond Geelong. By 1993, more than 80 organisations had sent people

to view the operation. Many were interested in the ProFIS system and others in the overall information technology strategy and how it had been implemented. Staff gave presentations to the computer industry and the board's achievements were detailed in various computer publications. Adamski and the board received accolades, including a Geelong Business Excellence Award for Information Systems, an Australian Computer Society Award and Computerworld Smithsonian award for excellence in information technology.

A Corporate Planning Group was established to define corporate objectives and develop appropriate strategies. It developed corporate objectives grouped under four main categories – management and finance, service and operation, human resources and organisation, and environment and conservation. The Corporate Plan was intended to shape the board's development into the future and be reviewed and revised regularly so its objectives continued to meet the needs of the community and the government. The board adopted it in March, 1991.

This new mode of corporate organisation, the tools of information technology and laboratory testing and changed employee culture made it possible for the board to develop 'performance indicators' against which it could measure its efficiency and effectiveness. Many of these indicators were developed by the employees themselves, based on their knowledge of their roles and how they could be improved. Indicators also were part of the government's requirement to make the water industry more accountable. The board developed a range of indicators relating to its internal operations (financial performance and service to customers, for example) and external performance (such as repaired burst pipes and water quality). Initially, some standards were not set at the highest possible levels but above current levels to encourage improvement. As performance improved, the goals were raised. For example, one target was that no household water supply should be interrupted for more than 30 minutes. In 1990/91, the target was set at 90 per cent, the following year at 92 per cent

and then higher again in following years. Another performance indicator was customer satisfaction, which was calculated simply as a proportion of the number of complaints received against the number of buildings served. The board acknowledged it was an arbitrary measure, but it was at least an attempt to describe satisfaction in a quantifiable way.

Providing high quality customer service became one of the main goals. The board developed new ways of serving its customers, including easier access. In 1993/94, the board served more than 50,000 customers in its various offices and handled more than 105,000 items of correspondence. As most people only needed to contact the authority when something went wrong or to pay their bills, the board focused in that direction. Staff in continuous contact with the public received special training, a customer response form was developed and the customer service department was streamlined. A further initiative was a special telephone service for customer account enquiries that could be quickly resolved by staff using the computer system.

Until the late 1980s, customers could only pay their rates by post or over the counter. In 1990, Australia Post became a collection agency for the authority and very quickly about 55 per cent of ratepayers used their local post office rather than a GDWB office. As a result, it became less important to have offices throughout the district. The Bannockburn office was closed in 1987, but there were still regional offices at Anglesea, Ocean Grove, Portarlington and Torquay until the 1990s. The offices at Portarlington and Ocean Grove were then closed and a new one opened in Drysdale because of population changes. The Anglesea office was closed later and the Torquay office moved to a shop front in the middle of a retail area where customers could visit more easily.

In 1987, the board began considering charging customers for the water they used rather than the traditional rates based on property values. This had already been adopted in Perth and Newcastle, but the board did not want to rush a decision because it wanted a fair and equitable system. In 1989, it used a



computer model to assess the effects of a 'user pays' charge and the next year held consultative meetings with 160 ratepayers selected at random to gauge public opinion. It also employed a business analyst to investigate the proposal. After these studies, the board decided to introduce 'user pays' charges in December, 1990. It believed the new system would be fairer and encourage consumers to manage their accounts by controlling how much water they used. The new arrangement included a fixed service charge for the water supply system and a volume charge for every kilolitre. The new scheme was introduced on July 1, 1991, and it was accepted with little complaint. In May, 1992, the board decided to introduce a 'user pays' charge for wastewater as well, based on the estimate that wastewater was 70 per cent of water consumed. Introduced from January 1, 1993, the board was the first water body in Victoria to adopt this system and set the benchmark for others. The immediate impact of the 'user pays' scheme was reduced consumption and sewer use that delayed the need for expanded services for some years.

One of the board's major objectives was to provide services at the least possible cost. It had always been careful with its finances, but performance indicators called for improved efficiency and

The board's new shop front office in Drysdale.

financial management and there was also a requirement to meet the government's demand for more operational details. Accommodating the government was a drain on the resources, but it ensured greater efficiency. From around 1987, the government asked water boards to prepare business plans and the board was able to adapt software to meet the demand and incorporate into it the 10-year forward plan. In 1997, it adopted government guidelines for investment planning and project evaluation to ensure projects met corporate objectives and provided service and financial benefits to customers. It also had to create an 'assets register', which led to the development of a management strategy to help plan the construction, operation and maintenance of its assets. Another tool designed to meet its objectives was management reporting. The board also continued to annually review and revise its 10-year capital works program that had become the cornerstone of its planning strategy. In 1990, it was renamed the Ten Year Capital Works Investment Plan because the construction of capital works was the board's investment in the future Geelong and district.

Before the 1990s, the board planned its spending and revenue to roughly break even. But by 1990, it planned to make surpluses – and did. In 1991/92, the surplus was \$12.273 million and in 1993/94 \$17.38 million. These were ploughed back into operations and capital works.

One technology that improved productivity and cut costs was a telemetry system, which allowed employees to remotely monitor and control the performance of every part of the water and wastewater systems. The board approved this new system in November, 1985, and began installing it in stages in June, 1986. Remote monitoring equipment was located at key points as was control equipment that could operate valves, pumps and other apparatus. Everything was linked to a control room in South Geelong where the information processed by a computer allowed operators to manage major components of the system. By 1993, this telemetry system monitored and controlled the water and wastewater systems from more than 100 sites 24 hours

a day.

All these changes threatened to overwhelm the board, which had a long tradition and set methods of doing things. The two-headed organisation had gone, but many of the old barriers between parts of the authority remained. At the daily work level, for instance, there was little official contact between some branches and it was not encouraged. Doing so could disrupt the tradition of a strict hierarchical structure. Chief Executive Vines saw that this tradition held back the organisation's development and he looked for ways to be more responsive to further change. It would mean a drastic revision of the old culture that could have severe costs to employees, but it was necessary to help the board survive in the new world. Vines was approaching retirement and he could have sat back, but he faced the need for change squarely and pushed ahead.

Cultural change had to begin at the top because the executive had to lead the way rather than follow. In November, 1988, Vines and his executives went to Ballarat for a weekend training seminar. What was the role and purpose of the board? How could it improve? How could they contribute to that change? It was a confronting experience and members of the executive team had to open themselves up to the rest on a personal level. Vines later told board members it had been a valuable experience and should be extended to other levels of management and to the board. Further intimations of change came in March, 1992, when Whiteside, other board members and staff attended a two-day conference on Corporatisation in Victoria. A little later, members and executives began defining the board's core structure. This kind of radical change lay beyond the board's experience so a consultant was appointed to develop a 'corporate vision' in what became known as the 'change management program'. In April, 1993, the board's Statement of Vision and Values had been completed and members committed themselves to supporting them. This led to a decision to extend the 'cultural revolution' process to all employees in a project that would cost around \$270,000.

The growth in the board's area of responsibility led to a steady increase in employees, from 330 in 1984 to a peak of 456 in 1990

and a decline to 427 in 1994. The board's existing accommodation was strained and again more space was needed. The new office at South Geelong had been designed with the potential to have more storeys and in October, 1986, architects were asked to draw up plans for two additional floors. The council did not favour the addition nor did people living in the neighbourhood. Protests over the proposed extension became another source of public complaint about the board and in May, 1987, it resolved on Whiteside's deciding vote that only one floor would be added. It was a compromise between what the board needed and the damage the issue could do to its already strained standing in the community.

With approval given, architects began design work almost immediately, making every effort to ensure there was minimum inconvenience to nearby residents. But one more floor at South Geelong did not solve the overall accommodation problem and in 1989 it was decided to buy additional property in Ryrie Street, west of the head office. Nothing came of it, however. The board spent 1990 investigating other possible sites for a new head office facility in central Geelong, but when it went to the government for approval it was turned down.

Despite accommodation problems, working conditions remained good, partly because of the friendly environment created by Whiteside and Vines, who did a lot of 'management by walking around'. They both made a point to see and be seen by all their employees, creating a big, busy family atmosphere. This feeling of inclusion was fostered by taking staff, who had no involvement with the operational side, on guided tours of facilities. Further, a staff magazine *Ulluricna* enhanced the sense of inclusion. In 1988, when it was decided to issue uniforms to office staff who dealt regularly with the public, the uniforms also were offered to other office staff at subsidised rates.

Industrial relations were generally excellent, mainly due to the board's policy of regular consultation with employees and union representatives. The union ban on operating the fluoridation equipment had no impact on workplace relations and was isolated from other industrial issues. When enterprise bargaining agreements became the main method of setting wages and

conditions in the early 1990s, the board and its employees were the first in the Victorian water industry to conclude their agreement. This brought more cultural change by blurring the traditional distinction between staff and wages employees that had existed since 1908.

A greater interest in the natural environment began to draw people to the water storages. Bird watching, fishing, picnicking and bushwalking were ways of enjoying the environment around storages, making the West Barwon Reservoir an increasingly popular destination. In 1986, it was decided to also open up Bostock Reservoir to the public, with toilets installed, and by 1990 the board was developing more facilities for the public at both storages. During 1994, a section of Wurdee Boluc was opened to fishing and barbecue facilities were provided at all three major storages. Information shelters for visitors also were constructed. The picnic area at West Barwon was named the Len Sprague Reserve in honour of his long and valuable service. A traffic counter installed on the access road to West Barwon recorded an average 600 vehicles a month between November and May. This equated to about 1,200 people a month or about 40 a day, reassuring the board its money was being put to good use. In 1994, the board embarked on a three-year program of improving facilities at West Barwon, including a massive planting of native trees.

The most visible work was on the environment around the Barwon River where it passed through Geelong. By 1993, the board was spending about \$650,000 a year on maintenance and improvements. The nursery produced around 40,000 indigenous trees, shrubs and grasses each year to be planted along the river. The board had plans to return some areas to their original state and staff managed the rowing course and open areas where spectators could gather to watch or have picnics.

One of the most popular attractions was the Stan Lewis Walk where an immense amount of effort had gone into restoring the river environment. In 1991, the Stan Lewis Walk vegetation restoration project was runner-up in the State Landcare Awards and a finalist in the National Banksia Environmental Foundation Awards.

The Stan Lewis Walk along the banks of the Barwon River in the 1980s.



The board, in conjunction with local government, continued to purchase property along the banks of the river to return them to open space, with the final property bought in 1989. This allowed public access to the river all the way from Buckley Falls to the Breakwater. In 1988, Chairman Whiteside presented the board with a concept plan he had drawn up for beautifying a stretch of the north river bank down to the Breakwater where industries had once stood. The project would take three years and cost about \$30,000 a year to complete. The board adopted the plan, generally along the lines Whiteside had suggested, and within four or five years local native plants were flourishing in what had been an industrial wasteland.

One of the most significant river-side developments was the Yollinko wetlands project. Launched in March, 1994, it called for construction of a wetlands habitat on a degraded section of flood-prone land on the north bank of the Barwon River upstream of Princes Bridge. The project was funded by several bodies to create a diverse environmental ecosystem and involved extensive replanting of about 30 indigenous species of flora, including 10,000 trees, shrubs, grasses and wildflowers. Walkways were constructed so people could learn from and enjoy the new environment.



The Yollinko wetlands walkway. This photograph was taken in 1997 when vegetation planted several years earlier was well established.

Another significant project, was an Aboriginal garden developed on the opposite bank, near a mound the Wathaurong had used in the winter season for 3,000 years before the white arrival. It was one of the few surviving Aboriginal mounds in any Australian city. Aboriginal food and herb plants propagated in the nursery by employees and through participation from local groups, including the Wathaurong youth group, were planted in the garden in February, 1994.

The Barwon River created a positive public image for the board, but the old aqueduct across it did the opposite. Even after the duplicate sewer had been commissioned, the old ovoid sewer carried about 30 per cent of Geelong's wastewater. But keeping the aqueduct in service had become a costly business; by 1988, \$270,000 had been spent on repairs over several years and a further \$130,000 in the following two years. This endless expense prompted the board to construct a replacement, a pump-boosted syphon. It comprised a pumping station and 700 metres of 750mm and 900mm diameter flexible polyethylene pipe installed across the Barwon River flood plain and under the river. It was approved in December, 1990, and completed at a cost of \$4.2 million.

When the new syphon was brought into operation, the board decommissioned the old aqueduct but could do nothing to dispose of it. In October, 1986, the structure was recognised for its heritage value and in 1987 it was classified by the National Trust. Later, it was added to the register of Victorian Heritage Places. This meant the board was stuck with it, even though it was of no further use. Initially, the board claimed the old structure had no heritage significance, but public support grew and heritage legislation supported public protests against any move to dispose of it. By 1991, the board agreed it would be prepared to recognise the aqueduct's heritage significance as long as management arrangements could be made for someone else to assume control. Members said it was not the board's role to manage old heritage structures and it was not the responsibility of their customers to pay for them. What had once been the board's most spectacular achievement had become a white elephant. From a distance, it remained a magnificent structure, but closer up its age and fragility became clearly obvious. There were many suggestions about what could be done, but all cost money. Despite public protests, special studies and proposals made by the board and others, the matter remained unresolved more than a decade later.

The old aqueduct and the new syphon under construction. The syphon has two one-metre diameter pipes to operate most efficiently; one pipe is usually sufficient to meet demand while the other allows the system to meet peak demand.





This issue, however, was only a minor distraction from the major problem of finding new water supplies. The board wanted access to the Gellibrand River, but places to the west, such as Colac, resisted. The decision rested with the government and the Natural Resources and Environment Committee (NREC) began investigations in 1983. Its report into a regional water strategy for South West Victoria, received in late 1984, acknowledged the board's water supply had to be augmented by 1988. But it also said the board should make better use of the resources it already had rather than extending into new catchments. As a result, the board committed \$300,000 to a study into the possibility of damming one of the tributaries of the Barwon River higher in the Otway Ranges.

The year 1985 was the first time Geelong's water consumption matched the safe annual yield of all its storages. The board expected that as growth continued so would the demand for water, but nothing could be done until the government gave approval. The NREC's second report, presented in October, 1986, included a recommendation to enlarge the Wurdee Boluc storage. Its final report in 1990 recommended groundwater should be developed in preference

The old aqueduct appears to be slowly falling to pieces. Lumps of concrete are dropping off and only reinforcing is holding it together in places.

to harvesting more water from catchments and that the board should not be given access to water from the Gellibrand River for many years to come.

In March, 1985, while the NREC was still investigating the issue, the Department of Water Resources convened a task force to prepare a strategic plan for water management in Victoria's south west. The resulting strategic plan made similar recommendations. The board had had significant input into both enquiries, but the culmination of seven years investigations, hearings, submissions and reports left it almost exactly where it had been at the beginning of the process. It would be excluded from any major augmentation of its supply, but the expansion of Wurdee Boluc would at least allow it to store more water.

The expansion of Wurdee Boluc would double its capacity from 20,000 to 40,000 megalitres and increase the safe annual yield by 12 per cent. The necessary detailed planning took several years of intense work to turn a recommendation into a reality. An environmental effects statement was prepared between March and October, 1986, and the government approved the project in March, 1987. The Rural Water Commission assisted with the site investigation and design of the foundations and embankment and a detailed seven volume report was completed in September, 1988. The enlargement would comprise an embankment raised to a height of four metres for a distance of 8.7 kilometres containing almost a million cubic metres in fill. In May, 1989, trial embankments were built to test construction techniques, landscaping design began and a nearby road was relocated.

Construction began with site clearing in late 1989 and in January, 1990, work started on the embankment. This was completed at the end of May, 1991, with the work site restored and landscaped. More than 55,000 indigenous species were planted to provide shelter and an aesthetically pleasing habitat for flora and fauna. A public viewing area also was created. The project won the Banksia Environmental Award (in the marine and waterways section) for the landscaping and salinity control.



An aerial view of Wurdee Boluc after it had been enlarged. The treatment plant is just visible on the right side of the storage.

Work on the water treatment plant began before the enlargement was completed, meaning the board had two \$20-million plus projects running concurrently. This placed an unusually heavy strain on staff and finances.

The new treatment plant provided about 80 per cent of Geelong's water, with the remainder coming from the untreated Moorabool system. Even before the Wurdee Boluc facility was finished, planning had started on a new plant at She Oaks to treat Moorabool water. The board also planned a small filter treatment plant for the towns of Meredith, Bannockburn, Lethbridge, Shelford, Inverleigh and Gheringhap to bring their water to WHO standards. This process passed water through an extremely fine filter membrane with 0.2-micron pores, providing up to 2.5 megalitres a day and capable of being expanded to five megalitres. It was quickly built, starting in June, 1993, and being commissioned during October that year.

The board had intended to proceed straight from Wurdee Boluc to the plant at She Oaks, but its plans were disrupted by revised EPA licence conditions for Black Rock. These had been imposed by the government as a result of public protests about the ocean outfall sewer. The EPA required even more rigorous testing of the environmental effects of the facility and an almost

immediate upgrade to a high quality biological plant. Plans had to be submitted in June, 1992, and the project completed by June, 1995.

The investment needed to upgrade Black Rock appeared to be so large – more than \$40 million – that the board undertook a major study to see if there was a better and cheaper alternative to meeting the EPA's new standards. Early in 1989, it began a major strategic review of its wastewater treatment and disposal arrangements, setting up a community consultation group and engaging consultants. The project cost more than \$500,000, but in comparison to the new facility the investment was necessary to ensure a correct decision. The consultants completed a draft report by December, 1990, and it was released for public comment.

Three options were proposed, including construction of a series of land-based treatment facilities around the district and improving the performance of the Black Rock plant. The period of public consultation coincided with the beginning of campaigning for the 1991 board elections and public reactions became a major election issue. Many people remained opposed to disposing of wastewater, treated or not, into the ocean while others objected strongly to the proposal to construct land-based treatment facilities around Geelong. The result was a lively election campaign, with the board in the middle being attacked from all sides. The front of the Ryrie Street office became a popular spot for protesters to have their photographs taken and a group calling itself the Environmental Security Force printed t-shirts and stickers that proclaimed "I Hate the Water Board". One board member, Peter Linaker, supported some protesters and would park his car bearing 'I Hate the Water Board' stickers in the board car park under the office to attend meetings.

The board eventually chose a major upgrade of existing facilities at Black Rock. It would be a great technical challenge, but the most difficult problem was where to source the funds. Customers were already paying for three very expensive projects and the upgrade would lift charges to extremely high levels. The government was already restricting borrowing limits and the board



By the early 1990s, employees had become accustomed to being the targets of environmental protest. Peter Thomas, the public relations manager at the time, found a different use for an anti-board sticker.

had a 'no-borrowing' policy that went against taking out further loans for the project. The board would have preferred the government to pay because, after all, it was the government (through the EPA) that had insisted on the upgrade and it was the people of the entire state, not just Geelong and district, who would reap the benefits. But the board already had experience of trying to get money from the government and getting nowhere.

The solution was a Special Environment Protection Levy (SEPL) that first surfaced in the Ten Year Capital Works Investment Plan in March, 1991. The government was not keen on the proposal, but eventually gave approval because refusing to do so would leave the board unable to meet its obligations to its customers and the EPA. The levy was imposed for five years, with charges based on land valuations of three cents in the \$ and ranging from a minimum \$65 to a maximum \$120 a year. The board engaged a consultant to develop a public relations strategy to sell the levy to the public. It was introduced on July 1, 1991, and there was remarkably little public protest, with less than 100 written complaints received. The levy was withdrawn – after five years – on June 30, 1996.

With the financial obstacle out of the way, the board was free to push ahead with the project. In essence, it was remarkably simple



This sign at the Black Rock treatment plant expansion works tells visitors it was paid for with Environment Protection Levy money. The tank behind it is a pilot sewage treatment plant in which treatment configurations were tested before the large plant was constructed. It has since been dismantled and taken away.

— nothing more than putting another stage into the treatment process between the screening plant and the ocean outfall. Micro-organisms would digest the organic matter in the wastewater, purifying it before it went to the outfall. The difficult part was deciding the best method and then constructing a treatment plant that operated correctly. Of the many options considered, the one chosen was officially called the Intermittent Decanted Extended Aeration process or, colloquially, the Bathurst Box because it had been developed in New South Wales for rural plants.

The only difference between the Bathurst Box and those to be built at Black Rock was size; they would be constructed on a much larger scale than ever before. The new plant would comprise four large aeration tanks, each 120 metres long by 60 metres wide, and be supplied with diffused air from an adjacent central aeration facility. Wastewater would be aerated alternately for two hours in a four-hour cycle, then the effluent would be allowed to settle before the clear water on top was drained off to the ocean outfall. The excess biological sludge would be removed to dry out in holding ponds, then the whole process would start again. Construction began in March, 1994, and sewage first entered the \$46 million addition on May 14, 1996.

The period during which the new plant was being constructed and commissioned was probably the most turbulent in the entire existence of the board. After the amalgamations of the 1980s, the government had continued pressing for further mergers and the tiny Otway Coast Water Board merged with the Colac and District Water Board on July 1, 1990. The Geelong board held negotiations with the Aireys Inlet board about a possible merger in 1990 and with the Shire of Ballan from mid-1989. But other events overtook these developments.

More radical change occurred after October, 1992, when a new government came to power. In August, 1993, it established a board to review the structure and operation of local government in Victoria, leading to major changes aimed at improving efficiency. The first significant change occurred in 1993 with the creation of the City of Greater Geelong, comprising six entire old local government areas and parts of two more.

It did not take the government long to turn its attention to the water industry. It set up the Victorian Water Industry Structures Reform Study to focus on water supply in Melbourne, but also analysed non-metropolitan bodies to ensure they gave maximum efficiency and performance. This new government intended to encourage greater restructuring, but if water boards were not prepared to merge the government would look at "implementing rational decisions for structural reform". This was generally taken to mean more compulsory amalgamations. The government also began exerting pressure on all government bodies to become corporatised and operate more efficiently. The board believed it was already well positioned to meet the government's demands, but saw no real need to become a corporation. More pragmatically the new government sought to raise more revenue from its business enterprises. The board was declared a public authority liable to pay the Public Authority Dividend to the government, which totalled \$1.647 million in 1992/93. The board found the additional money by increasing water and wastewater charges.

These radical government interventions in the organisation's

activities ran counter to the beliefs of many Geelong people. They considered the community had bought the water supply system from the government decades earlier and had, since then, developed it and the sewerage system with no financial help from the government. Therefore, the elected board should be left free to run the organisation as it saw fit. That may have been partly true, but it was also true the government had never handed over control to Geelong residents and had always had the power to direct the board to conform to its policies. The fluoridation argument had demonstrated that fact. It was also brought home during the water industry reform when the authority was told, either directly or in a more roundabout way (there are various ways in which this is remembered), that the people of Geelong were wrong if they thought they owned the authority. . . . the government owned it and would do as it liked.

An equally difficult change was the retirement of Wal Whiteside and appointment of a new Chairman. When re-appointed in 1989, Whiteside announced it would be his last term. He had enjoyed his work with the board immensely and, although he was only required to dedicate two days a week to its business, he often spent a full working week there. He admitted the board had been his life for 40 years.

In May, 1992, the government advised the board to advertise the position of part-time Chairman, to be appointed from July 1, 1992. Thirty-seven people applied including, it was said, at least three existing board members. The applications were sent to the government in Melbourne, but by the end of June no decision had been made. The government asked Whiteside to stay on another three months. By September, there was still no decision and Whiteside was asked to remain until the end of the year.

Immediately after the new government came to power in October, the board requested a quick decision on the new Chairman, but nothing happened. At a 'lively' meeting in December, 1992, the members learned the government had approached Member Golightly to act as Chairman for six months until a decision had been made. He had not been

among those who applied for the job, but he agreed to take it on for an interim period.

Wal Whiteside's final meeting was filled with tributes to his achievements and reminders of how much Geelong and the board had changed since he had taken over as Chairman. Due to his extension as Chairman, he had served in the position for 22 years, beating Jack Carr's record of 21 years. The walking path he had designed along the north bank of the Barwon River was named The Wal Whiteside Walk in his honour and a special farewell function took place in March, 1993. Also in 1993, he was awarded the medal of the Order of Australia and in 1998 the Wal Whiteside Scholarship was awarded for the first time. Demonstrating the sense of family and closeness that had developed during his term as Chairman, Mrs Vines hosted a luncheon for Mrs Whiteside that was attended by the wives of other board members and executives. It was, simply, the end of an era.

The new Chairman was Frank De Stefano. He was well known in Geelong and had been a Mayor of the City of Geelong. He had no experience in the water industry and it was said he was a political appointment because his name had not been among the 37 sent to the previous government. Be that as it may, he had a good track record in community service, including local government, and he had a good knowledge of the Geelong community and its needs. He also had a belief in and the energy to bring more change to the board at a time when the new government was demanding it. People did not take to him with the same enthusiasm they had for Whiteside, but it would have been unreasonable to expect anything else.

De Stefano arrived at the board at the beginning of July, 1993, just as a drawn out enquiry into the future of water management in the south west came to an end. It had begun as a recommendation of the enquiries into the future of water use in the region and was a logical extension of those investigations. While the enquiry was taking place, rumours flitted through the water industry as people wondered about their futures. In mid-1991, there was said to be a proposal before the government that

the MMBW would take over the Geelong board as part of an amalgamation of water bodies around Port Phillip Bay. Nothing came of it. In December, 1991, the chief executives of the Ballarat, Colac and Geelong water bodies met to discuss another rumoured proposal that the government was going to merge all the water bodies between Port Phillip Bay and the South Australian border. Water bodies began competing based on the possibility they might become the core of a new merged water authority – and/or for their survival! The Geelong board sent a submission to the government saying that whatever the restructured water industry in the south west, it was the best body to take control. Ballarat City Council began lobbying to become the headquarters of what was rumoured to be a proposed merger of 31 water bodies. The Geelong board responded that it was a recognised leader in the water industry and it “intended to continue to be a leader”. No-one felt secure, although the large Geelong board felt safer than some, including the Colac board that fought to save its role as the water resource manager in the Otway region. In June, 1993, the government announced that 32 water bodies in the south west region would be amalgamated into six. Geelong and Colac survived.

The uncertainty about survival was quickly replaced by uncertainty about the government’s plans for the board. There were rumours it intended to dismiss the elected board and replace it with an appointed board. One member said this move would overcome the problems of elections that did not always return people with the skills and experience needed to make properly informed decisions. Chief Executive Vines believed the future lay in an appointed board and wrote to local Members of Parliament supporting the proposal. He believed members should be selected to match and support the “highly skilled and professional teams which already exist in the GDWB”. The board re-affirmed its preference for elected members at a meeting in August, 1993. But by December government pressure had encouraged them to vote unanimously to ask the government to reconstitute the board with ministerial nominees, who would be better equipped for the commercial direction of the future.

In mid-December, the government announced that from February 1, 1994, the Geelong and District Water Board would be reconstituted as the Barwon Region Water Authority and all seven directors would be appointed. Up to 60 people applied for positions, including at least six existing members.

The board's leaders believed it was ready for the challenges ahead because of the changes it had experienced in the past. The Corporate Plan was reviewed and revised so the board could achieve its corporate vision, which stated: "By 30th June, 1997, through our Business Excellence, we will be providing the Best Customer Service in the Australian Water Industry." By the end of 1993, all staff had been affected by cultural change and the training that supported it. A 'Change Management and Continuous Improvement Program' was introduced and the results, De Stefano wrote, "..... demonstrate the ability and willingness of employees to adapt to the needs of the future".



CHAPTER NINE

REVOLUTION

1993 – 2003

We are moving into new territory. This history to date has been about incidents and episodes that occurred decades ago and the flow of time has given them a perspective. We are now so close to the present it is more difficult for the perspective of time to give events meaning. Further on, the developments recounted here might look quite different. In the meantime, the following story is the best understanding we have of what has happened so recently.

In a mere 10 years, the new Barwon Region Water Authority transformed itself from a traditional service provider to an organisation with new goals and objectives, a new organisational structure, revitalised workplace relations, a business strategy, improved customer focus and, most important of all, a commitment to the environment. This revolution has been achieved by a combination of factors, including a new skills-based government appointed board, a new Chief Executive, who brought with him a new vision for the authority, the energy of the executive team and the commitment of employees, who were carried along by the exciting direction and new energy.

The Barwon Region Water Authority, like the bodies it succeeded, existed to serve the community. In 1994, it provided services to a permanent population of 203,000; in 2003 it served around 251,000. Barwon Water's employees did the work necessary to serve that population. In 1993, there were 447 employees and in 2003 there were 360. With less resources, the authority provided a larger community with a measurably better level of service. It did this through improved efficiency and a dedication to new ways of planning, operating and relating to its customers.

Barwon Water also served the community in other ways, such as boosting economic development and improving the natural environment. But the authority was not a complete master of its own destiny because politicians and public servants, mostly in Melbourne, made fundamental decisions that gave direction to what the organisation did and appointed board members to implement government policy. The interaction between these groups of people propelled Barwon Water into the future.

The Bannockburn sewage treatment plant soon after it was completed.

New leadership brought new ideas and energy. The government's decision to replace the elected board with appointed members changed the way it operated and the capabilities of its members. When it met for the first time on February 9, 1994, the new board had only four members who had served previously: Frank De Stefano, Priscilla Pescott, Graham Kelleher and Harry Peeters. Many members of the old board had not even bothered to apply and those who had opposed the government over fluoride believed they stood little chance of appointment. The same change occurred across Victoria with, for example, the Ballarat Water Board being reconstituted as the Central Highlands Water Authority.

The board was re-appointed every three years, with the only public components of the process being advertisements seeking applications and the announcement of who had been appointed. Pescott and Keller did not apply for appointment to the second board in February, 1997, leaving Peeters the longest serving member with about six years experience.

In many ways, the appointed boards were quite different from those that were elected. Many old members had stood for election out of a sense of civic pride and responsibility; many saw it as a way of contributing to their community. But they could only win their seats by appealing to ratepayers so they used issues such as fluoride or the environment to attract votes. Their popularity did not confer upon them any organisational skills or the ability to read a balance sheet. That left some ill-equipped to cope with the many complex issues the board faced. Members of the new skills-based board were there because they had the necessary skills and experience and, perhaps, the right political inclination.

Generally, new board members had professional experience with backgrounds in areas such as engineering, accounting, management or administration and could read financial statements. The number of women appointed, while still low, brought a different atmosphere to meetings. The new board generally matched the staff in talent, experience and competence. They were interested in strategic direction and



Tree planting became a favoured way of involving school children with the environment and a good photographic opportunity. Here, children from the Barwon Heads Primary School watch as the authority's Chairman Frank De Stefano (left) and the Minister for Agriculture and Resources, the Hon. Pat McNamara, MLA, plant a tree.

much less interested in interfering in the many minor details that previous members had found interesting.

Frank De Stefano was the driving force of the new board and he pushed ahead with the change process with vigor and determination. He liked to be in the spotlight and rarely missed an opportunity to be present when press photographers were around. He became the public face of Barwon Water and lifted its profile in the community.

Geoff Vines announced his retirement as CE at the time Barwon Water was created and retired in June, 1994. He had been held in high regard by staff and knew most of the people in the organisation personally. He had been awarded an honorary doctorate by Deakin University for his long service to that university as a council member and Deputy Chancellor. In April, 1995, the public reserve and lookout constructed at Wurdee Boluc Reservoir was named the Geoffrey Vines Reserve in his honour.

Whiteside and Vines had, each in their own way, reshaped the organisation to their personalities and goals. They had generally worked well together. Sometimes there was friction and sometimes Vines, who was the more restrained, had to smooth over situations. Whiteside died in February, 1995, and Vines in September the same year, both tragic losses so soon

Part of Mike McCoy's
speech at Geoff Vines'
farewell from the authority.

VINES ON THE BEACHES

It has already been noted that Geoff had another part-time career in the Army Reserve, rising to the rank of Captain of the 106th Construction Squadron. And in those early years at the trust, this training showed up in the military-type precision with which memos and reports were prepared. He soon had to modify his ways as the non-military types became confused with commands to attend briefings and meetings at times such as 13.30 hours and kept turning up at the wrong times.

Of course, throughout his career there have been battles and, in the context of his career with Barwon Water and its predecessors, I have no doubt Geoff would acknowledge that there have been defeats, surrenders, truces and even victories. I am sure that his military training again played some part in tackling those battles, such as the battles of the board room, the battle for fluoridated teeth where the CE and his organisation were caught in the crossfire – even at board level – between those who supported the government intent and the fervent anti-fluoridationists, who even asserted that the organisation should disobey orders and not build the plants. Geoff's wise counsel was that this was a situation in which you kept your head down and waited for the firing to stop and the smoke to clear. This turned out to be wise counsel because a third party stepped in and put a black ban on the operation of the plants anyway.

And who could forget the battle of the beaches. Black Rock and Anglesea. Judged by our leader to be situations in which you stood up and faced your charging opponents, admitted some past mistakes, consulted your community, provided them with the facts and then devised a strategy to resolve the problems in an acceptable manner.

However, in reflection on the battle of Anglesea, I must recall an example of Geoff's public consultation technique that is memorable. At the height of the campaign, we called a public meeting at Anglesea and Geoff, while suffering under a barrage of hostile questioning, fired back the retort at one persistent questioner, "Why don't you sit down and stop asking silly questions". However, before outrage erupted, a diversionary tactic was launched whereby our public relations manager fainted at the thought of the headlines in tomorrow's paper. That's not quite true: she didn't faint. But the headlines were not kind either.

after their retirements. They had been the right men for their time, but circumstances were changing and their departures created the opportunity for new people with new ideas.

Applications for Vines' replacement were widely advertised and there were more than 80 responses. Consultants narrowed the field down to a select few and a committee of board members set themselves up in a meeting room in a Geelong hotel and spent several days interviewing the short-listed

applicants in depth. One, an engineer and manager from the State Electricity Commission, Dennis Brockenshire, arrived fully prepared with his vision for the future for Barwon Water and “blew everyone away”. He had the philosophy, the experience, the energy and the force of will to take Barwon Water where the board believed it needed to go. He was appointed the new CE on April 13, 1994.

Brockenshire’s philosophy had several fundamental principles around which the whole re-direction of Barwon Water would take place. These were improved customer service and business efficiency leading to a viable, sustainable, environmental authority. He believed in providing leadership by having a clear vision of the future and promoting effective communication throughout the organisation as its lifeblood. He believed in people; that good employees were the most important resource of any organisation. He held that all outputs must be measured because what was measured was usually achieved. On organisational change, he believed change and competition were constant and relentless and the real challenge lay in managing to achieve desired outcomes. His aim was to change Barwon Water from a utility that supplied water and sewerage services to an integrated environmental business.

The new CE “hit the ground running, and kept running”, as Peeters later put it. He found Barwon Water a technically sound but traditional organisation that needed significant cultural and business change. He set about delivering it in two ways – through organisational restructuring and development of a new Corporate Strategy. The first was designed to re-focus Barwon Water on providing customers with the best quality service at the greatest possible flexibility. The authority’s five new departments focused on customer service, strategic planning, asset creation and operation and business performance. Beneath these changes lay a new structure that clearly defined people’s roles in Barwon Water and expanded performance measurement and control arrangements. A later restructuring in 2000 reduced the number of departments to four, but retained the same focus. These executive teams

became one of the keys to Barwon Water's transformation because of the vital role in overseeing change and fostering the ethos of change in employees.

The Barwon Water strategy for the future was encapsulated in three important and concise statements of its 'Vision, Values and Mission'. These statements formed the heart of the Corporate Strategy and from that strategy everything that happened in Barwon Water flowed.

The initial Corporate Strategy was developed in 1995 and concentrated on improving productivity and organisational efficiency to create benefits that were returned to the community through real reductions in the price of services. Quality principles and continuous improvements were emphasised to pursue an improved drinking water quality strategy and in upgrading sewage treatment processes. Employees were encouraged to fully participate and achieve their maximum potential through leadership, opportunity, education and training.

The second strategy of 1998 demonstrated Barwon Water had substantially completed its initial strategy and it set a new direction. This second Corporate Strategy heralded a period of increased investment in capital works, expanding the non-price elements of service to customers, moving toward a closed water reticulation system, enhancing the environment by developing beneficial uses for recycled water and biosolids, improving environmental management and occupational health and safety processes and encouraging a learning organisation.

The latest Corporate Strategy, adopted in 2003, showed yet another change in focus with, most notably, the often taken-for-granted public health function of the authority being brought forward once more.

Barwon Water's corporate strategies were constructed around these important ideas, creating a complex matrix of related policy documents setting out how the organisation would fulfil its mission and aspire toward its vision by developing its values. The measure of Barwon Water's success

VISION, VALUES AND MISSION STATEMENT

Vision

'Through excellence in customer services, environmental care and business efficiency, we will be a leading provider of sustainable water and sewerage services.'

Values

Our people... are valued

Environment ... must be protected

Customer service ... is our goal

Business efficiency ... is essential

Integrity ... will be upheld

Quality and Safety ... is a total commitment

Public health ... is a prime focus

Mission

Barwon Water exists to meet the needs of the community by managing collection, treatment, re-use and disposal in an efficient, cost-effective and environmentally responsible manner.

The authority's most recent statement of its vision.

was to be assessed through performance indicators that covered the whole range of its activities. For example, in 2002 Barwon Water set itself three major performance indicators on the environment – complying with EPA licence conditions, developing commercial use of recycled water and achieving environmental quality management certification. It reported it had achieved two of those aims and was working on the other. Failure to achieve a goal directed attention to it so it could be achieved in the future.

The board also examined its own functions and set guidelines about how it would operate. This was previously taken for granted. It defined its role as overseeing and giving direction to the authority and set up an annual review program of its own performance. It also established committees to oversee particular functions, such as audit, executive remuneration and risk management.

Another significant government change that affected the authority was the National Competition Policy, which began to cast an influence across the whole country from 1994. Of the six central propositions adopted under the policy, the one impacting most on Barwon Water was "restructuring of public sector monopoly businesses to increase competition". The policy made Barwon Water revise many of its financial

arrangements, including cross-subsidisation, and reshaped many of its operations to make them more business like. Many people in the wider community feared these changes and trends meant Barwon Water would eventually be sold to private enterprise. That seemed unlikely to board members, and by the time of the general election in 1999 privatisation had become so unpopular the Premier announced he would not sell the water authorities if he was re-elected.

The most significant government-directed change occurred on July 1, 1997, when the Otway Region Water Authority based in Colac was amalgamated with Barwon Water. In December, 1996, the government decided to press ahead with further consolidation of regional water authorities and “requested” a number of neighbouring authorities to investigate the benefits of amalgamation. The Geelong and Colac authorities began some unenthusiastic negotiations, but the government forced the issue by directing Colac that it would merge whether it liked it or not.

Eventually, Barwon Water was not averse to amalgamation because it was far larger than Colac and considered economies of scale would bring benefits to the whole region. The only significant change as far as the Geelong-based authority was concerned was an expansion of its area of responsibility and the addition of three members to its board, two of them from Colac. But the amalgamation was rushed and, unlike the earlier merger with the Bellarine water supply system, Barwon Water had little opportunity to examine the quality of the facilities it was inheriting. When the papers were signed, some people in Barwon Water became dismayed by what they saw as the poor condition of much of Colac’s water supply and sewerage system. Such standards were unacceptable in Geelong and people began to see the merger as a black hole that would soak up board funds rather than an opportunity for expansion and improvement.

For Colac’s part, the amalgamation was not welcomed. It was an insult to local capabilities and traditions and could have long-term implications for the security of the district’s water

supply. The Colac Otway Ratepayers' and Residents' Association complained bitterly that the "takeover" was an attack on local autonomy while others in the Colac district protested for a whole range of reasons. De Stefano's enthusiastic support for the merger helped inflame opposition in Colac. The amalgamation also included some of the smaller water authorities, such as Lorne and Aireys Inlet, that had preferred to merge with Colac rather than Geelong in earlier rounds of amalgamations. But the government had made its decision and there was nothing the Geelong or Colac authorities could do to change the fact.

The first meeting of the merged board occurred on July 8, 1997, but details of the amalgamation were still being worked out months later. Despite many complaints, people who had been served by the Otway Region Water Authority found there were benefits to the merger, including a 38 per cent saving on their bills, improved maintenance and enhanced customer services. For example, before the merger an average Greater Geelong residential customer had paid \$469.90 for Barwon Water services while in 1999/2000 they paid \$429.50. The reduction in Colac was more significant, falling from \$635.00 to \$453.75 while the reduction at Lorne was spectacular, from \$814.50 to \$503.75.

In early 2000, the board underwent something of an upheaval. Early in the year, one of its members resigned and the government had to appoint a replacement. Then, on May 1, before that decision had been announced, Chairman De Stefano resigned unexpectedly. While unrelated to Barwon Water, the circumstances surrounding the resignation caused a great deal of consternation and community concern. Harry Peeters was appointed Chairman. Several days later, the government announced its new appointment to the board was Stephen Vaughan, who declared himself interested in developing the community consultation process and looking forward to getting his 'official Barwon Water gumboots'. He was astute, highly intelligent and able to understand and analyse situations quickly. He was new to the water industry and widely

questioned the authority's policies and procedures. While he seemed aloof to some, he was basically a shy but very personable man. He appeared to be a political appointment because, as a physician, he had publicly resigned from the Geelong Hospital in 1998 in protest over the government's corporatisation of public hospitals. Now a new government was in power. Ten days later, the government invited applications for appointment to the board for its third three-year term and, when the appointments were announced in October, Vaughan was the new Chairman. His personality and approach were quite different to De Stefano's and seemed more appropriate to the mood of the new decade.

Brockenshire had experienced massive change in the electricity industry and his reputation as a change manager at the SEC, where he had overseen many lay-offs, preceded him. Many staff were afraid of what he would do to Barwon Water. He assured them no-one would be put off as a result of change, and he was true to his word. While massive outsourcing and lay-offs in other organisations were features of new efficiency drives, they were limited at Barwon Water. Some 'non-strategic' activities, such as the automotive and mechanical

Dennis Brockenshire talks of the authority's staff and their ability to meet new challenges.

GUARANTEEING THE FUTURE

Many water authorities had a belief that the only way to achieve efficiencies was to out-source non-core business. We have proved this is not the case.

In the mid-1990s, with unemployment in Geelong running at about 10 per cent, the impact of outsourcing systems maintenance jobs, possibly to Melbourne businesses, would have had an adverse effect on regional employment.

After investigation, we decided to remove the civil maintenance activity from the core business of water supply and sewerage operations and developed a service level agreement to benchmark our performance and costs against external service providers. This process was entered into with the knowledge of our employees. I could offer them no guarantees regarding future job security, but had every confidence they could compete on the open market with the best of them.

My confidence in our people was justified. Maintenance management and employees embraced the challenge and achieved efficiencies in operation. Systems maintenance continues to be a service-driven vibrant arm of our operation.

workshops, project design and meter reading, were outsourced. Many of the functions outsourced at other places, however, were retained. Staff reductions were achieved by offering attractive retirement packages or by resignations of those who were not able or prepared to match the spirit of cultural change being fostered in the authority. In 1994/95, Barwon Water's workforce fell by 8 per cent and the following year by 13 per cent, "mainly due to natural attrition". The profile of Barwon Water's employees changed quickly; there were younger people and women in responsible positions and less long-term employees. Barwon Water began presenting certificates recognising the service of those who had been with the authority for 10 years. When Executive Manager of Water Systems Mike McCoy retired in February, 2001, his 40 years' service was considered exceptional.

Those who remained at Barwon Water found it had improved in many ways over its predecessors. In the past, employees often discovered what was happening where they worked through the newspaper or over the radio, but the new CE launched an internal communique called 'Keeping in Touch'. He used this regularly to inform people about what was happening or likely to happen.

The traditional, paternalistic, hierarchical and male-dominated organisation began to give way to a more all-encompassing one. Barwon Water adopted the principles of equal opportunity, fair and equitable treatment for all staff and appointment based on merit. Barwon Water also aimed to provide a more flexible working place catering to the needs of families and staff with difficulties. In an environment that had once been overly masculine and engineer-dominated, women and younger people began progressing further up the organisational ladder.

Training remained an important method of improving skills and gaining knowledge. In-house courses expanded and the board supported staff undertaking relevant TAFE and tertiary courses. More effort went into worker occupational health and safety, creating a succession of years in which lost

Dennis Brockenshire tells of the lesson in safety his employees sent him.

SAFETY LESSON

I knew our employees had embraced workplace safety when I received a bluey jacket with reflective stripes in the internal mail one morning.

A few days earlier, I had stopped off at the site of a burst water main on my way home. It was late, probably about nine o'clock, and there was I, dressed in a hard hat and dark suit eager to see the maintenance crew in action.

My lack of suitable attire had obviously not gone unnoticed and the crew quite rightly believed that occupational health and safety was for everyone.

The result, I was the proud owner of some safety gear and even prouder of employee commitment to safety.

time injuries declined to record lows. As a result, Barwon Water was awarded the prestigious Australian Water and Wastewater Association Occupational Health and Safety Award in 1998.

During this period of change, the social club continued to provide a sense of friendship and camaraderie that gave Barwon Water people a feeling of being part of a large family. By the turn of the century, about half Barwon Water's employees were social club members and management provided encouragement by allowing committee representatives time to meet and organise events. Club membership fees were deducted automatically from members' pays. The club staged a range of activities to involve all employees, including a monthly happy hour, corporate golf day, race day trips, annual casino night, mystery bus tour and annual wine tour. The annual cabaret was the major and most popular event. In 2003, the social club marked its 40th birthday with a special cabaret that the authority supported. For families with children, the kids' Christmas party was the highlight of the year, with Santa distributing presents to children who had been good during the year (and some who had not as well).

Increased productivity resulting from structural and cultural change allowed Barwon Water to serve a greater population with less resources. From 1994 to 1996, it froze tariffs, giving the equivalent of a 10 per cent reduction in cost due to inflation. It was a bonus to customers, but just as importantly it was a way of forcing the organisation to improve business methods and



find greater efficiencies to reduce operating costs. 'Value engineering' was adopted as another tool to reduce the cost of engineering projects without endangering their quality.

New and improved technology also helped Barwon Water improve productivity. Trenchless excavation technology made it possible to lay, relay or repair pipes at much reduced cost. Pipes could be inspected internally using closed circuit television. New telephone systems improved communication with customers. The telemetry system was upgraded to link more than 300 authority facilities to the South Geelong control centre.

Computer modelling helped staff design system improvements and allowed managers to find the best solutions to business performance studies. Emerging electronic commerce allowed the establishment of digital links with other organisations to exchange data, including financial transactions. The Geographic Information System (ProFIS) continued to expand, becoming the primary source of asset management information and a marketable product to other bodies, such as the City of Greater Geelong. Barwon Water was the first water authority in Australia to establish a website on the

The communications centre at the South Geelong depot is the core of the authority's operations. The centre monitors and controls the entire system to ensure smooth operations.

internet where, in 1996, it could be “accessed by hundreds of individuals and organisations throughout the world”. The website was redeveloped in the new century to include features such as on-line account payment, tender registration and an education section.

Barwon Water set out to establish a Quality Management System for the whole organisation. A huge and difficult undertaking, it began by taking the key goals from the Corporate Strategy and preparing documents that detailed how each task necessary to achieve a goal would be done and how it could be assessed. By following the procedures set out in those documents and training staff in using them, the authority was assured of providing a high level of quality service to customers. Developing the Quality Management System involved the entire organisation. A Quality Management System team developed procedures, helped prepare documentation and provided quality awareness training for employees. Barwon Water was successful in receiving quality certification in May, 1997, and in 1998 the quality system was extended to the Otway region that had recently been amalgamated with Barwon Water. It also became the first Australian water authority to earn certification for quality and environmental management of integrated catchment, water and sewerage systems.

A maintenance team in the field working on a water main. The suitcase contains a portable fax machine that can receive plans, drawings or instructions to enable the team to work more efficiently.



As part of its plan for organisational change, including enhanced customer service and a new strategic planning function, the authority brought together its billing, metering, marketing, conservation, information and maintenance activities into one Customer Service Department. Barwon Water assessed customer satisfaction by surveys using performance benchmarks that allowed it to compare itself with other authorities. These surveys showed Barwon Water was giving its customers very good service and that it had maintained its position as a water industry leader. Overall satisfaction with Barwon Water ranged from 83 per cent in 1999/2000 to 95 per cent in 2001/02.

Financial planning and accounting also experienced significant change. Brockenshire saw the new world demanded higher business efficiency that meant not only counting the authority's expenditure but determining how well the money was spent. This was a move from the traditional accounting focus to a business performance focus. The Business Performance Department implemented a comprehensive performance, measurement and control system that included physical as well as financial controls, a corporate planning function, innovative human resources strategies and efficient procurement and stores functions. The internal auditing process, which had previously only dealt with financial matters, was expanded to include occupational health and safety and environmental reporting. These activities became important components of the 'Triple Bottom Line' accounting system Barwon Water adopted in 2001. These three bottom lines covered its social and environmental performance as well as its traditional financial performance report.

Barwon Water continued to return surpluses that were used to pay government dividends, fund capital works and pay off debt. The problem of debt was not restricted to Barwon Water. In reality, it ran right through the water industry and was a major economic problem for the government. Following the sale of some major public assets, such as the State Electricity Commission, the government applied some of the proceeds to

assist water authorities reduce their debt through a Financial Assistance Package announced in October, 1997. Barwon Water received \$86 million from the package and used it to reduce debt and accelerate capital works for water and environmental quality improvements. It also allowed the authority to deliver to customers another tariff freeze of 18 months. In 1999, Barwon Water's inscribed stock register, which had been its form of borrowing for decades, was transferred to the government and the authority began paying off that debt. These measures improved its debt level significantly and by 2000/01 the cost of servicing debt was only 6.4 per cent of overall costs.

To improve customer service, Barwon Water initiated a range of measures for customers to pay their bills. A 24-hour telephone payment service and improved counter payment options were introduced in 1997/98, direct debit payment was introduced the following year and later payment options included the internet and payment at some supermarkets. These choices made the long last-minute queues at the revenue counter a thing of the past and the large bill payment area in the foyer of the Ryrie Street office was remodelled with only two cashier positions remaining. Quarterly bills were introduced at the beginning of 1999 whereby customers received smaller and more manageable accounts and spread the authority's income more evenly across the year.

Barwon Water was the first non-metropolitan water authority to publish a Customer Charter that clearly described the levels of service it would provide. It was published in several languages and 19 bilingual and multilingual employees volunteered to act as interpreters for customer enquiries. Barwon Water also introduced a Customer Care Program to help people having difficulty paying their bills. The board established a Customer Advisory Committee to help it better understand the needs of ratepayers. The committee included a broad range of customer representatives from industry, domestic users, farmers and welfare agencies and, when the Otway region was amalgamated, two new members representing that region.

Brockenshire's goal of moving Barwon Water from its traditional utility function to an environmental organisation was a necessary change and what the wider community expected. Environmental awareness and performance became an integral part of the authority's overall Corporate Strategy. A full-time environmental officer was appointed and an Environment Strategy was produced within the framework of the Corporate Strategy. In March, 1996, an Environmental Management System was developed setting out the procedures and processes necessary to improve the authority's environmental performance. In November, 1998, Barwon Water was the first water authority in Australia to have its Environmental Strategy quality certified.

Despite these efforts, the authority still had many strong environmental critics not afraid to attack it at any opportunity. To many at Barwon Water, it seemed the further it moved toward its goal of becoming an environmental business, the more demanding its critics became.

Perhaps the most violent protest ever experienced was over a small sewage treatment plant planned for Bannockburn. Initial community consultation went well, but part of the project involved clearing about 12 hectares of bushland to make way for



At the height of the 'Battle of Bannockburn', protesters occupied the foyer of the Barwon Water building in Ryrie Street. Photo courtesy of the Geelong Advertiser.

treatment ponds. Standing on Barwon Water's land were yellow gum trees that had to be removed and they attracted the attention of environmental activists. The main group, the Bannockburn Yellow Gum Action Group, began its protest in late July, 1997, and reached a peak on August 19 when clearing the site and cutting down trees commenced. The protest lasted until September 4 when some of the protesters reached a compromise with Barwon Water that would save about four hectares from being cleared. A year later, Barwon Water agreed to place an environmental covenant on the remnant woodland surrounding the sewage treatment plant and used seeds collected from indigenous plants around the area to revegetate 13 hectares of the treatment area. In retrospect, the authority could have handled the situation better. But it stuck to its plans despite the protests and 80 or so yellow gums were knocked down to make way for the treatment ponds.

The protest was the most intense and ugly Barwon Water staff could remember. There was a month-long protest at the site where people tied themselves to trees and invaded the work site to stop the project. They also gathered on the forecourt of the Ryrie Street office waving placards and shouting abuse at the authority in general and any staff members who had to use the entrance. On one occasion, they invaded the building. There were claims of harassment and a Barwon Water cover up. Graffiti, stickers and gum leaves were scattered about while the so-called Yellow Gum Girl attracted more attention. De Stefano, having become the public face of Barwon Water, took the brunt of the abuse. He was heckled and threatened and graffiti was painted on his own office building. Most employees knew people had the right to protest, but were upset and sometimes very distressed by the personal attacks made by some protesters. In September, 1997, the board decided to support De Stefano, an executive manager and the authority, and writs were issued against some members of the public to protect those involved from public hostility and defamation.

Conversely, most residents of Bannockburn were more interested in getting a sewerage service than in preserving trees

ANGRY PROTESTERS HELPLESS AS TREES FALL

Bannockburn's threatened yellow gums – about 80 trees in an 8.5 hectare site – were cut down yesterday as a small group of protesters shouted abuse and wept.

There was some initial confusion about the extent of the tree-felling, but Barwon Water issued a statement confirming the number.

The yellow gums will make way for sewerage ponds needed for Bannockburn to be provided with its sewerage service.

Most residents seem to support the project, but it has been opposed by a range of environmental groups.

Residents say they want the scheme implemented quickly to save them facing financial penalties from delays, but protesters claimed some of the trees are 300 years old and that bird and animal life is threatened by yesterday's actions.

They claim destruction of the trees would "wipe out thousands of years of evolutionary history for the sake of a few households".

The 8.5 hectares cleared is part of an 80-hectare site, but environmentalists claim some 24 koalas and scores of possums and sugar gliders face death.

Protesters said they only learned the trees were being chopped down when they heard the buzz of chainsaws.

By early afternoon, about 10 were making their case to hired security guards at the gates to the site of the sewerage ponds.

Some were members of the Bannockburn Yellow Gum Action Group and some from the Geelong Environmental Council.

Tempers flared as they were told they could not enter.

It was all too much for Trish Edwards, who sobbed, yelled "bastards" and hugged fellow protester, Tom Ratcliffe.

Mr Ratcliffe had earlier marched on the roadway in front of the site, carrying a placard which read: 'Yellow gums are sacred.'

A sign on the double gates read: 'Barwon Water Reserve. Authorised personnel only. Trespassers prosecuted.'

Ms Edwards said she had "fallen in love" with the trees at first sight.

She described the area as "magic" and said up to 15 wildlife species were displaced after making their homes in yellow gum branches and hollows.

The protesters said they had arranged to meet Barwon Water on Friday.

But also yesterday, Barwon Water chairman Frank De Stefano said he had called the meeting off because of the campaign of misinformation conducted by the environmentalists.

**The Geelong Advertiser
of August 20, 1997,
reports on the protest
at Bannockburn.**

and could not wait for the project to be completed. The rapid growth of the town had brought with it pollution, odour problems and health risks associated with septic tank systems and the treatment plant was seen as an appropriate, cost-effective and environmentally responsible solution. The \$2.9 million project was commissioned in May, 1998, and connections began almost immediately.

The 'Battle of Bannockburn', as it became known, marked a low point in relations between Barwon Water and the public. It must be noted, however, the authority's customer satisfaction rating around this time was still about 83 per cent. Previous problems had strained relations with the community, but never anything so public, angry and damaging. Politicians in Melbourne knew what was happening and it was no accident

Barwon Water placing a hollow tree in the revegetation zone at the Bannockburn sewage treatment plant to encourage fauna to the area.



changes occurred in the membership of the board when the time came for new appointments. It resulted in Vaughan being appointed Chairman in 2000. A major focus of Barwon Water became to restore its close bonds with the community that had been so strong for so long. In response to the crisis, the authority moved to become a more open, transparent and responsive organisation. This included greater engagement with stakeholders, such as customers, environmental groups, developers and industry.

Barwon Water established an Environmental Consultative Committee which, like the Customer Consultation Committee, represented various community stakeholder groups. It advised and assisted the authority in general and commented on current issues, such as new projects, new strategic plans and broader environmental policies. More practically, Barwon Water opened its plant nursery to community organisations, many of them Landcare groups working in the Barwon, Moorabool and Otway Coast catchments. In 1999/2000, community groups produced 112,000 indigenous plants at the centre and Barwon Water produced a further 24,000 plants. A seed store was established there to provide locally collected seeds for various community group projects.

A further step in making Barwon Water an environmental organisation was publication of the inaugural 2002 Environmental Performance Report detailing environmental performance indicators and how the authority had performed against them. The document placed environmental performance reporting on the same level as financial reporting and invited the same critical public examination.

Another important Barwon Water-community link was the continuing improvement of the Barwon River through Geelong. In keeping with the Corporate Strategy, Barwon Water developed a River Management Strategy focusing on three major themes. One was to form partnerships with the community to promote community interest and involvement with river improvement works. The second was to manage the

river efficiently and the third was to attract external funding to support improvements. The Yollinko wetlands development was completed and to improve fish migration up river a fishway was constructed at Fyans' Breakwater. The latter was an immediate success and soon after its completion thousands of small fish migrated up it in one night. Several years later, Barwon Water constructed another fishway at Baum's Weir and Buckley Falls to provide upstream access for native migratory fish. In 1996, Barwon Water won a Landcare Award for its work on the Wal Whiteside Walk and the following year was a finalist in the National Banksia Awards for its work on the Yollinko wetlands.

Public relations and community education remained an important aspect of Barwon Water's commitment to quality customer service and a strong Public Relations Branch was developed. Brochures, newsletters, media releases, tours, special events and an extensive schools' program were among activities that kept the community informed and promoted important issues such as water conservation and public health. In July, 1998, Barwon Water began offering glass water bottles

Harry Peeters (right) welcomes Stephen Vaughan to the authority's board with water from a Barwon Water bottle. Photo courtesy of the Geelong Advertiser.



to local restaurateurs and publicans to promote water as a healthy alternative as part of a 'Drink More Water' campaign. It was an innovative marketing approach, the response was overwhelming and regional restaurants began serving customers water in attractive bottles bearing the Barwon Water logo and the word 'Naturally!'

Considerable effort went into Barwon Water's schools' education program, with an education officer, teaching aids and guided tours of facilities. In 2000, the program provided more than 4,000 specially designed blue plastic water bottles to promote the healthy benefits of drinking water. In 2002, it launched a Rainwatch program to show students the link between rainfall and water availability by distributing rain gauges and providing further information on its website.

National Water Week gave Barwon Water further opportunities to promote its services and the importance and value of water. In 1995, the 30th anniversary of the completion of West Barwon Reservoir was marked with a birthday celebration there. The following year, there was an open day at Black Rock and the year after the centre of attention was the Barwon River. Each week also featured an Education Day for school children and when West Barwon's birthday was celebrated activities included tree planting, water testing and guided walks. After the amalgamation with Colac, Barwon Water conducted similar activities on the banks of Lake Colac, including planting trees, water testing, bird watching and weed removal.

Many of the authority's initiatives were ground breaking. Employees became accustomed to meeting visitors from other Victorian water authorities, and further afield. They came to see first hand Barwon Water's achievements and how they had been implemented. The most popular accomplishments were the information technology systems, including ProFIS and the user pays volume-based tariff system.

To ensure assets were constructed with due recognition of the needs of the people who would operate them, Brockenshire brought together asset creation and asset operation within the

one department of Water Systems. In addition, asset operators, through the concept of business centres, specified and budgeted for the required level of maintenance supplied under agreement with the Customer Service Department. The Water Systems Department was restructured to seek optimum performance through value engineering, maximise performance of water supply and sewerage facilities and meet strategic customer service and highly regulated business performance targets.

The final link in this long chain of assets that had begun with the construction of the Stony Creek Reservoir was the water treatment plant at She Oaks. It had been planned for construction in the early 1990s, but had been postponed because of the urgency of the Black Rock upgrade. In comparison to Wurdee Boluc, the She Oaks plant was smaller, delivering up to 65 megalitres a day of treated water meeting World Health Organisation standards. It treated all the water from the Moorabool system and contributed about 30 per cent of the Geelong region's needs.

Planning and preparation for this project was meticulous and involved extensive community and stakeholder consultation and preparation of a number of studies into environmental and social effects. One of the most sensitive parts of the project was an 11-kilometre pipeline from the Stony Creek storages to She Oaks through the Brisbane Ranges National Park and the Steiglitz Historic Park. These two areas demanded special treatment and all but about 2 per cent of the pipe was located within existing road reserves to limit the direct environmental effect. As a result, less than 100 metres of the pipeline had an impact on the sensitive land through which it passed. The pipeline was completed in May, 1998, and the water treatment plant at She Oaks subsequently constructed and commissioned.

Perhaps the most significant aspect of the pipeline was that it carried water from the Ballan channel and the storages constructed at Stony Creek under Sharland's direction in the 1910s. It was not linked to the earlier Stony Creek Reservoir or

the Lower Stony Creek Reservoir, however. The system that had carried water from Stony Creek through Anakie to Lovely Banks for more than a century was abandoned and the original Stony Creek storage remained in use only as an emergency reserve.

Barwon Water also provided the smaller towns it served with the same high quality water. There were plans for open earthen storages at Torquay and Ocean Grove to be replaced with tanks. The old open channel to Anglesea was replaced by a pipeline and a closed six megalitre tank. A new covered tank was constructed for treated water pumped to Anakie from Lovely Banks. The small towns of Forrest and Birregurra were given small, fully automatic water treatment plants and a larger plant at Meredith supplied another six nearby towns. On the

The Black Rock second stage sewage treatment plant in operation. Each of the four main areas of the facility is in a different stage of operation. The two on the left are in different phases of aeration, the top right is in the decanting stage and the bottom right is in the settling stage.



Bellarine Peninsula, the authority duplicated mains and lined and covered storage basins. It also replaced mains to Lorne and Colac. Apollo Bay gained a new water treatment plant to improve the quality of its supply.

When the upgraded Black Rock sewage treatment plant was commissioned in 1996, the board had completed one of the largest and most expensive projects in its history. But, like the water supply, conclusion of a major project did not mean there was little work remaining. A review of Geelong's trunk sewer system suggested options to enable the system to cope with future peak wet-weather flows for the next 25 years. The first major project recommended by the review was a large retarding facility at North Geelong. This was virtually a huge below-ground tank with a capacity of six megalitres that could store heavy flows, which previously overloaded the system, and release them into the system later. The facility, costing \$4.3 million, was completed in March, 2000, and operational by June. No sooner had it been completed than it was needed to overcome an emergency when a leak was discovered in a nearby sewerage rising main. Without the new facility, a fleet of tanker trucks would have been needed to carry the sewage past the problem, causing serious traffic disruptions. Instead, the flow was simply diverted into the new facility while repairs were carried out.

Another milestone was replacement of a section of the old ovoid sewer still in use. In February, 2002, Barwon Water commenced an \$8 million project to replace the old sewer from the Geelong racecourse to Marshall, which was completed in 2003. A further stage of the work remains to link the outfall and ovoid sewers. When completed, it will cater for growth on the Bellarine Peninsula and ease pressure on the outfall sewer.

Since the beginning of Geelong's sewerage system, there have been suggestions about using the sewage rather than letting it go to waste. Barwon Water did not begin seriously considering water recycling until the mid-1990s, and even then there seemed little point in projects that were not economically viable and meant subsidising users. Consequently, Barwon Water only supplied projects that would be a commercial proposition as well

as making good use of the resource. The first major re-use project commenced in January, 1998, when an irrigation farmer entered an agreement with Barwon Water to take 500 megalitres of treated effluent a year. The following year, the authority concluded an agreement with a vineyard to take treated effluent from the Portarlington treatment plant and other opportunities began to emerge. By 2000, other customers were using recycled water for golf courses, potato and tomato farming and a turf growing business. Six users were taking 800 megalitres a year, and consumption is expected to grow to 2,100 megalitres by 2005, 11 per cent of Barwon Water's treated effluent.

Biosolids, the product left after water is cleaned at sewage treatment plants, was an even greater challenge. There were several potential uses, the most likely being a soil additive, but there were problems in making it suitable. From 1996, when the treatment plant at Black Rock was commissioned, until 2001, biosolids were accumulated in lagoons on site. When these became full in 2001, the biosolids were transported to Melbourne Water's Western Treatment Plant for storage. In



A field day demonstration using biosolids in farming, one of its potential uses.

2003, plans for a drying facility on farm land at Balliang, east of Anakie, were modified following public concern. This reinforced the importance of successful community consultation. Nevertheless, the issue had become a high priority for the authority and would eventually be solved.

Trade waste also took on a new urgency as Barwon Water investigated the effects of hazardous materials in its sewers. It was partly an occupational health and safety issue because of the effects the materials could have on workers. There was also the matter of how much it cost Barwon Water to treat trade waste to meet the required standards for effluent discharge from its sewage treatment plants. Barwon Water encouraged trade waste producers to introduce processes that created cleaner material and begin their own recycling processes to reduce the amount and type of waste directed into sewers. It also introduced a scale of charges based on the quality of the

The South-Western Region of Victoria that includes the Barwon region and the catchment area under the control of the Corangamite Catchment Management Authority.



effluent and the cost of treating it to meet EPA standards.

Water quality in the Barwon River had been an unceasing problem. At various times there had been suggestions an organisation should be appointed to oversee the entire Barwon catchment. In 1994/95, the government set up a consultative action team to investigate management arrangements for the Barwon, Moorabool and Lake Corangamite catchments. Out of this came a decision to create the Corangamite Catchment Management Authority to take responsibility for those inter-linked catchment areas from July 1, 1997.

After an absence of 15 years, water restrictions returned to Geelong in 1998. Previously commissioners and executives had been forced to act in haste, but this time Barwon Water had prepared a Drought Response Plan as part of its overall water development strategy. The plan set carefully defined points at which the levels in storages would trigger responses and included public communications programs, pumping from the Barwon Downs borefield and drawing down supplies from Lal Lal Reservoir.

At the end of July, 1997, Geelong's storages held only 50 per cent capacity or 30 per cent below average. That triggered the first phase of the Drought Response Plan, a comprehensive publicity campaign designed to encourage people to conserve water. By January 30, 1998, storage levels had fallen to 47 per cent capacity and restrictions were introduced and the publicity campaign escalated.

The drought continued into 1999, breaking all records since keeping figures commenced in the 1880s. Heavy rains fell in September and October, 2000, and restrictions were lifted from July 1, 2001. They had been in place a record 41 months. The drought had been long and severe, but there had been less panic because Barwon Water moved through the stages of the plan as they were needed rather than making reactive decisions.

The long drought re-inforced, as all serious water shortages had, the need for action. In the past, this had invariably meant developing a new source of supply. But this option no longer existed. For 20 years, the authority had been attempting to gain

West Barwon Reservoir in September, 1998. Dennis Brockenshire indicates how low the water had become during the longest drought in the region's history. Photo courtesy of the Geelong Advertiser.



access to new water sources but had been denied. The traditional response had been an engineering one – go out and build something. Now the response needed to be in keeping with the times, a management response. If Barwon Water was unlikely to gain access to a large supply, then it had to examine the situation carefully, consider the options and find a way forward.

In October, 2000, it launched the first phase of a process to develop a Water Resources Development Plan. The process would devise a long-term strategy that explored every possibility to meet increasing demand for 20 years and beyond. It was the largest, most complex and far-reaching study the authority had undertaken and involved public consultation on a scale beyond anything previously attempted. It entailed community workshops and conferences, information bulletins, fact sheets and the assistance of a 21-member reference group. Barwon Water prepared an options paper that would be followed by further community consultation before a draft was prepared.

The process flowed smoothly and the completed plan was released publicly in March, 2003. It was the culmination of

almost two years' intensive technical and economic investigation and community consultation. The report's recommendations included the goal of a 15 per cent reduction in consumption, making better use of existing supplies and, eventually, developing further resources. It was a bold but sensible plan that should be achievable. How it might turn out would be, as these things had often been, beyond the control of Barwon Water.

Conservation became the centrepiece of the Water Resources Development Plan. After the record drought, Barwon Water launched a marketing service to further promote water conservation. It included rainwater tanks, garden mulch, soil conditioner and a discount scheme for other water-efficient gardening products. But for water conservation to become a way of life and be fully integrated into the community, it would have to be built into their lives and their homes. Water Sensitive Urban Design, involving development of residential land to foster conservation and protect the water cycle, promised to be a step in that direction. It included collecting rainwater and run-off, re-using greywater, conserving potable water and minimising sewage discharge. These were the things all future urban development would have to accommodate if conservation was to be as successful.

Barwon Water chose Bell Post Hill to turn this concept into a reality. The service basin there had been constructed under Sharland's direction in 1926, but it had never been really successful and the development of much larger basins at Highton and Pettavel had made it obsolete long before being taken out of service around 1985. It had remained unused for some time before the board agreed to develop it as a residential subdivision in partnership with a commercial developer. Barwon Water then decided to make it a showplace for conservation technologies by building a house to demonstrate how easily significant water conservation could be incorporated into traditionally designed homes.

The subdivision was designed around the floor of the circular basin, which was kept as open public space, taking the

The plaque marking the opening of Sharland Park and, behind it moved from elsewhere on the estate, is the valve house bearing Sharland's trademark turret.



form of an attractive and slightly sunken amphitheatre, landscaped and with community features. Barwon Water named it Sharland Park in memory of the organisation's founding engineer. This example of what the future might look like was officially opened, in the presence of one of Sharland's descendants, on September 24, 2003.

This new project acknowledged the past and pointed toward the future. The old Bell Post Hill service basin had been constructed to foster Geelong's development by allowing industrial development along the shore of Corio Bay. The new Sharland Park development showed how people would have to live in the future to make the best possible use of Geelong's water supply. The achievements of the previous 95 years in reaching the objective of the organisation as Sharland had understood it had been magnificent. The achievement of only the previous decade in giving the authority a new structure to equip it to face the future was just as significant.

ACHIEVEMENTS

I was appointed to the Chief Executive's role to be a change agent and to provide leadership to move the organisation from a traditional water authority to a new future of enhanced customer service, business efficiency and environmental care to what I term an environmental business. But one cannot achieve this alone. I pay tribute to successive Barwon Water boards, talented, highly skilled, community-minded people who provided the opportunity, encouragement, direction and full support to allow Barwon Water to continually develop to a current pre-eminent position in Australia's water industry.

My Executive Managers and Branch Managers must be recognised and receive enormous credit for a job well done. Teamwork is the key, valuing employees, creating a learning performance-based organisation where innovation and creativity flourish.

All the strategic planning, the visionary work, the change processes, the re-engineering, the measurement and the control only became reality when the Executive Managers and Barwon Water employees got behind the new direction, supported the leadership and created this new future through achievement.

The achievements are:

- *Barwon Water is now a viable, sustainable environmental business*
- *High quality reliable water is delivered from 10 advanced treatment plants*
- *Sewage and trade wastes are treated to regulated environmental standards by nine modern treatment plants*
- *Advanced strategies have been formulated for growth in water and sewerage services and for beneficial use of recycled water and biosolids*
- *A highly skilled, innovative and adaptative workforce is maintaining a customer satisfaction rating of around 95 per cent*
- *The turnover has reached \$100 million and investments of almost \$300 million have been made in the past 10 years, bringing the asset base to not quite \$1 billion ODRC.*

However, it is not appropriate for Barwon Water to judge its first 10 years of achievements. History will do that for us.

Dennis Brockenshire reflects on the achievements to date as CE of Barwon Water.



CONCLUSION

FROM PAST TO FUTURE TENSE

The end point of this story is the opening of Sharland Park. Barwon Water continues on into the future while this history ends, to also become part of its past. Chairman Vaughan gave the story a tidy and significant concluding point at Sharland Park when he reflected on the links between the beginnings of Geelong's water supply body and its work almost a century later, and on the difference between what had been done then and what Barwon Water did in 2003.

At the dedication of Sharland Park. (LtoR) Dennis Brockenshire, CE of Barwon Water, James Ingpen, grandson of James Sharland, Elaine Carbines, local Member of Parliament, and Stephen Vaughan, Chairman, Barwon Water.

THE FUTURE AND THE PAST

This is a very significant day for the authority, both in terms of honouring one of its former employees and in looking forward to the future. Today we face similar challenges to those faced by James Sharland, but our focus is different. His era was characterised by what you might call nation building, building reservoirs, building dams. Our era is typified not so much by collecting more water but using it more wisely. We hope to encourage land developers, architects and local government to take up the challenge of water conservation and energy efficiency and use this estate as a model for what can be done in the future.

Part of Stephen Vaughan's speech at the dedication of Sharland Park, September 26, 2003.

The differences between the organisation in 1908 and 2004 are so immense they are almost completely different bodies. What they have in common is that one has become the other over time, and that process of transition is the subject of this story. From 1909 when the organisation's first annual report showed it had raised and spent £25,599 (in modern day values no more than \$2.6 million) to July, 2004, when the CE could report to the board that it had accumulated a surplus of around \$4 million in the previous year, Barwon Water has become a large and important business. But the trust had grown to become the authority in much more subtle ways.

At two distinct points in the development of Geelong's water authority it chose to use symbols from the mythic past to create an image for itself. Of course, in both cases it only did what was commonplace at the time. In the 1920s, the use of a figure from the pantheon of classical gods and Latin mottos were commonplace. In the 1980s, creation of corporate logos replaced the older way of defining the guiding principles of organisations and communicating them to the community,

albeit using a figure from the mythic past as a basis for a logo was not so common. But the knowledge of the classic gods and the language of Rome had fallen into disuse while the knowledge of the zodiac and its symbolic meanings had become much more commonplace in the public imagination. By the beginning of the new century, even that kind of symbolism has drifted into disuse as popular culture mutated with ever increasing rapidity.

In the 1920s, the body that was to become Barwon Water chose a goddess, Hygieia, and a motto that emphasised what it believed was its purpose – that is, protection of public health. This was a time when the trust's sewerage system was less than 10 years old and people knew from personal experience the effect its work had had on public health. By the early 1980s, the trust's public health function was so taken for granted that no-one recalled what Geelong had been like when the streets stank and contagion threatened every-day health and life. Then the trust, wishing to redefine itself in a more modern way, chose a popular and well known symbol, Aquarius, the water carrier.

There was no contest between these two ways of seeing the organisation because it was both Hygieia and Aquarius. The trust protected the public health and it supplied the community with water. By doing one, it did the other. The contrast was in the emphasis each view gave. In the time of Hygieia, the trust existed to protect public health by supplying water and removing sewage. Later, in the age of Aquarius, water itself was the focus rather than the public health that made possible.

This transformation in how people understood the world tells us something else. It tells us about the change that had occurred in how people knew and understood the wider world. In the 1920s, people still believed one of the best ways of equipping themselves to meet the challenges of the future was by knowing what people had done in the past. In that era, the actions of great men (but very few women) gave the lead to how a man of the times might frame his actions. And why not? What better tools did a person have to face the future? By the 1980s, however, a whole new pantheon of tools to help people face and cope with the future had come to prominence. The most

powerful was economics, but there was also sociology, political science, management theory, cybernetics and a whole new world of information transforming tools. They made it possible to predict what the future might hold without having to depend on the experiences of long dead people who had no idea of the complexities and problems of the modern world.

If this is the way life had become by the 1980s, why write a history of Barwon Water and its predecessors at the beginning of the 21st Century? Why? Several reasons suggest themselves, not all of them relevant here.

One is simply to recall and honour the achievements of the people who have gone before us and created the world in which we live. People long dead like Christopherson, Sharland, McKay, Reilly and Hodges all played important roles in creating the kind of water and sewerage services Barwon Water gives the community. So understanding the world in which they lived and worked helps explain what they did and why they made the choices they did that still affect our lives today.

Another is to tell a story as a way of explaining the world in which we live. Despite all the new ways of understanding the world, people still have basic needs that can only be met in old fashioned ways, by experiencing the challenges of the past and how they were overcome in the form of a narrative. Of course, history is a very particular kind of narrative that, by the conventions of its very existence, has to stick to the fact of what happened and why it happened. But still, all the problems encountered in providing a vital public service to the Barwon region by handling one of the most difficult substances on the face of the earth – that literally runs through your hands – provides the material for such a story.

The most important contribution of this history, however, is to give perspective to the present that might assist in revealing trends and broad themes that may continue into the future. These include the value of thorough and careful planning, the impact that broad government policy has had on the daily operation of the organisation and the long tradition of water management dating back to the 1886 Irrigation Act and the

1905 Water Act that needs to change radically to meet future demands. There is also the role money has played in the management of water and the recent expansion of trends to include the 'Triple Bottom Line' and the undissolvable link between people and water. Water is vital to life, and there would be no people living as they now do in the Barwon region if it were not for Barwon Water.

What has Barwon Water done in the past? It has provided customers with potable water, a sewerage system and improved the quality of the environs of the Barwon River through Geelong. In doing this, it has improved the public health of as many as a quarter of a million people at one time and improved the civil enjoyment of the people of Geelong, the district around it and the Barwon region. To achieve these things, it has employed more than 400 people at one time, boosting the economy of the city and region. It has given people a workplace where they could learn, practice and improve their skills and knowledge and given many of them a second family. It has created one of Geelong's greatest public bodies and made modern Geelong possible.

In the present, Barwon Water strives to improve the quality of the service it provides customers by developing the skills, knowledge and experience of its staff. It continues to offer a source of employment for more than 300 people in an efficient and generally friendly atmosphere that has been created to encourage and aid personal development as well as the wider success of the authority. It is striving to develop ways to meet unfolding government expectations and the challenges of the future.

And what of the future?

Hygieia and Aquarius were two mythical symbols possessing characteristics that described the role and purpose of Barwon Water's predecessors; to protect the public health and provide the community with water services. Barwon Water has now transformed itself into something new, what Brockenshire calls an "environmental business" that recognises the inseparable link between the environment and the people. It recognises what

we do has an impact on the environment and the state of the environment will inevitably have an effect on us. Barwon Water must be an environmental business because it cannot be anything else if we are to live. The transformation it has undergone since its creation out of the Geelong and District Water Board has produced an organisation that is prepared to meet the challenges of the Victorian Government's 2004 strategy 'Our Water Our Future'. This strategy aims to reshape the state's water industry because, after decades of study into the environment, we know that to fail will bring disaster.

Before we came to this region, the Wathaurong people – the people who belonged to the water – knew that the quality of how they lived and their very lives depended on water. The white way of manipulating the environment is, in the end, different only in the scale of how it uses water. We still depend on the natural world and its water for our lives. If the water system fails because we do not look after it, we will suffer, perhaps tragically.

If there was ever a time when Barwon Water needed a new symbolic way of understanding itself it is now. That is no longer the way things are done, however, and so we have to look into the past again to find such a symbol.

In 1979, when such thoughts were still fashionable, James Lovelock used the idea of the Greek goddess, Gaia, to give a sense of poetry to a scientific proposition that became known as the 'Gaia Hypothesis'. Gaia was the Greek earth goddess so ancient she was not born like other gods, but emerged from the great emptiness of the universe and gave birth to the sea and the sky. The 'Gaia Hypothesis' suggested earth was one entire living organism and it has become the subject of strenuous scientific debate. Whether or not this is true and in what way it might be true is not as important as the idea itself, being a very powerful and fundamental way of telling us how we must conduct ourselves in the future. Gaia is the entire planet and the living systems on it, all of them linked to each other in innumerable and often still mysterious ways. Humanity is only a tiny fraction of the entire Gaia system, but its ingenuity, rapaciousness and swelling numbers give it a significance beyond its size in the

Gaia is an enormous ecological system spanning the entire globe. We hold her future in our hands.

scheme of things. Gaia, like other earth mother goddesses, is gentle and nurturing on the one hand and cruel and harsh on the other. She dispenses her cruel justice without mercy. In natural history, Gaia has destroyed entire species along the stream of time. Their previous presence in her ecosystems is now only to be found in the fossil record.

Gaia's blood is the water of the planet, circulating endlessly throughout those systems, bringing life wherever it goes. But if the cycle is tampered with or disrupted, the effects can be devastating. The Victorian Government's new water strategy is not an arbitrary decision taken for some political advantage. Rather, it is vitally important because it attempts to halt and reverse the damage we have done to Gaia in our part of the globe. Our future depends on its success and, if we fail, Gaia's harsh justice will overcome us.

But that future is not inevitable. By embracing the broad philosophy of Gaia as a gentle goddess who punishes mistakes harshly, people can learn to live with her rather than fight against her. That is how Barwon Water intends to meet the future. It has to do so because the future of the Barwon region's environmental integrity depends on it and because, as has happened so often in the past, Barwon Water can set an example for others.

Dennis Brockenshire
looking to the future for
Barwon Water.

THE FUTURE WILL BE – A SEA OF CHALLENGES

Water supply and reliability

Our challenge is to pursue our Water Resources Development Plan with innovation and creative endeavour and develop desalination and potable substitution as viable water sources.

Environmental management of sewage

Our challenge is trade waste reduction, trade waste control at source, localised sewage treatment, quality improvements and recycling.

New products and services

Our challenge is using biosolids as a fuel or an agricultural conditioner, innovation in collection and re-using stormwater, greywater, rainwater and providing recycled water to meet end user needs.

Sustainability

The challenges include conservation, demand management, catchment protection, stressed rivers, wise water use, education, renewable energy use, micro hydro use and energy efficiency.

To put it in water terms, the future will be a 'sea of challenges'.



APPENDIX I

CHRONOLOGY

1802	Matthew Flinders explored parts of Port Phillip Bay from a base at Indented Head.
1803	First white settlement of Port Phillip Bay established at Sorrento, abandoned May, 1804.
1824 <i>December</i>	Hume and Hovell briefly visited Lara on their overland expedition from New South Wales.
1835 <i>May</i>	John Batman and party stayed briefly at Indented Head before going on to establish their settlement on the Yarra River.
1836 <i>April</i>	First white settlement of area around Corio Bay began with sheep grazing on the site of future Geelong.
1837 <i>March</i> <i>October</i>	Governor Bourke visited Geelong. Police Magistrate Foster Fyans arrived in Geelong.
1838 <i>August</i> <i>November</i>	Survey of Geelong completed and approved. Town of Geelong gazetted.
1839 <i>February</i>	First land sales around Geelong.
1840 <i>March</i> <i>November</i>	First shipment of wool left Geelong for London markets. The 'Breakwater' nearing completion. It would separate salty and fresh water in the Barwon River and serve as a river crossing.
1841 <i>February 12</i>	J Griffen announced he had installed an iron pump in the Barwon River to pump water from four feet depth, said to be superior to other water taken from the river.
1848	Breakwater repaired by David Lennox due to damage caused by several floods.
1849 <i>October</i>	William Gray received government approval to construct a water reticulation system in Geelong. Corporation of Geelong created. The first election was held on February 9, 1850.
1850 <i>April 1</i>	Water from a steam-driven pump installed by William Gray delivered to a fountain in the Market Square. It was soon replaced by a large tank.

1851

July 5
November 13

Discovery of huge gold deposits near Ballarat.
Victoria’s Legislative Council held its first meeting, the commencement of colonial self-government.

1852

July

Geelong Water Company formed at a public meeting convened by the Mayor of Geelong. John Henry prepared a report on a possible water supply system.

1854

December

Surveys commenced to explore the potentials of the Barwon and Moorabool Rivers, the Winchelsea area, Lal Lal and the tributaries of the Little River, New local government legislation led to fragmentation of the Town of Geelong. South Barwon separated in 1857, Newtown and Chilwell in 1858, Geelong West in 1875 and the Corio Road District was formed in 1861. Telegraph communication commenced between Geelong and Melbourne.

1855

October 11

December 5

Town Council instructed Gray to remove his tank from Market Square due to a dispute over charges.
Government appointed members to the Geelong Water Commission to investigate the supply of water to Geelong.

1856

May
June

December 31

A scathing report was published on public health and sanitary conditions in Geelong.
Board of the Geelong Water Commission met for the first time.
Gray removed his tank from Market Square and established a new fountain at the western end of Malop Street.
Melbourne’s Yan Yean water supply scheme began service.

1857

February 20

August

September

Report of investigations into water supply submitted to the Geelong Water Commission. It recommended a Wormbete Creek scheme.
Government asked the Geelong Water Supply Commission to investigate a more economical water supply scheme.
Geelong Water Commission reported on a Buckley Falls water supply proposal.

1858

January

February

June 2

Government said the money allocated to Geelong’s water supply scheme had been spent on Melbourne’s Yan Yean system instead.
Government appointed a Select Committee to investigate Geelong water supply. The Geelong Water Commission board resigned.
Select Committee of the Legislative Assembly made recommendations on the water supply scheme for Geelong.

1859

June 29

Report prepared on a Geelong water supply by two experts. It recommended a supply from Lal Lal area. The government did not act on this suggestion, but further surveys were undertaken.

1862*March*

Fire destroyed 'Singapore Terrace', leading to creation of the Water Supply Committee of the Geelong Town Council.

April

Railway line between Geelong and Ballarat opened.

1863*March*

Town of Geelong Water Supply Committee began examining existing water supply proposals. Henry O Christopherson (working on the new Railway Pier) was appointed to recommend a scheme.

1864*August*

Christopherson's report recommended a site on Stony Creek.

1865*May*

A deputation from Geelong went to Melbourne to press the government for a Geelong water supply.

October

Legislation was passed to provide finance for the Geelong water supply scheme.

1866*May*

Contact awarded for construction of the Geelong water supply reservoir at Stony Creek.

June 15

A ceremony was held to mark the commencement of construction of the embankment at Stony Creek. Most of the contracts for the project appear to have been let during the rest of 1866.

1868

Work on the Stony Creek scheme suspended due to exhaustion of funds.

1869*April 13*

Contract signed for construction of a service basin and filter beds at Lovely Banks.

1870

A start made on construction of a channel to divert waters from Wallace's Swamp into Stony Creek. The work was later abandoned.

1871

General problems with Stony Creek scheme, including embankment subsidence and Anakie aqueduct construction work standards. This led to accusations of malpractice.

August

A report on water supply construction work problems delivered to the government by Richard H Sankey.

1872*July*

Pipeline from Anakie to Lovely Banks commissioned.

Stony Creek embankment began subsiding, by August it was considered unsafe so the water let out and the reservoir was empty by September 7.

September 14

The major subsidence of the Stony Creek embankment appeared to have come to rest by March 1873. As a result, the reservoir's capacity was reduced from 750 million to 168 million gallons.

1873

August 17

Lower Stony Creek concrete dam constructed to provide some of the lost capacity from the Upper Stony Creek reservoir. Construction took about 18 months in 1873-74.

Winter rains collected at Lovely Banks, filling the service basin. Water broke through the embankment due to poor workmanship. It was sufficiently repaired by September 11 to supply water to the Geelong Infirmary and Benevolent Asylum.

1874

January 13

Gray's water supply system closed. The pipes were dug up and used in the new water supply system.

The first domestic water supply provided in Geelong, to Block I, the area north of Malop Street to Corio Bay and between Gheringhap and Bellarine Streets.

1875

Several miles of sub-mains extended through the city and suburbs.

1877

June

Settling ponds completed at Lovely Banks to improve water quality.

July

Railway line between Geelong and Colac opened.

November

Service tank constructed in Noble Street to improve water supply to high areas. It was not very successful.

1879

May

Railway line between Geelong and Queenscliff opened.

1882

October

Water restrictions introduced in Geelong due to water shortages.

1883

October

Water restrictions introduced again.

1884

Summer

A Royal Commission held into water in Victoria.

Only 16 weeks of water supply remained in Geelong's storages.

1885

The *Geelong Times* published a series of articles called 'Complete History of the Geelong Water Failure'.

1886

The Irrigation Act passed.

1887

Report prepared by Stuart Murray, Chief Engineer of the Victorian Water Supply, on the possibility of obtaining water from the upper Barwon, the Moorabool and the upper Werribee Rivers, including a recommendation of a diversion weir north of Ballan. From 1885 to 1898, survey gangs were active at Lal Lal, Pennyroyal, the upper Barwon River, the East Moorabool in the Great Dividing Ranges at Bolwarra, north of Ballan, and at Korweinguboorra, near Daylesford.

October Minister for Water Supply suggested Geelong should buy its water supply system from the government to make possible the required expansions and improvements.

1893

Negotiations between the government and Geelong over purchase of the water supply system agreed on a price of £180,000, but no conclusion was reached.

1898

Public anger at water shortage in Geelong. The government installed pumps on the Barwon River bank, near Queen's Park Bridge. By March 12, 1899, the reservoirs were down to 12 million gallons.

Discussions between Geelong and the government over purchase of the water supply system. Not concluded.

March The government decided to construct a new service basin at Montpellier that was completed November, 1900.

1899

The government decided to construct a diversion weir at Bolwarra, north of Ballan, and the Ballan channel to connect with Stony Creek to increase the supply of water to Geelong.

March Water shortage; only nine days of water were left when heavy rain saved the situation.

1902

December More discussions between Geelong and the government over purchase of water supply. Not concluded.

1905

Water Act enacted.

October Negotiations began between the government and Geelong municipal councils over the purchase of water supply system. The Geelong Water Supply Committee established to conduct the negotiations on behalf of the Geelong municipalities.

1906

February Mayor of Geelong called a meeting to discuss a sewerage system for Geelong.

March A party of Geelong municipal councillors visited Sydney and Hobart to inspect sewerage systems.

August Geelong Water Supply Committee agreed to buy Geelong's water supply from the government.

1907

April 9 Public meeting passed a resolution that Geelong should be sewerred.
December 16 The Geelong Municipal Waterworks Act 1907 proclaimed.

1908

January A representative of the Septic Tank Company of London visited Geelong to prepare a report on a sewerage scheme that was completed mid-April.
January 11 Commissioners were elected by the municipal councils they represented; the nominations were duly confirmed by the Minister for Water Supply.
January 18 The Geelong waterworks, building and plant were transferred from government ownership to the trust.
January 25 First meeting of trust commissioners held at the Water Supply Offices, Post Office building.
February 24 James Sharland appointed Engineer and Secretary.
May A Sanitary Conference, initiated by district councils to examine the question of sewerage Geelong and suburbs, instructed to prepare a sewerage Bill to be submitted to the government.
September 25 Trust decided to construct a new storage at Korweinguboorra.
December Stony Creek embankment restoration completed.

1909

February Trust agreed to be incorporated into a new waterworks and sewerage trust.
February 16 Water restrictions introduced; lifted at the end of June.
April First contract awarded for Korweinguboorra Reservoir project.
July 15 Geelong Municipal Waterworks Act 1907 Amendment (Sewering and Cleansing) Bill introduced to Parliament. There were several delays during its passage.

1910

January 4 Geelong Waterworks and Sewerage Trust Act enacted.
March 24 Final meeting of the Geelong Municipal Waterworks Trust held.
March 30 Geelong Municipal Waterworks Trust became the Geelong Waterworks and Sewerage Trust.
March 31 First election for Geelong Waterworks and Sewerage Trust commissioners.
June 1 Charles Breen appointed staff surveyor for sewerage surveys.
June Construction of Korweinguboorra Reservoir practically completed.
November 23 Drainage area for sewerage system gazetted.
December 8 Town of Geelong became the City of Geelong.

1911

Wooden main pipe constructed from Lovely Banks into Geelong.
New pipe head basin constructed at Anakie to give better control between Stony Creek and Lovely Banks.
January Chad Oliver, of the MMBW, presented a report on sewerage options for Geelong.
May R T McKay, of the Public Works Department, Sydney, appointed sewerage engineer.
June 11 Korweinguboorra Reservoir filled.
October 25 Commissioners unanimously adopted McKay’s recommendation for an ocean outfall sewerage scheme for Geelong.
December Contract awarded for construction of the trust’s office building in Ryrie Street.

1912

<i>January</i>	First contracts advertised for the sewerage scheme.
<i>May</i>	Excavation of sewerage outlet commenced.
<i>October</i>	First oviform reinforced concrete main pipes completed early in the month.
<i>October 1</i>	Tender provisionally awarded to Stone & Siddeley for design and construction of the sewerage aqueduct across Barwon Valley.

1913

<i>February</i>	Approval given for the design and specifications of the sewer aqueduct.
<i>March 28</i>	Contract awarded to Stone & Siddeley for the manufacture, laying and joining of pipes to bring the main sewer through the city to the Geelong Railway Station.
<i>July</i>	New trust office building in Ryrie Street opened.
<i>September 25</i>	Contract for third section of the ovoid sewer from Geelong Railway Station to the abattoirs at North Geelong awarded to Stone & Siddeley.

1914

	Upper Stony Creek Storage No 2 completed in mid-year.
<i>January 10</i>	First pier of the aqueduct across the Barwon Valley completed.
<i>May</i>	Excavation commenced for low level pumping station in Victoria Terrace, Corio Bay, late in the month.
<i>June 2</i>	First cantilever of the aqueduct across Barwon Valley completed.
<i>July</i>	Contract awarded for first reticulation sewers, completed in November, 1915.
<i>July 30</i>	Walls collapsed on excavation of low-level pumping station at Victoria Terrace, Corio Bay.
<i>August</i>	Construction began on stage three of the ovoid sewer.
<i>November</i>	Water restrictions introduced at beginning of the month.

1915

	Settlement basin constructed at Lovely Banks.
<i>January</i>	Construction of reticulation sewers in the main part of the city (area bounded by Malop, Yarra, McKillop and Gheringhap streets) commenced.
<i>February</i>	Trust began sewer reticulation by day labour. By November, it had decided day labour was more cost-effective than most contract work.
<i>February 13</i>	Final cantilever of aqueduct across Barwon Valley completed.
<i>February 15</i>	Work begins on sewer reticulation of the area bounded by Gheringhap Street, Latrobe Terrace, Little Ryrie and Little Malop streets.
<i>April 26</i>	Construction of duplicate pipeline from Anakie to Lovely Banks commenced.
<i>May</i>	Final stage of ovoid sewer main completed.
<i>June</i>	Aqueduct virtually completed.
<i>November 29</i>	First sewerage area declared by the trust.

1916

<i>July</i>	Ovoid sewer completed and put into service.
<i>October</i>	Low level pumping station to serve the central city completed.

1917

- Stony Creek embankment raised to original height.
- Sharland conducted major analysis of the water supply system.
- January Trust commenced Deferred Payment Scheme to help people pay for their connection to the sewerage system. The first contracts under this scheme awarded in April, 1917.
- April Trust began testing water supply and sewerage fittings, pipes, etc.
- June Geelong's main sewerage system completed.
- June R T McKay resigned.
- June 29 Sharland appointed Engineer-in-Chief.
- July 19 P G Reilly appointed acting Secretary, made permanent on January 25, 1918.

1918

- No 3 Storage created at Stony Creek by raising embankments around a nearby swamp.

1920

- Legislation passed to allow the trust to construct special sewerage areas along the north bank of the Barwon River.

1921

- Employees began holding an annual picnic, usually in February.
- Trust adopted crest and motto.
- April Approval given for the trust to begin construction in special sewerage areas on the north bank of the Barwon River.

1922

- March Geelong West proclaimed a Town.
- April Special Sewerage Area No 1 ready to start operations.

1923

- First problems noticed with concrete in the ovoid sewer aqueduct.
- March Special Sewerage Area No 2 ready to start operations.

1924

- Ford Australia announced it would open its head office and a major factory in Geelong.
- April Borough of Newtown and Chilwell became a Town.

1925

- July Trust decided to construct a dam at the junction of Paddock Creek and East Moorabool River to be named 'Bostock Dam'. It was ready to commence work in early 1926, but did not proceed.

1926

- Trust began sending out rates notices in the mail; they had previously been delivered by rate collectors.
- Trust occupied the old Temperance Hall in Little Malop Street.
- January* Bell Post Hill storage basin ready for use
- January 27* Conference summoned by the Borough of Queenscliffe to form a Bellarine Water Committee. It approached the trust regarding the project, but it was unable to prepare estimates.
- April* Conference convened of municipalities and other bodies interested in the provision of water supply to the Bellarine Peninsula. The State Rivers and Water Supply Commission (SR&WSC) undertook to investigate the possibilities of using the headwaters of the Barwon River.
- September* Analyst appointed to test water quality for the trust.

1927

- Construction of Wurdee Boluc storage commenced late in the year.
- March* Discussions between the trust and SR&WSC about the possibility of the trust taking bulk water from the Bellarine Peninsula supply scheme.
- October* Drought led to the decision to construct a pumping station on the Barwon River at Buckley Falls .
- November 17* Ballarat Water Commissioners offered Geelong 100 million gallons of water.
- November 19* Trust began using three pumps to transfer water from a weir built across the Barwon River, near Buckley Falls, into the Montpellier service basins.
- November* Construction of the Bellarine Peninsula water supply system commenced.
- December* Trust agreed to buy bulk water from the upper Barwon River from the SR&WSC.

1927/28

Bellarine Peninsula water scheme, main inlet channel and associated channels and syphons to Wurdee Boluc completed. Subsidiary channels constructed to pick up water from Retreat Creek and East Pennyroyal (Deans Marsh) Creek.

1928

- February* Trust took over sanitary pan services in its sewerage areas.
- October* Water started flowing into Wurdee Boluc Reservoir.
- October 1* Two sitting commissioners defeated at election due to reaction to water restrictions.
- December 9* Pumping from Buckley Falls pumping station recommenced.
- December 21* Water from Ballarat flowed to Geelong.

1928/29

First stage of Wurdee Boluc Reservoir completed and storage of water commenced.

Waurm Ponds pipe head basin completed.

Channel to convey water from Wurdee Boluc to Waurm Ponds completed.

1929

First water from Wurdee Boluc flowed into Waurn Ponds basin storage early in the year.

April

Housing connection workers laid off due to worsening economic conditions; more employees laid off in June and later.

April 4

First water from the Upper Barwon catchment flowed into the Montpellier service basin.

November

Trust complained about the quality of the water from the Barwon system.

1929/30

Main inlet channel to Wurdee Boluc Reservoir considerably extended to tap West Pennyroyal, Matthews, Goslings and Dewing Creeks.

1930

September

Commissioners directed that burst mains were only to be repaired in working hours as a cost-reduction measure.

1930/31

Wurdee Boluc inlet channel extended to tap East Barwon River Bellarine basin completed.

1931

Temporary weir at Buckley Falls dismantled. The emergency pumping station was removed in 1933.

February

Office staff offered to take a 10 per cent pay reduction due to economic conditions.

July

Three office staff laid off.

1932

First corrosion problems noted in the ovoid sewer. Unsuccessful attempts made to reduce the corrosive conditions in it.

1932/33

Main supply pipeline from Waurn Ponds to Bellarine Basin completed. Reticulation of Queenscliff, Point Lonsdale, Ocean Grove and Barwon Heads completed.

1933/34

Laying of main supply pipelines from Drysdale and Portarlington completed and reticulation systems installed.

1934

Trust leased land for a sanitary depot at Grovedale. It was closed by 1954.

1934/35

Construction of channels to supply Torquay and Anglesea completed. Reticulation of Torquay and Anglesea completed.

1935

July

Ten per cent wage and salary reductions ended.

August 1

Sharland resigned as Engineer-in-Chief. Richard Pearce appointed to the position.

1936

Forced air blowers installed in ovoid sewer to reduce corrosion.

1937

Trust constructed a slow sand filter at Montpellier to filter water from the Bellarine Peninsula supply. Only partially successful.

October

Working hours reduced from 48 to 44 a week. Trust closed on Saturday afternoon.

1938

SR&WSC constructed a second pond at Waurin Ponds to allow longer settling times.

February 22

Public meeting proposed that the trust should be given responsibility for the Barwon River where it passed through Geelong.

1939

An 18-inch main laid between Montpellier and Geelong West was constructed to meet the growing industrial demand, including Ford, Corio distillery, Pilkingtons Australia and International Harvester.

September

War declared. Halted virtually all trust development until after 1945.

September 18

The Barwon River Improvement Act, 1939, proclaimed. It gave the trust responsibility for the Barwon River where it flowed through Geelong.

1940

Barwon River Improvement Rate introduced.

Capacity of Ballan channel doubled to obtain more water from the Moorabool system.

1941

September 22

Chairman Doyle died in office. He had been a commissioner since 1908 and Chairman since 1928.

1942

November

Special meeting of commissioners asked the Engineer-in-Chief to begin planning for an improved water supply for Geelong and district after the war.

1943

April

Trust asked to begin planning for post-war development on Corio Bay. Engineer-in-Chief's 'Supplementary Water Supply' plan completed.

1944

Housing Commission of Victoria asked the trust to begin providing housing connections mid-year.

1945

August

World War II ended, but shortages and rationing continued for several years. Petrol rationing ended in 1950.

October

Water restrictions imposed until March, 1946. Water shortages became a common feature of this period.

1946*February*

Trust decided to revive plans for Bostock Reservoir.

June

Staff picnics resumed after the war.

Superannuation scheme introduced for staff.

1946/47

Branch channel and service basin constructed to serve Birregurra from the Barwon headworks.

1947*September*

P G Reilly retired as Secretary, B C Henshaw appointed to the position.

November

Forty-hour working week introduced. Trust closed on Saturday.

December 17

Lara water supply turned on, extended to Lara under a grant from the Town Water Supplies formula.

1948

Water supply to Birregurra completed.

December 20

Water restrictions imposed; lifted at end of March, 1949

December 22

Government directed the State Development Committee to investigate the supply of water under the control of the trust.

1949*January*

Trust joined the Provincial Sewerage Authorities of Victoria Association.

May 11

Trust took possession of its first trench-digging machine.

Report of State Development Committee into the operations of the trust completed. It included recommendations on major mains replacement, improved Barwon headworks and reconstitution of the trust.

August 15

Construction of Highton service basin commenced, commissioned June 30, 1950.

November 28

The Geelong Waterworks and Sewerage Act 1949 proclaimed. It reconstituted the trust as a body of seven commissioners, including a government-appointed Chairman.

1950*June*

Trust switched from twice yearly to annual rate collection.

Highton basin commissioned by R G Pearce. It had been constructed during 1949-50.

June 30

Engineer-in-Chief Pearce resigned, J M Macintyre appointed to replace him on July 3.

September 22

Final meeting of old trust.

September 28

First meeting of reconstituted trust with government-appointed Chairman, Jack Carr.

1951

Trust bought land in South Geelong for a works depot. Staff from the buildings in Little Malop Street moved there.

Trust concrete lined pipes in North Geelong to extend service lives.

Investigation of West Barwon dam sites commenced, conducted by SR&WSC.

Around £3000 spent on aqueduct repairs.

Trust decided to plant pine plantations in catchments, with timber to be sold for packing cases.

1951/52

SR&WSC investigation of the Upper Barwon water resources completed.
Investigation of dam sites on West Barwon River commenced.

1953

January

New main from Anakie to Lovely Banks commissioned.

June 15

Work started on Bostock Reservoir; construction of the main embankment commenced in September.

1954

Design of improvement to Wurdee Boluc inlet channel completed.
New sanitation depot opened at Marshall.
Trust received first application to use powerboat on the Barwon River.
Bellarine Water Supply Act passed to allow the government to sell the headworks of the Barwon River to the trust but retain responsibility for local supply on the peninsula.

March

Discussions between trust and SR&WSC progressed to the point where the trust asked the commission for ownership of the Barwon headworks.

September

Construction of Bostock Reservoir completed.

September

Enlargement of Wurdee Boluc Reservoir commenced.

December 15

Bostock Reservoir officially opened.

1954/55

Site selection began for a dam on the West Barwon River.
Wurdee Boluc Reservoir enlarged.

1955

July 1

Barwon headworks taken over by the trust.

1955/56

Wurdee Boluc inlet channel enlarged.

1956

Montpellier-Pettavel main enlarged, completed in 1957.

April

Enlargement of Wurdee Boluc Reservoir completed.

1957

Wurdee Boluc inlet channel improvements completed.
Decision made to accept trade waste into sewerage system.
Major repairs undertaken to the aqueduct, costing more than £22,000.
First land in catchments cleared for pine plantations, at Stony Creek. Work continued steadily into the 1970s.

1958

West Barwon dam site selection completed.
Trust began using two-way radio communication for maintenance service.
Macintyre completed full report on condition of the ovoid sewer.
Trust decided to increase resources dedicated to 'catch-up' sewerage works.
Properties at 61 and 63 Ryrie Street purchased.

May

June

September

1958/59

Wurdee Boluc outlet channel capacity increased.

1959

- January Construction commenced on duplicate aqueduct between Wurdee Boluc and Pettavel.
- October West Barwon dam project approved.
- November West Barwon dam construction commenced.

1960

Water supply provided to Leopold.

1961

- Trust began issuing permits for boats to exceed six miles per hour on the Barwon River.
- Annual staff picnics came to an end.
- May Trust commenced program of concrete lining pipes to extend service lives. Program of works peaked in 1963 and was virtually completed by 1966.
- May Trust decided to discuss proposal for a duplicate sewer with the government.
- July 6 Wurdee Boluc-Pettavel duplicate channel opened.

1962

Bell Post Hill service basin brought back into service.
Trust began photographing all its plans and important records.
Peninsula water supply extended to Indented Head and St Leonards.

1963

- Bell Post Hill service basin concrete lined.
- Trust began using computer services to prepare rates notices.
- Trust supplied water to Batesford.
- September Approval given for construction of new office building at rear of properties in Ryrie Street.

1964

- Special sewerage areas abolished and a system of trade waste agreements introduced.
- Torquay supply extended to Jan Juc.
- April Social club formed at instigation of commissioners.
- November New office building at rear of Ryrie Street office completed, renovations to the existing head office building completed and the complex officially opened.

1964-65

Trust gazetted as the authority in control of the Barwon River through Geelong for the purposes of the Motor Boating Act, 1961.

1965

- Clifton Springs water supply scheme completed, commenced in 1962.
Construction of duplicate sewer commenced.
- January* Geoff Vines appointed senior design engineer in charge of the duplicate sewer project.
- July* New accounting machine arrived, all internal ledger work recorded in decimal currency from July 1.
- July 1* New valuations used to ensure a more equitable basis of ratings between the different municipalities.
- October* Major extensions to the South Geelong maintenance depot completed, including an auditorium. Subsequent to opening of auditorium, the Social Club was formed, including the previous sectional social clubs, embracing all employees.

1965/66

Trust asked the government for approval to proceed with the detailed design and construction of a large dam on the West Moorabool River at Bungal. Construction commenced on an interceptor sewer from Cowies Creek to Corio via North Shore.

Approval given to proceed with the construction of a new service basin at Montpellier. It had been delayed due to proposals for a ring road.

1966

- Trust enters agreement with Geelong Harbour Trust to extend the laboratory and a full-time chemist appointed.
- Construction of the Bellarine supplementary pipeline from Bellarine basin to Marshall commenced, completed in 1968.
- Trust returned to twice yearly rate collection.
- February* Australia converted to decimal currency.
- March* West Barwon embankment completed.
- August* Agreement reached with the Shire of Bannockburn to sell it water to supply Meredith, Bannockburn, Lethbridge.
- November 17* West Barwon Reservoir officially opened by State Governor.
- December* Government amended the Geelong Waterworks and Sewerage Act to reduce the number of commissioners from seven to six by reducing the representation of the City of Geelong from two to one.

1966/67

In association with duplication of the outfall sewer, the trust proposed the possibility of planning the sewerage for the entire Bellarine Peninsula.

1967

- Repairs to aqueduct cost \$3000.
Trust commenced using its ratepayer water allowance to encourage water conservation.
- July 1* Trust altered its method of issuing annual rate notices to half yearly, the system from 1908 to 1949. Rising costs of services had resulted in rate bills that the average domestic ratepayer would find easier to meet in two half-yearly payments.
- September* Construction of John M Macintyre Bridge commenced.
- October 27* Water restrictions imposed and increased progressively as the summer proceeded, to the stage where no garden watering whatever was permitted.

1967/68

- West Moorabool Water Board created to construct and operate a reservoir on the Moorabool River at Lal Lal. Chairmen of both the Ballarat and Geelong water authorities were members.
- Trial bores on the Wurdee Boluc aquifer near Barwon Downs proved encouraging.
- Construction of the Callahan's Creek project completed.
- A number of properties on the north bank of the Barwon River were purchased so the area could be landscaped.
- Trust arranged with members of the Geelong District Dental Group for a dental survey to be carried out to ascertain the need for fluoride in Geelong.
- Callahan Creek diversion weir and channel constructed.

1968

- Construction of the fourth storage basin at Montpellier commenced, completed in 1970.
- Barramunga Creek diversion scheme constructed.
- Callahan Creek diversion scheme completed.
- January* Trust installed pumps on the Barwon River, near Queen's Park Bridge, due to severe drought conditions.
- February* Agreement reached with the SR&WSC and the Ballarat Water commissioners on joint construction of a new dam at Lal Lal.
- April* Groundwater exploration began with a six inch bore sunk adjacent to the Wurdee Boluc inlet channel.
- May* West Moorabool Water Board constituted by an Act of Parliament.
- June* Trust began pumping water from the Barwon River at two million gallons a day.
- August 2* First stage of duplicate sewer commissioned at Marshall.
- August 22* Water restrictions lifted.
- October 26* West Barwon overflowed for the first time.
- November* Work commenced on Bungal Dam.
- November 13* Duplicate sewer officially commissioned and John M Macintyre Bridge officially opened.
- December* Trust decided to sink production bores for groundwater.

1968/69

Construction completed for pumping from the Barramunga Creek into the West Barwon catchment area.

Work commenced on improvement to the Lara water supply.

Approval granted to construct a pipeline from She Oaks to the trust's Montpellier service basins.

1969

Anti-fluoride group formed in Geelong.

April Construction of 30 million gallon capacity concrete-lined storage basin at Montpellier commenced.

June Drilling of first production bore at Barwon Downs commenced, completed in October.

November Duplicate sewer pumping station at Cowies Creek commissioned, completing the duplicate sewer project.

1969/70

A production bore and four observation bores installed at Barwon Downs and a test pumping program carried out in preparation for a permanent bore pumping plant.

Anti-erosion measures taken on south bank of Barwon River, near Moorabool Street Bridge, including an experimental section using plastic mesh. Service basin at Anglesea completed.

1970

Trust developed a safety program in association with the National Safety Council.

Colour movie of the trust's activities completed.

February 5 Construction officially commenced on the Bungal Dam at Lal Lal.

September 26 J W Carr resigned as government nominee and Chairman. Wal Whiteside appointed his successor.

October New service basin at Montpellier put into operation

December Work commenced on section one of the She Oaks-Montpellier main.

1970/71

Pumps and communitors at the outlet works at Black Rock sewage treatment plant put under automatic control but vandalised.

1971

Trust officially recognised the service of all employees upon completion of 30 years with the trust.

January Jack Dillon honoured on completion of 50 years as a permanent employee.

March Work commenced on section two of the She Oaks-Montpellier main.

August Presentations made to nine employees who had worked for the trust for thirty years.

September Fluoridation became an issue at the election of commissioners.

September 26 J W Carr retired from trust after thirty years as commissioner and then Chairman, Wal Whiteside was appointed the new Chairman.

1971/72

Computer analysis conducted into probably future water requirements of outer areas; Lara, Grovedale and Fyansford.
 Agreements reached to accept sewage for various coastal authorities.

1972

SR&WSC announced a comprehensive survey of the water resources of the Gellibrand River.
 Environment Protection Authority created.
February Trust decided to construct three production bores for groundwater.
June 30 Amended by-laws introduced regarding the acceptance of trade or industrial waste.
August Trust decided on a scheme to share Barwon River use between various groups.
November First meeting held of executive group.
November 24 Bungal Dam at Lal Lal officially opened.
December 30 John Macintyre retired as Engineer-in-Chief.

1972/73

Computer modelling used to prepare analysis of the safe annual yield of the Barwon system under different systems of operation. Another computer analysis carried out on the probable future requirements in Geelong's outer suburban areas.
 Trust applied to the Environmental Protection Authority for a licence to dispose of sewage through the trust's ocean outfall.
 Outfall sewer used to dispose of sewage from Queenscliff, Ocean Grove, and Barwon Heads for the first time. The Torquay Sewerage Authority had begun using the outfall in the previous financial year,
 184 acres purchased adjacent to the outfall sewer at Black Rock to create a buffer zone and for use, in part, as a site for a sewage purification plant in the future.
 Trust purchased additional land in South Geelong to expand its maintenance depot
 Management consultants appointed to review staffing structure. Some major re-organisation resulted.

1973

Trust Safety Council appointed.
 Supply extended to Breamlea from Mount Duneed scheme.
January 1 A W Cooke replaced J M Macintyre as Engineer-in-Chief.
July 1 Water measured in metric measurements commenced on this day.
July 1 New policy came into effect that all staff must retire at the age of 65.
September 11 Dinner held at the Geelong Hospital to mark the centenary of water supply there.

1973/74

Implementation of Local Government (Subdivision of Lands) Act 1973 required land developers to have sewers installed in their subdivisions.
 An additional 57 hectares purchased for possible construction of a sewage treatment plant at Black Rock.
 Decision made to proceed with a Bellarine Peninsula sewerage authority.

1974

Students in the Department of Architecture at Gordon Institute of Technology prepared a plan for beautification of banks of the Barwon River.
 Trust entered its first float in the Gala Day parade.
 Shire of South Barwon proclaimed a city.
 Scenic walk created between Princes Bridge and Queen's Park was named the Stan Lewis Walk after the late Stan Lewis, superintendent of maintenance.

March 21 Trust donated a fountain, located in Little Malop Street mall, to the City of Geelong as a reminder of the centenary of water supply and the contribution of water to the quality of life in the town.
April 11 Water from the Lal Lal Reservoir officially turned on at the Montpellier No 4 Basin.
May Approval given for Leopold sewerage scheme.
December Alan Cooke retired as Engineer-in-Chief.

1974/75

A licence was obtained to pump water from the trust's first production bore at Barwon Downs.
 Analysis of discharge from Black Rock sewage treatment plant commenced as a monitoring program to provide basic data for future sewage treatment.

1975

Engineer-in-Chief investigated a proposal to amalgamate the water supply to the Bellarine Peninsula with the Geelong system.
January Geoff Vines appointed Engineer-in-Chief.
June Plans approved for a new six-storey head office building in Ryrie Street.
October Barwon River flooded, Fyans Park, Queen's Park and the Belmont Common largely under water for about a week.
November Temporary office premises leased and the former office building in Ryrie Street demolished.
November 11 Commission of Public Health directed the trust to add fluoride to all public waters supplied by the trust by June 1977.
December 17 Commissioners held their final meeting in the old office.
December 26 Demolition of old office building commenced.

1975/76

Investigations carried out into increasing the transfer capacity between Montpellier and Lovely Banks to take full advantage of the water yield available from Lal Lal.
 Discussions held with the Shire of Bellarine on the need for a strategy for sewerage the peninsula.

1976

- February West Moorabool Water Board reconstituted to give Ballarat and Geelong a greater say in its activities.
- April Detailed report on the proposed transfer of the Bellarine Peninsula water supply system to the trust completed.
- August Laboratory Branch was transferred to new facilities in the 1965 office building.

1976/77

Trust granted a licence by the Environment Protection Authority to discharge wastes at its ocean outfall, but the conditions were such the trust lodged an appeal against the severity of the requirements.
Safety Incentive Scheme introduced to encourage staff to think and act safely.
Land acquired for the construction of fluoridation plants.
Discussions held regarding duplication of the Bellarine mains.
Water supply scheme in the Bell Post Hill area approved.
Investigations carried out into the repairs needed for the ovoid sewer aqueduct over the Barwon River, last repaired in 1959.
Introduction of electronic survey equipment improved the flexibility and productivity of the trust’s survey team.

1977

- March Trust’s ‘Standards and Criteria for Admission of Trade Waste to Sewers’ adopted, amended in February 1978.
- May 29 Environment Protection Authority issued a licence for use of the outfall sewer at Black Rock.
- July First trust computer installed.
- July New anti-fluoride group formed in Geelong.
- August Approval given for the government to spend \$7.2 million on upgrading the Bellarine Peninsula water supply system over six years to prepare it for transfer to trust ownership.
- November 23 Leopold sewerage scheme completed.
- December Trust’s Registrar of Inscribed Stock, P R Hammerli, retired after 51 years.
- December Staff moved into new office building in Ryrie Street over two weekends.
- December 4 Barwon Valley Park officially opened, jointly developed by trust and City of South Barwon.
- December 14 Commissioners held their first meeting in the new office.

1977/78

Work completed on the improved water supply to Lara.

1978

- Government announced a Parliamentary Public Works Committee investigation into use of Gellibrand water. The work was later taken over by the Natural Resources and Environment Committee (NREC).
Trust approved construction of pipeline between Wurdee Boluc and Pettavel to replace open channels.
- June Appeal Board’s decision on the trust appeal against the Environment Protection Authority licence gave the trust more time to meet stricter discharge requirements and complete a detailed study to ascertain the best disposal system.

<i>June 28</i>	First 10-year program for all the trust's water supply and sewerage work presented to commissioners.
<i>August</i>	Trust and the Geelong Regional Commission jointly engaged consulting engineers to carry out preliminary study into management of the Barwon River.
<i>September 19</i>	Trust's laboratory granted registration by the National Association of Testing Authorities, Australia.
<i>October</i>	Initial meeting held with SR&WSC to discuss past investigations and future proposals for development of the Gellibrand River to augment Geelong's water supply.
<i>November</i>	Construction of the fluoridation plant at She Oaks commenced.
<i>November 20</i>	Barwon River extensively flooded.
<i>December</i>	Report on ground water at Barwon Downs commissioned by the trust.
<i>December 15</i>	Water first flowed through the Bellarine supplementary main.

1978/79

Stage I of the Bellarine pipeline augmentation from Marshalltown Road to Ghazeepore Road completed.

Investigations carried out into possible dam sites and groundwater resources in the Gellibrand River catchment.

Parliamentary Public Works Committee opened an inquiry into proposals for use of the water resources of the Gellibrand River system.

1979

	Geelong Regional Commission engaged consultants to conduct a preliminary study into Barwon river management.
<i>January</i>	Publicity brochure issued to inform the public of the aims of the Black Rock outfall study.
<i>January</i>	Fluoridation building at Anakie completed.
<i>January</i>	SR&WSC called a meeting of interested municipalities and government departments with a view to initiating a comprehensive study of Barwon River floods at Geelong.
<i>June 26</i>	Trust reconstituted to include a commissioner for part of the City of South Barwon and Shire of Bellarine.
<i>August</i>	Parliamentary Public Works Committee held hearings into the Gellibrand River development. SR&WSC studies followed.
<i>September</i>	Trust approved development of the Barwon Downs groundwater project.
<i>November</i>	Final report of the Board of Review on the Role, Structure and Administration of Local Government in Victoria, including recommendation that water and sewerage services should be handled by local governments.
<i>December</i>	Consultant report received on preliminary study of Barwon River water management.
<i>December</i>	Government approved the Barwon Downs Groundwater Project.

1980

January	Permission given for fluoride trials at Anakie. The tests were subsequently completed.
March	Trust approved the proposal to sewer Lara.
March 18	Assent given to establishment of the Public Bodies Review Committee; the trust was to be included in the review.
April 13	Trust, Environment Protection Authority and others met with the government to discuss funding options for works needed to bring the output at Black Rock up to EPA standards.
May 28	Trust resolved to approach the State Government for financial assistance in work to meet Environment Protection Authority requirements.
May 28	Death of Brian Henshaw, Secretary since September, 1947.
October	Trust resolved to proceed with stage one of the Barwon Downs groundwater project.
October 17	Lara sewerage scheme construction commenced.
December	Trust decided to formally approach the SR&WSC to take over the Bellarine Peninsula water supply system.

1981

March	Joint Steering Committee established to study the feasibility of transferring the Bellarine Peninsula water supply to the trust.
August 1	Environment Protection Authority issued amended licence for Black Rock ocean outfall, requiring the project to be constructed in two stages by June, 1985.
December	Sixth Report of the Public Bodies Review Committee, Final Recommendations on the Future Structures for Water Management tabled in Parliament. It was a blueprint for change in Victoria's water industry.

1982

	Trust decided to introduce an eight-stage water restriction system.
February	First groundwater production bore began flowing.
June 28	Barwon River Management Study data collection program commenced.
August	Maintenance and trade workshops at South Geelong first stage project completed.
September	Wurdee Boluc-Pettavel pipeline completed.
September	Joint Steering Committee on transfer of Bellarine Peninsula water supply system transfer presented its report.
September 10	Trust imposes stage three water restrictions.
October	First public relations officer appointed.
November 12	Trust imposes harsher stage four water restrictions.

1983

	Trust introduced a 24-hour shift roster to cope with growing number of maintenance calls.
	New office block constructed at South Geelong depot, completed around December.
	Investigation commenced into ocean outfall sewer.
<i>January 1</i>	Lara sewerage scheme stage one brought into operation.
<i>January 25</i>	Commissioners and officers met in the Telegraph Office, Ryrie Street, to mark the 75th year of the trust's operations.
<i>February</i>	Government agreed to the proposal to transfer the Bellarine Peninsula water supply system to the trust.
<i>February</i>	Groundwater from Barwon Downs flowed into the system for the first time, the urgency due to severe drought.
<i>March</i>	Education program, 'A Good Turn for Geelong', launched.
<i>March 29</i>	Water Structures Implementation Group recommended the creation of a Geelong and District Water Board to assume the responsibilities of the trust and other authorities.
<i>April 29</i>	Water restrictions reduced.
<i>May</i>	Public Bodies Review Committee eighth report recommended that the Geelong Regional Water Board assume much wider responsibilities.
<i>June</i>	Len Spitty retired as Secretary. Bob Jordan appointed the new Secretary.
<i>June 8</i>	Water restrictions lifted.
<i>September</i>	Government abolished 70 water and sewerage bodies through mergers.
<i>October</i>	Board adopted consultant report on Barwon River management.
<i>December</i>	Lara sewerage scheme completed.

1984

	Board developed a water quality strategy.
	NREC Report on water strategy for south west Victoria received.
	Consultants engaged to investigate possible dam sites on the upper tributaries of the Barwon River early in the year.
<i>January 1</i>	Part of Little River township in the Shire of Corio transferred to the trust from the Little River Waterworks Trust.
<i>March 30</i>	Lara sewerage scheme declared officially open.
<i>April</i>	Fourteen wages employees retrenched due to downturn in works program, a further five retired on medical grounds.
<i>June 30</i>	Geelong Waterworks and Sewerage Trust ceased to exist.
<i>July 1</i>	Geelong and District Water Board incorporates the former trust.
<i>July 1</i>	SR&WSC dissolved and Rural Water Commission established.
<i>July 11</i>	First meeting of interim board held.
<i>August</i>	Barwon Downs groundwater project reached practical completion.
<i>October 1</i>	Board incorporated the former Anglesea, Torquay, Barwon Heads and Queenscliff sewerage authorities.
<i>December</i>	Water quality strategy report presented to the board.

1985

<i>January 1</i>	Bell Post Hill service basin taken out of service around this time. Board incorporates the Winchelsea Waterworks Trust and Sewerage Authority.
<i>March</i>	South Western Region Water Management Strategy task force convened by the Department of Water Resources.
<i>April</i>	Barwon Downs groundwater project commissioned.
<i>May 25</i>	First election for board members, the first compulsory adult franchise election for a water authority in Victoria.
<i>July</i>	Black Rock sewerage development project approval to proceed obtained from the Environment Protection Authority.
<i>October 1</i>	Winchelsea Sewerage Authority and Waterworks Trust merged with the board.
<i>October 1</i>	Bellarine Sewerage Authority amalgamated with the board.
<i>November</i>	Board approved introduction of a telemetry system.

1986

	Water & Sewerage Authorities (Annual Reporting) Regulations provide that 14 mandatory performance indicators be published in annual reports. Board decided to open Bostock Reservoir for public recreational use.
<i>January</i>	Board resolved that the enlargement of Wurdee Boluc Reservoir should be the next headworks augmentation project.
<i>April 4</i>	Barwon Downs groundwater project officially opened.
<i>June</i>	Regular employee newsletter initiated.
<i>July</i>	Union placed bans on the operation of fluoridation plants.
<i>October</i>	Old aqueduct recognised for its heritage value, classified by the National Trust in 1987 and later added to the register of Victorian Heritage Places.
<i>October</i>	NREC second report issued. Recommended the board enlarge Wurdee Boluc Reservoir.

1987

	Board began considering a volume-based charge rather than traditional rates charges, began computer modelling in 1989. Drysedale/Clifton Springs connected to the sewerage system.
<i>February 11</i>	Formal government approval received for the Wurdee Boluc enlargement project.
<i>April</i>	New electronic data processing division commenced operations.
<i>April 2</i>	Black Rock ocean outfall sewer 1.2 kilometre pipeline successfully towed into position.
<i>May</i>	Board decided to add a floor to the office at the South Geelong depot.
<i>July 22</i>	Drysedale/Clifton Springs sewerage system officially opened.
<i>September</i>	Corporate Planning Group established to define corporate objectives and develop strategies to meet those objectives.
<i>October</i>	Black Rock ocean outfall sewer contract completed.

1988

	Board decided to issue uniforms to office staff who dealt regularly with the public. Chairman Whiteside presented the board with a plan for beautification of north river bank where industries had previously stood.
<i>March</i>	Automated meter-reading system introduced.
<i>April</i>	Water testing extended to domestic water supply by installing sampling taps on the supplies of selected houses around Geelong.
<i>May 28</i>	Second triennial board election held.
<i>June</i>	Draft South Western Region Water Management Strategy released for public comment.
<i>July 1</i>	Bannockburn Water Trust merged with GDWB.
<i>December</i>	NREC released a preliminary report and draft recommendations on the South Western Region Water Management Strategy

1988/89

Winchelsea pumping station, supply main and tank constructed.

1989

	Board began investigating ways to meet sewerage demands at Anglesea. Board initiated a comprehensive strategic review of its wastewater and disposal arrangements early in the year.
<i>February</i>	Sewage treatment plant at Black Rock commissioned.
<i>February</i>	Board adopted a technical computing strategy. Approval given for stage two in October, 1990.
<i>March</i>	Meter readers began using electronic data recorders.
<i>October</i>	Public Relations re-named Community Relations.
<i>November</i>	NREC presented its final report on the South Western Region Water Management Strategy.
<i>November</i>	Escorted bus tours of board facilities for the general public commenced.

1990

	Australia Post became a collection agency for rate payments. Government adopts Water Resources Management Strategy for South Western Victoria.
<i>January</i>	Winchelsea township water supply improved and commissioned.
<i>January</i>	Work started on construction of embankments for Wurdee Boluc Reservoir enlargement.
<i>March</i>	Board's primary school education kit launched.
<i>April</i>	First stage of technical computing strategy, installation and commissioning commenced.
<i>April</i>	Board resolved to proceed with project to replace ovoid sewer aqueduct.
<i>April</i>	Construction of Wurdee Boluc water treatment plant commenced.
<i>May</i>	Board convened a working party to report on the feasibility of land-based wastewater disposal at Anglesea.
<i>July 1</i>	Board commenced public consultation process about introduction of 'user pays' process for water rates.
<i>November</i>	Government adopted the South Western Region Water Management Strategy.
<i>December</i>	Bannockburn water system supply improvement commissioned.
<i>December</i>	Board adopted land disposal wastewater strategy for Anglesea.
<i>December</i>	Board decided to introduce volume-based water charging.
<i>December</i>	Draft report on the new treatment plant at Black Rock released for public comment.

1991

	Stan Lewis Walk vegetation restoration project a runner-up in the State Landcare Awards.
	Board adopted the WHO standard for water quality and Victorian Health Department’s regulations for sampling domestic water supplies.
	Trade Waste Users’ Group established.
	NREC third report recommends that the board develop its groundwater resources rather than construct a new reservoir.
January	Breakwater pump boosted syphon construction commenced.
March	Board approved recommendation to consolidate the operations of regional offices.
March	Black Rock emergency storage project, board approval granted for embankment construction.
March 13	Board adopted a Corporate Plan.
March 25	New Environment Protection Authority licence for the Black Rock wastewater treatment plant became effective.
April/May	Word processing/office automation software and workstations installed.
May	Approval granted to create a facilities information storage system to store and relate all graphical and textual information.
May	Final report from Wastewater Review consultants submitted to the board.
May 31	Wurdee Boluc Reservoir enlargement project completed.
July 1	Special Environment Protection levy introduced to meet higher cost of environmental standards, to run until June 30, 1996.
July 1	Board introduced a new ‘user pays’ tariff system for water supply, replacing the previous system based on property values.
August 19	New shop front office opened at the Drysdale shopping centre, replacing the Portarlinton and Ocean Grove offices.
September 13	Board adopted a wastewater strategy,
October	Third board elections held.
October	Water treatment plant at Wurdee Boluc began supplying treated water to most parts of Geelong.

1992

March 6	Water treatment plant at Wurdee Boluc officially opened.
April 29	New laboratory completed, fully operational by end of June.
May	Board decided to introduce volume-based sewerage charging.
July 1	On-line purchasing system introduced to streamline purchasing activities
November	Board decided to upgrade Anglesea wastewater treatment plant.
December	Wal Whiteside retired as Chairman, Don Golightly appointed acting Chairman pending appointment of new Chairman.

1993

	Waterwatch launched in the Barwon region.
	City of Greater Geelong created out of the existing municipal governments.
	Board declared a public authority and required to pay the government a public authority dividend.
	Dam safety and surveillance program implemented.
<i>January 1</i>	'User pays' tariff system introduced for domestic wastewater.
<i>March 31</i>	Wal Whiteside Walk river reserve opened.
<i>April</i>	Tariff assistance and relief widened to include pensioner health care cards.
<i>April</i>	Training commenced on the Property & Facilities Information System (ProFIS).
<i>April</i>	Board's Statement of Vision and Values completed and adopted.
<i>June</i>	Construction commenced on small water treatment plant for Meredith and nearby towns, completed in October.
<i>June 30</i>	Frank De Stefano appointed Chairman.
<i>October</i>	Meredith water treatment plant commissioned.
<i>November</i>	First Drought Response Plan prepared.
<i>December</i>	Government announces new water policy and that the board would be reconstituted on February 1, 1994.

1994

	Board embarked on a three-year program to improve public facilities at West Barwon Reservoir.
	Water strategy adopted.
	Torquay transfer main constructed to replace Torquay channel.
<i>February 1</i>	Geelong and District Water Board reconstituted as the Barwon Region Water Authority (Barwon Water).
<i>February 9</i>	Barwon Water board held its first meeting.
<i>March</i>	Yollinko wetlands project on Barwon river launched.
<i>March</i>	Black Rock sewage treatment plant upgrade commenced.
<i>March</i>	New computer-operated workflow system for processing information statements introduced.
<i>April</i>	Three-year tariff freeze introduced.
<i>April</i>	Shop front office opened in Torquay.
<i>April 13</i>	Dennis Brockenshire announced as new Chief Executive of the authority.
<i>May 12</i>	Barwon Water Enterprise Bargaining Agreement ratified, the first in the water industry in Victoria.
<i>May</i>	Board adopted a charter for sustainable development as a minimum standard for its forthcoming environmental policy.
<i>June</i>	Picnic area at West Barwon named the Len Sprague Reserve.
<i>June</i>	Dennis Brockenshire takes over from Geoff Vines as Chief Executive.
<i>September</i>	Discussion paper 'Geelong's Trunk Sewers – The Next 25 Years and Beyond' released for public comment.
<i>October</i>	Water strategy launched.
<i>December</i>	Quality policy adopted by the board.

1995

	Initial Corporate Strategy developed.
February	Stony Creek Reservoir specially opened for inland fishing event for the World Police and Fire Games.
March	Launch of Executive Account Management Program to facilitate closer working links with major customers.
March	West Moorabool Water Board abolished.
May	First meeting of committee formed to jointly manage Lal Lal Reservoir with Central Highlands Water.
May 19	Anglesea sewage treatment plant upgrade completed, commissioning took place on May 24.
August	Internal auditor appointed to report to the audit committee.
August	Barwon Water released its three-year Corporate Strategy.
October	Aireys Inlet and Fairhaven sewerage system officially opened.
November	Severe flooding of the Barwon River, one of the worst on record.
December	Government issued Barwon Water bulk entitlement orders, setting annual entitlements.

1996

	Barwon Water launched its website.
	Barwon Water won a Landcare Award for its work on the Wal Whiteside Walk.
February 12	New Enterprise Bargaining Agreement became effective.
March	Environment strategy released.
April 4	First meeting of Barwon Water Customer Consultative Committee.
June 21	Public announcement of a water quality improvement program and levy of \$49 from July 1 to raise \$25 million over coming five years. It was centred on a new water treatment project for the Moorabool system.
June 30	Special Environment Protection Levy withdrawn after five years.
July	Introduction of full cost-recovery for trade waste, to be phased in over three years
August	Black Rock sewage treatment plant handed over to Barwon Water after 29 months' construction program.
September 3	Anglesea sewage treatment plant officially opened.
December	Government requested a number of water authorities to investigate the benefits of amalgamation with neighbouring authorities.
December 2	New process implemented allowing developers and their consultants to plan, design and construct sewerage and water mains for new subdivisions and extensions.

1996/97

- Customer Charter launched.
- Barwon River User Group established.
- Human Resources policies, training and development plan and a new employee development plan introduced.
- Official opening of sewage treatment plant at Anglesea.

1997

<i>March</i>	Flexible customer information system introduced enhanced billing services.
<i>April</i>	Due to drought conditions, Barwon Water began using its water entitlements from the Lal Lal Reservoir.
<i>April 21</i>	Black Rock sewage treatment plant officially opened.
<i>May</i>	Barwon Water achieved certification of the Quality Management System to AS/NZ ISO 9001.
<i>June</i>	Bannockburn sewerage scheme construction commenced.
<i>June 18</i>	Discussions held between Barwon Water and Otway Region Water Authority over possible merger.
<i>August 19</i>	Peak of protest against Bannockburn sewage treatment plant construction. It lasted until September 4 when a compromise reached between some protesters and Barwon Water.
<i>October</i>	Premier announced a \$140 million contribution to non-metropolitan urban water authorities to reduce debt and accelerate capital works for water.

1997/98

New account payment methods introduced, including 24-hour telephone payments using credit cards.
Fully automated water treatment plants constructed at Forrest and Birregurra.
Barwon Water's Waterwatch education kit launched.

1998

	Barwon Water awarded the Australian Water and Wastewater Association Occupational Health and Safety Award.
<i>January</i>	Barwon Water's first commercial water re-use project commenced with a Torquay flower producer.
<i>January 30</i>	Stage one water restrictions introduced.
<i>May 29</i>	Bannockburn sewage treatment plant commissioned.
<i>June</i>	Barwon Water launched the Barwon River Environment Trail education kit at the Geelong Environment Expo.
<i>June 29</i>	Barwon Water's third Enterprise Bargaining Agreement successfully finalised.
<i>July</i>	Barwon Water began offering glass water bottles to local restaurateurs and publicans.
<i>November</i>	Barwon Water achieved certification of Environment Management Systems to ISO 14001.
<i>December</i>	Lorne and Apollo Bay sewage treatment plants commissioned.

1998/99

Barwon Water launched a new-look internet site focusing on providing accessible information on all areas of its activity.

1999

	Barwon Water's inscribed stock register transferred to the government.
January	First edition of a new, full-colour, biannual newsletter mailed to customers with their accounts.
January 1	Quarterly billing introduced.
February	Feasibility field tests using reclaimed water began on a potato trial research.
March	Construction commenced on a wet weather retarding facility in northern Geelong, the first stage in the trunk sewer strategy.
March	Long-term partnership announced to supply reclaimed water to vineyard at Drysdale.
April	Barwon Water joined the Energy and Water Ombudsman (Victoria) Scheme.
July 1	Responsibility for Barwon River waterway management transferred to Corangamite Catchment Management Authority. Barwon Water continued with operational management of the waterway through Geelong.
December 12	Stage two water restrictions introduced.

1999/2000

Barwon Water attained SafetyMAP Advanced Level certification for its safety management system.

2000

March	North Geelong sewage retarding facility completed and commissioned in June.
May 1	Frank De Stefano resigned from Barwon Water Board. Harry Peeters appointed Chairman.
June	Northern flow retarding facility commissioned.
June	Multi-media educational kit for secondary schools produced.
September	Staff performance and development plan implemented.
September	Reserve at the entrance of the Stony Creek reservoirs named Jack Dillon Reserve.
October	Government announced appointments to new Board, with Stephen Vaughan Chairman.
October	Barwon Water launched the first phase of the process to develop its Water Resource Development Plan.
November	Stage two restrictions eased to stage one.
November	Report on possibility of developing high value green industries using reclaimed water presented to the government.

2000/2001

Barwon Water introduced marketing service to promote water conservation.
Barwon Water adopted the "Triple Bottom Line" in its reporting.
\$2.5 million upgrade and expansion of telemetry system completed.
Anakie water supply completed.
Apollo Bay water treatment plan brought into operation.
Bellarine Peninsula water supply upgrade pipeline from Grovedale to Leopold construction commenced.
Anglesea transfer main completed.

2001

<i>February</i>	Stage two restrictions imposed at Apollo Bay, Skenes Creek and Marengo, increased to stage four in March, reduced to stage two in April and lifted at the end of June.
<i>June</i>	Barwon Water established an Environmental Consultative Committee.
<i>July 1</i>	Water restrictions lifted after 41 months.
<i>August</i>	Ocean Grove sewer main replacement community information program conducted, followed by other community liaison activities.
<i>August</i>	Option Paper released as part of the development of the Water Resources Development Plan.
<i>September</i>	Recycled water agreement signed with the Barwon Heads Golf Club.
<i>September</i>	Bellarine transfer main commissioned.
<i>October</i>	Skenes Creek sewerage scheme approved.
<i>November</i>	Comprehensive sewerage strategy released.
<i>November</i>	Stage one water restrictions announced for Apollo Bay, Skenes Creek and Marengo.

2002

<i>January</i>	Inaugural Environmental Performance Report released.
<i>February</i>	Commencement of work to replace the ovoid sewer between Geelong racecourse and Marshall.
<i>March</i>	Discussions between Barwon Water and major developers following review of developer charges.
<i>March</i>	Draft Water Resources Development Plan released for public comment.
<i>April 25</i>	Barwon Water's Barwon Bulk Entitlement Conversion Order approved.
<i>May</i>	Water restrictions in Apollo Bay, Marengo and Skenes Creek lifted.
<i>June</i>	Colac office relocated following sale of its property to the Corangamite Catchment Management Authority.
<i>June</i>	An easy-call single telephone number introduced for all customer enquiries.
<i>August</i>	Draft Water Resources Development Plan released and received more than 277 submissions.
<i>September</i>	Board approved major augmentation of the water supply system serving Apollo Bay, Marengo and Skenes Creek.
<i>November</i>	Barwon Water and Barwon Heads Golf Club entered an 18-year recycled water agreement.
<i>November</i>	Stage one of ovoid sewer replacement completed.
<i>December</i>	Recycled water partnership between Barwon Water and tomato producers announced.
<i>December</i>	Stage one water restrictions introduced in Apollo Bay, Skenes Creek and Marengo.
<i>December</i>	Contracts worth more than \$11 million awarded for the construction of the new Colac sewage treatment plant.

2003

January	Apollo Bay water restrictions ungraded to stage two.
January	Victoria's first water conservation by-law launched by the government.
January	\$2.5 million Avalon and Little River water supply improvement project completed.
January	Former CE Geoff Vines honoured with the Wurdee Boluc Reservoir's public area named the Geoff Vines Reserve.
March	Barwon Water's Water Resource Development Plan as released to the public.
March	Third Corporate Strategy launched.
March	Water Resources Development Plan released.
April	Apollo Bay water restrictions removed.
September 24	Sharland Park at the old Bell Post Hill service basin dedicated.

APPENDIX II

OUR PEOPLE

GEELONG MUNICIPAL WATER WORKS TRUST, 1908–1910
 GEELONG WATERWORKS AND SEWERAGE TRUST, 1910–1984
 GEELONG AND DISTRICT WATER BOARD, 1984–1993
 BARWON REGION WATER AUTHORITY, 1993–2003

CHAIRMEN

Isaac George Hodges	January 1908 to September 1928
John Patrick McCabe Doyle	October 1928 to September 1941
Alan Belcher	October 1941 to October 1945
Neil MacKenzie Freeman	October 1945 to October 1946
George Alexander Cameron	October 1946 to October 1947
John Wilfred Carr	October 1947 to October 1948
George Nuenhoffer	October 1948 to October 1949
Frederick Hilton Wallace	October 1949 to September 1950
John Wilfred Carr	September 1950 to September 1971
Raymond Wallace Whiteside	September 1971 to December 1992
Donald William Golightly (Acting)	January 1993 to June 1993
Frank De Stefano	July 1993 to May 2000
Harry Francis Peeters	May 2000 to September 2000
Stephen Vaughan	September 2000 –

COMMISSIONERS AND BOARD MEMBERS

Isaac George Hodges

–*Brewer*

Appointed by Corporation of Geelong January 1908. Elected 31 March 1910. Re-elected every second year from 1912 to 1926. Defeated at election 1 October 1928 by Alan Belcher. Chairman from 25 January 1908 to 30 September 1928



John Patrick McCabe Doyle

– *Barrister and solicitor*

Appointed by Corporation of Geelong January 1908. Elected 31 March 1910. Re-elected every second year from October 1911 to October 1939. Died in office 22 September 1941. Elected Chairman 3 October 1928. Re-elected Chairman annually from October 1929 to October 1940.



Henry Blomfield **Brown**

– *Auctioneer*

Appointed by Borough of Newtown & Chilwell January 1908.
Defeated at election 31 March 1910 by John Small.



Henry Frederick **Christopher**

– *Works manager*

Appointed by Borough of Geelong West. Elected 31 March 1910. Re-elected every second year from 1912 to 1926. Defeated at election 1 October 1928 by F H Burn. Died 17 February 1941.



Hugh Mann **Sutherland**

– *Grazier*

Appointed by Shires of Bellarine, Corio and South Barwon. Elected 31 March 1910. Re-elected 1 October 1914. Retired, did not seek re-election 1 October 1914.



John **Small**

– *Doctor*

Elected 31 March 1910, defeating H B Brown. Re-elected 1911, 1913 and 1915. Died 9 January 1916 before term expired.



William **Rulgin Wilton**

– *Orchardist*

Elected 1 October 1914. Re-elected 1916 to 1936. Retired, did not seek re-election (withdrew nominations, notice of retirement lodged after close of nominations). Died 31 May 1944.



Jacob Cairns

– *Plumber*

Elected by Council of Borough of Newtown and Chilwell for unexpired period of Small's term from 26 January 1916. Re-elected 1 October 1917 to 1927. Defeated at election 1 October 1929 by James Gill.



Alan Belcher

– *Auctioneer and estate agent*

Elected 1 October 1928, defeated Isaac Hodges. Re-elected 1930 to 1940. (Term extended for one year in 1942 National Security Regulations) Re-elected 1943. Defeated at election 25 September 1945 by Wallace. Elected Chairman 27 September 1941 for balance of year. Elected Chairman October 1941 to 1944.



Frederick Herbert Burn

– *Contractor*

Elected 1 October 1928. Re-elected 1930 to 1940. Term extended in 1942 for one year National Security Regulations. Re-elected 1943. Retired September 1945.



James Thomas Gill

– *Produce manager*

Elected 1 October 1929, defeated Jacob Cairns. Re-elected 1931 to 1935. Died 2 January 1936.



Neil MacKenzie Freeman

– *Barrister and solicitor*

Elected 29 January 1936 at extraordinary election to replace Cr Gill. Re-elected 1937 to 1961 (Term extended for one year National Security Regulations 1942). Died 7 November 1961. Elected Chairman 2 October 1945 for one year.



George Alexander Cameron

– *Farmer*

Elected 1 October 1938. Re-elected 1940 (Term extended for one year National Security Regulations 1942.) Re-elected 1943 to 1949. Defeated at election 25 September 1951 by R E Gorrell. Elected Chairman 25 October 1946 for one year.



John Wilfred Carr

– *Estate agent*

Elected at extraordinary election on death of Cr Doyle 22 September 1941. (Term extended for one year National Security Regulations 1942) Re-elected 1944 to 1948. Retired as elected Commissioner 1950. Appointed as Government Nominee Chairman 26 September 1950. Re-appointed 1954, 1956, 1960, 1964, 1968 and 1970 for one year.



George Nuenhoffer

– *Contractor*

Elected 1 October 1945. Re-elected 1947 to 1955. Defeated at election 29 September 1959 by R W Whiteside.



Frederick Hilton Wallace

– *Doctor*

Elected 1 October 1945, defeated Cr Belcher. Re-elected 1947 to 1955. Defeated at election 29 September 1959 by L W Sprague.



Burwin Ellis Purnell

– *Manufacturer*

Elected 26 September 1950 to fill vacancy due to government nomination of Cr Carr. Re-elected 1953 to 1957. Defeated at election 26 September 1961 by R H Robertson.



Arthur Sydney Thomson

– *Director*

Elected 26 September 1950, first independent for Corio Shire. Re-elected 1950 to 1969. Defeated at election 25 September 1973 by E G Mallett.



Roy Eric Gorrell

– *Master plumber*

Elected 25 September 1951. Re-elected 1955 to 1963. Defeated at election 26 September 1967 by J S Calvert.



Leonard William Sprague

– *Public accountant*

Elected 29 September 1959 defeated F K Wallace. Re-elected 1963 to 1983. Appointed to interim Board of Geelong & District Water Board (GDWB) 1 July 1984. Elected 25 May 1985. Re-elected 1988. Retired 12 October 1991.



Raymond Wallace Whiteside

– *Civil engineering contractor*

Elected 29 September 1959, defeated Cr Nuenhoffer. Re-elected 1963 to 1967. Appointed Government Nominee Chairman from 26 September 1971 to 31 December 1992



Ronald Hendry Robertson

– *Manufacturers' agent*

Elected 26 September 1961 defeated Cr Purnell. Re-elected 1965. Resigned December 1966.



Leonard Myer Jacobs

– *Retail store proprietor*

Elected 5 December 1961, extraordinary election following death of Cr Freeman. Re-elected 1865. Resigned 28 February 1969.



John Stephen Calvert

– *Solicitor*

Elected 26 September 1967, defeated R E Gorrell. Defeated at election 28 September 1971 by C R Bennett. Re-elected 30 September 1975, defeated Cr Bennett. Defeated at election 25 September 1979 by J R B Webster.



John Emmanuel Lakis

– *Engineer*

Elected 25 March 1969, extraordinary election following resignation of Cr Jacobs. Defeated at election 30 September 1969 by A H S Foster.



Arnold Henry Scott Foster

– *Master painter*

Elected 30 September 1969, defeated Cr Lakis. Re-elected 1973 to 1981. Appointed to interim Board of GDWB 1 July 1984. Elected 25 May 1985. Re-elected 25 May 1988 and 12 October 1991. Retired 1 February upon formation of Barwon Regional Water Authority (BRWA).



Frank Charles Moore

– *Company director*

Elected 28 September 1971. Re-elected 1975 and 1979. Retired 27 September 1983, replaced by Cr Walker.



Charles Raymond **Bennett**

– *Newsagency proprietor*

Elected 28 September 1971, defeated Cr Calvert. Defeated at election 1975 by J A Calvert.



Edwin Gardiner **Mallett**

– *Business proprietor*

Elected 25 September 1973, defeated A S Thompson. Re-elected 1977. Resigned 1980.



James Robert Bruce **Webster**

– *Engineer*

Elected 25 September 1979. Re-elected 1983. Appointed to Interim Board of GDWB 1 July 1984. Elected 25 May 1985, 28 May 1988 & 12 October 1991. Retired 1 February 1994 on formation of BRWA.



James Joseph **Jordan**

– *Retired*

Elected 25 September 1979. Re-elected 1981. Appointed to interim Board of GDWB 1 July 1984. Elected 25 May 1985. Defeated at election 28 May 1988.



Peter **Lang**

– *Fire officer*

Elected 7 December 1980, extraordinary election following resignation of Cr Mallett. Re-elected 1981. Appointed to interim Board of GDWB 1 July 1984. Defeated at election 25 May 1985.



Francis Ian Walker*– Business proprietor*

Elected 29 September 1983. Appointed to interim Board of GDWB 1 July 1984. Resigned 23 January 1985.

**Archibald Lawrence Dean***– Insurance agent*

Appointed to interim Board of GDWB 1 July 1984. Defeated at election 25 May 1985.

**John William Caldow***– Farmer*

Appointed to interim Board of GDWB 1 July 1984. Elected 25 May 1985. Retired at election 28 May 1988.

**Donald William Golightly***– Business proprietor*

Appointed to interim Board of GDWB 1 July 1984 representing Queenscliffe SA. Elected 25 May 1985. Re-elected 28 May 1988 and 12 October 1991. Appointed Acting Chairman January to July 1993. Retired 1 February 1994 on formation of BRWA.

**Robert Wood Pettitt***– Farmer*

Appointed to interim Board of GDWB 1 July 1984 representing Torquay SA. Did not seek election to Board 25 May 1985.



Leonard Reginald Newman

– Retired

Appointed to interim Board of GDWB 1 July 1984 representing Anglesea SA. Did not seek election to Board 25 May 1985.



Ian Walter Bennett

– Computer consultant

Elected 25 May 1985. Defeated at election 28 May 1988.



Norman Ellis Boyce

– Retired

Elected 25 May 1985. Re-elected 28 May 1988 and 12 October 1991. Retired 1 February 1994 upon formation of BRWA.



Jacob Halik

– Self-employed

Elected 28 May 1988. Retired 12 October 1991.



William Jones

– Retired teacher

Elected 28 May 1988. Defeated at election 12 October 1991.



Prescilla Ann Pescott*– Not in paid employment*

Elected 28 May 1988. Re-elected 12 October 1991. Appointed to Board 1 February 1994. Retired 31 January 1997.

**Harry Francis Peeters***– Police officer and management consultant*

Elected 12 October 1991. Appointed to Board 1 February 1994, re-appointed 1 February 1997, 28 February 1997 and September 2000. Chairman May 2000 – September 2000.

**Graeme Douglas Kelleher***– Self-employed*

Elected 12 October 1991. Appointed to Board 1 February 1994. Retired 31 January 1997.

**Peter Wenmoth Linaker***– Consultant*

Elected 12 October 1991. Resigned 1 February 1994 on formation of BRWA.

**Frank De Stefano***– Public accountant*

Appointed Government Nominee Chairman 1 July 1993. Appointed as Chairman 1 February 1994. Re-appointed 1 February 1997 and 28 February 1997. Resigned May 2000.



Robert James Riordan

– *Fuel retailer*

Appointed to Board 1 February 1994. Re-appointed 1 February 1997 and 28 February 1997. Retired 2000.



Ian Robert Inglis

– *Pharmacist*

Appointed to Board 1 February 1994. Re-appointed 1 February 1997 and 28 February 1997. Retired 2000.



Lawrence Rae Baker

– *Professor, School of Engineering*

Appointed to Board 1 February 1994. Re-appointed 1 February 1997 and 28 February 1997. Resigned 2000.



David John Fraser

– *Senior partner in law firm*

Appointed to Board 27 October 1997. Retired 2000.



Catherine Joyce Roth

– *Businesswoman and PR consultant*

Appointed to Board 27 October 1997. Retired 2000



George Neil Stewart

– *Company chairman*

Appointed to Board October 1997. Retired September 2000

**Stephen Vaughan**

– *Consultant physician*

Appointed to Board May 2000. Re-appointed September 2000. Chairman from September 2000.

**Helen Paatsch**

– *Teacher/librarian*

Appointed September 2000. Retired September 2003.

**Tim Orton**

– *Managing director*

Appointed September 2000 –

**Heather Wellington**

– *Lawyer and medical practitioner*

Appointed September 2000.



Julie Hansen

– *Pharmacist*

Appointed September 2000.



David Withington

– *Managing director*

Appointed October 2000. Retired September 2003.



Roger Lowrey

– *Industrial officer*

Appointed October 2003.



John McDonald

– *Licensed surveyor, retired.*

Appointed October 2003.



PRINCIPAL OFFICERS/EXECUTIVE TEAM

(This list is somewhat incomplete due to the absence of GWST Annual Reports from 1915 to 1964. Where possible, information has been drawn from the trust staff register that ran from 1908 to 1964.

James Sutherland Sharland

Secretary and Engineer for Water Supply 1908 - 1917

Engineer-in-Chief July 1917 - 1935



Philip G Reilly

Accountant 1908 - 1917

Secretary 1917 - 1947



Robert T McKay

Chief Engineer for Sewerage 1911 - 1917

Richard H G Pearce

Engineer-in-Chief 1935 - 1950



Brian C Henshaw

Secretary and Treasurer 1947- 1980



Alan W Cooke

Assistant Engineer-in-Chief 1950 - 1957

Deputy Engineer-in Chief 1957 -

Deputy Engineer-in-Chief and Chief Engineer for Sewerage
1965-1973

Engineer-in-Chief 1973-1974



John M Macintyre

Engineer-in-Chief 1950 - 1972



Archibald Leitch

Chief Engineer for Water September 1961 - 1973

Chief Engineer Investigation & Design 1973 - 1975

Chief Engineer Operations 1975 - 1979



Leonard C Spitty

Assistant Accountant - February 1954 - December 1959

Accountant - December 1959 -

Assistant Secretary 1962-1979

Secretary and Treasurer 1980-83



Paul S Kavanagh

Assistant Treasurer 1962 – 1977

**Victor Seitz**

Senior Construction Engineer 1962 – 1973

G J G (Geoffrey) Vines

Senior Design Engineer, Sewerage 1965 – 1973

Chief Engineer Operations and Maintenance 1973 – 1975

Engineer-in-Chief 1975 – 1987

Chief Executive Officer 1983 – 1994

**Lindsay H Vernon**

Senior Design Engineer 1956 –

Senior Design Engineer, Water 1965 – 1969

John F Powers

Senior Design Engineer 1955 –

Senior Design Engineer, Electrical/Mechanical 1969 – 1973

Senior Electrical/Mechanical Engineer 1973 – 1975

Geoffrey N Earp

Senior Design Engineer, Water 1969 – 1973

Senior Design Engineer 1973 – 1975

Chief Engineer Investigation and Design 1975 – 1986



Michael J McCoy

Senior Construction Engineer 1973 - 1975
Chief Engineer Operations 1979 - 1987
Manager Engineering Development 1987 - 1989
Executive Manager, Engineering Development Division 1989-1995
Executive Manager, Water Systems 1995-2001



George H Batty

Assistant Treasurer 1978 - 1979
Manager Administration 1980 - 1986



Robert A Jordan

Manager Finance 1980 - 1983
Secretary 1983 - 1987
Manager Corporate Services and Secretary to the Board 1987 - 1989
Executive Manager, Corporate Services Division & Secretary 1989 - 1995
Executive Manager, Business Performance/Secretariat 1995 - 1999



Ian G Zierk

Manager Finance 1983 - 1989
Executive Manager, Finance Division 1989 - 1995



John B Graham

Manager Engineering Operations 1987 - 1995
Executive Manager, Resources Development 1995 - 1999
Executive Manager, Customer Services 1999 - 2000



Joe J Adamski

Manager EDP 1987 - 1989

Manager, Information System Division 1989 - 1991

Executive Manager, Information System Division 1991 - 1995

Executive Manager, Corporate Strategy and Systems 1995 - 1999

Executive Manager, Strategy and Technology 1999-

**Dennis B Brockenshire**

Chief Executive Officer 1994-

**Grant V Green**

Executive Manager, Customer Services 1995 - 1998

Executive Manager, Business Performance/Secretariat 1998 - 2001

Executive Manager, Customer Services/Board Secretary 2001 -

**Michael A Watson**

Manager Finance 1995 - 2000

Executive Manager, Business Performance 2001 -

**Carl F Bicknell**

Manager, Strategic Planning 1995 - 2000

Manager, Sewerage Operations 2000 - 2001

Executive Manager, Water Systems 2001-



TRUST, BOARD AND AUTHORITY EMPLOYEES

Following is a list of the people who have worked for Barwon Water and its predecessors since it was established in 1908. It is possible there are a number of omissions that may have occurred when record systems were changed from the original staff register and wages employees cards to other record keeping systems.

Abbott, William, H	Arigo, Nicola,	Bates, Frederick, W
Abson, Philip,	Arnold, Craig,	Bath, Jillian, M
Adamski, Joseph, J	Arnott, John, F	Batty, George,
Adamson, Wilfred, H	Ashton, Peter, H	Batty, George, H
Adornetto, Frank,	Asplin, David, W	Baycan, Serhat,
Adornetto, Phillipo,	Astill, Julie, A	Beath, D,
Aherne, Robert, C	Atkinson, T,	Beattie, Barbara, L
Aickin, Jill,	Atkinson, William, G	Beatty, Natalie, J
Aiezza, Mechele,	Attwood, M,	Beck, Alan,
Aiezza, Pasquale,	Backwell, Anthony, G	Beck, Peter, C
Ainsworth, Dudley, J	Backwell, Betty,	Beckley, Patricia, M
Ainsworth, Wendy,	Backwell, Colin, L	Beckwith, Nigel, W
Ainsworth, William, L	Bailey, Geoff,	Beckworth, John, S
Aitcheson, Thomas, J	Baine, Tammy,	Beckworth, Kenneth, R
Aitkenhead, Steven, C	Baird, Clarence, H	Beckworth, Raymond, L
Alderdice, J,	Bajric, Alija,	Beggs, Damian, J
Allen, Glenda, R	Baker, Darroch, T	Beggs, Owen,
Allen, Margaret,	Balding, Jessica, J	Beggs, Samuel, J
Allen, Robert, J	Ball, David,	Bell, G,
Almond, G, D	Ball, Gordon, R	Bell, John, D
Althoff, George, E	Ball, L,	Bell, Peter, J
Altoft, Minnie,	Ballantyne, Susanne, P	Bell, Robert, W
Amatnieks, Anna,	Ban Ho, Andy,	Bell, William, G
Ambrus, Michael, G	Barber, Betty, J	Bennett, Geoffrey,
Anderson, Danielle, M	Barber, Robert, G	Bennett, Joseph,
Anderson, Darren, D	Barby, Charles, E	Bennett, Pam,
Anderson, James, L	Bargerbos, Gerrit,	Bennett, Stanley, T
Anderson, Kellie, A	Barker, Douglas,	Benson, Charles, A
Anderson, Kenneth,	Barker, Kirsty,	Benson, Raymond, B
Anderson, Leslie, J	Barker, Lyle, R	Benson, William, G
Anderson, Rachele, T	Barker, R,	Benson, William, N
Anderson, William, C	Barkley, David, S	Berger, Hans,
Andreacchio, Robert,	Barmby, Bryan, D	Berriman, Eric, W
Anglin, Alan, K	Barnes, Heather, J	Berry, Lawrence, V
Angus, Simon,	Barrett, Daniel,	Berry, Marion,
Anscombe, Shayne,	Barrett, Thomas,	Berry, Ronald, J
Antoff, Nickolas,	Barrow, Leslie, H	Bertucci, Anton,
Antonello, W,	Barry, William, A	Bertucci, Antonio,
Appelby, Albert, J	Bartlett, Cecil, R	Bertucci, Filippo,
Archer, Graeme, J	Bartlett, Daryl, W	Bertucci, Philip,
Archer, Kevin, J	Bartlett, William,	Betteridge, Samuel,
Archibald, Ian, R	Barton, Gavin, R	Betts, Donald,
Arigo, Nick,	Bates, Benjamin,	Betts, Paul, L

- Bicknell, Carl, F
 Biesse, John, F
 Biggs, Alfred, J
 Bill, Robert, W
 Birch, Catherine, J
 Birch, Keryn, L
 Birrell, Arthur, J
 Birrell, Stanley, W
 Biscan, Susana,
 Bishop, Craig, S
 Bishop, John, E
 Blacklaws, Geoffrey,
 Blackman, A,
 Blackshaw, Neil, L
 Blair, R,
 Blake, Herbert, H
 Blakemore, Norman, W
 Blanksby, L, H
 Blomeley, Walter, J
 Blumhoff, Roman, J
 Blyton, Melissa, G
 Boal, Rebecca, M
 Boddington, Tania, L
 Bodger, Glenys, A
 Boede, Diane, I
 Bolwell, Lynette,
 Bond, Daniel, P
 Bond, Harry,
 Bonser, Stanley, P
 Booth, C, J
 Booth, John, T
 Borgia, Chesie, D
 Borgia, Orazio, F
 Bos, Richard,
 Boseley, Grant, B
 Bottrell, Daryl, A
 Bouhof, Teena, T
 Bound, Ada, F
 Bound, James, R
 Bourke, Patrick, F
 Bowd, T,
 Bowdern, Carmel, A
 Bowey, Greg,
 Bowler, Norman,
 Boyd, Allan, H
 Boyd, Amanda,
 Boyd, L,
 Boyle, Karen, M
 Boyle, Rodney, J
 Boyle, Sally,
 Bradley, J,
 Bradley, Richard,
- Bradley, Richard, A
 Bradshaw, Daniel, L
 Brady, Andrew, N
 Brady, Edward,
 Branagh, Melissa, J
 Brearley, Kenneth,
 Breen, Charles, C
 Breen, Jeffrey, D
 Brennan, Julie,
 Brewin, Mrs,
 Bridgman, Daniel, F
 Britton, Daryl,
 Broadhead, Francis, J
 Brockenshire, Dennis, B
 Bromley, Bernadette,
 Brookes, Malcolm,
 Brookes, Peter, M
 Brooke-Ward, Edwin, G
 Brooks, Brian, J
 Broom, Brett, W
 Brough, Robert, J
 Brown, Laura, E
 Brown, Malcolm,
 Brown, Matthew, D
 Brown, Murray, L
 Brown, Peter, J
 Brown, Peter, R
 Brown, Phillipa, M
 Brown, R,
 Brown, Ronald, S
 Brownbill, Margaret, J
 Browne, Aaron, S
 Brownlee, Robert, G
 Brunacci, A,
 Brunt, Christopher,
 Bubb, William, H
 Buchan, Robert, A
 Buchanan, Barry, K
 Buchanan, Caroline, E
 Buckle, Laurence, N
 Budge, Heather, M
 Bull, Alan, A
 Buntine, John, M
 Burgess, George,
 Burke, Irene, J
 Burke, Paul,
 Burmeister, Jamie, R
 Burns, David, J
 Burns, Graeme,
 Burns, Rohan, K
 Burrows, Andrew, P
 Burt, Robert,
- Burt, Ross, W
 Bush, Cyril, J
 Bush, Maxwell, F
 Butcher, Allen, A
 Butcher, Robert, H
 Butcher, Seamus, L
 Buxey, Monika, V
 Byrne, Ian, P
 Byrnes, Peter, R
 Byron, Charles, J
 Cahill, Frederick,
 Cahill, Greg, J
 Cahill, James, A
 Cahill, James, F
 Cairns, Colin, J
 Cairns, Murray, J
 Caldow, Garry,
 Caldow, Ross, W
 Caldwell, J,
 Callanan, Thomas,
 Callaway, Thomas, A
 Cameron, Desmond,
 Cameron, Jeffrey, R
 Camp, G,
 Campana, Nicola, W
 Campbell, Douglas, W
 Campbell, Edward, W
 Campbell, Leslie, G
 Campbell, Malcolm, D
 Campbell, Ronald, R
 Campbell, Ross,
 Campigli, Wayne,
 Cannell, Andrea, J
 Canning, Darren, J
 Cannon, Jennifer, L
 Cantwell, Bryan,
 Capper, Herbert, S
 Cardinal, John, F
 Cardinal, Walter, P
 Carey, B,
 Carey, Kevin, J
 Carey, Thomas, B
 Carpenter, Robert, T
 Carroll, Albert, J
 Carroll, Andrew, J
 Carroll, Deborah,
 Carroll, Francis,
 Carroll, Frank,
 Carroll, John, L
 Carter, Benjamin, M
 Carter, Terence, F
 Cartwright, Arthur, C

- Caruso, Joe,
Casey, Scott,
Caspar, Robert, F
Castle, Noel, P
Cauchi, Melanie, J
Causon, Leslie, G
Chadwick, David, M
Chadwick, George,
Chadwick, Robert, J
Chalmers, Alison, W
Chalmers, Allan, M
Chalmers, Peter, M
Champion, Anthony, L
Chanter, Arthur, E
Chapman, L,
Chapman, Ramond, E
Chapman, Stephen, J
Charleson, Joanne,
Charteris, Brian, F
Charty, Kenneth, W
Chesterfield, John, C
Child, David,
Chillari, Angelo,
Chonka, Michael,
Churchill, Sharna,
Ciganovics, Joseph,
Clare, S,
Clark, Alan, G
Clark, Eric, W
Clark, Thomas, J
Clarke, Bradley, D
Clarke, Bradley, D
Clarke, Darren, J
Clarke, Graham, D
Clarke, Howard, V
Clarke, Joseph, W
Clarke, Maureen
Clayton, Charles, D
Clayton, John, H
Clegg, David, W
Clifford, Natalie, J
Clifford, Terence, P
Clinch, Anne, C
Clingan, Simon, A
Coates, Noel, E
Coates, Robert, M
Cochrane, Paula,
Coghill, Lyndal, J
Cole, Grant, J
Cole, Stuart, M
Colegrave, Darren, L
Colla, Victoria, G
Collett, Deidre,
Collins, Elizabeth, K
Collins, Stuart, J
Colombies, Luc, B
Comerford, Thomas,
Comyn, Bessie,
Conder, Allen, E
Condon, G,
Condon, Kerrie, L
Connell, Michael, W
Connolly, B,
Connor, Arthur, L
Connor, Clarence, J
Connor, Gerald, L
Connor, John, E
Conolan, Andrea,
Conroy, Francis, J
Considine, Robert, F
Cook, Glenda,
Cook, John,
Cook, Michael, T
Cooke, Alan, W
Cooke, Brian, D
Cooke, Maxwell, A
Cooper, Rosslyn, J
Coots, Ian, A
Coppi, Antonio,
Cosgrove, Leslie, J
Costello, Anthony,
Cotter, Archibald, S
Cotter, Harold,
Cotter, William, P
Cotton, Judith, S
Couchman, Cathy, L
Coulter, David,
Courtney, Ian, J
Coverdale, Allan,
Coverdale, Thomas, P
Cowley, R, J
Cranstoun, John, F
Creece, Paul, A
Creece, Robert, A
Creech, Geraldine,
Crocker, Ellen, L
Crocker, Roland,
Croll, Eric, A
Croll, Albert, H
Cromer, Raymond, J
Crumpton, Daniel, C
Culcheth, Bertram, A
Cullen, Nicholas, W
Cumming, Shaun, D
Cunningham, Adam, M
Cunningham, Joan, M
Curtis, Eilwyn, K
Curtis, Francis, M
Curtis, Peter, R
Daffy, Janelle,
Daher, Rober , G
Dalli, Emmanuel,
Damico, Nicola,
Dando, David, T
Dando, Wiliam, A
D'Angelo, Luigi,
Dangerfield, Kate, L
Daniel, Phylis, M
Darcy, Ivan, R
Dart, Janice, M
Davie, Dennis, J
Davis, Ian,
Davis, Leonard, R
Davis, Philip, J
Davis, S,
Dawes, Pamela, J
Dawson, Peter, G
Daymond, Maureen,
De Francesco, Salvatore,
De Man, Leender,
De Vries, Charles,
De Waal, Henk, A
Deakes, Brian, J
Dean, Gilbert, G
Deckys, Deborah, C
Deckys, Rudolph,
Degoldi, Pauline, M
Delange, Pamela,
Dell, Alfred, T
Della-Bosca, Peter,
Deller, Jennifer,
Dellpoppo, Guiseppe,
Dempster, George, J
Denham, Danny, H
Denny, Dene, H
D'Errico, Lisa, J
DeVere, Noel, F
Dew, D,
Dexter, Sandra,
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 Zuppín, Tania

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PRESIDENT

Henry Goodgame	1964
Michael Mahoney	1965 - 1975
Ron Podbury	1976 - 1978
Sandra Dunoon	1979
John Jackson	1980 - 1986
Daryl Rodda	1987
Ron Podbury	1988 - 1989
Mal Campbell	1990 - 1994
Rob Lyons	1995
Peter Brown	1996 - 1997
Grant Cole	1998 - 2000
Karen Taylor	2001 - 2004

TREASURER

Rodney/Ronald McKenzie	1964 - 1969
Dudley Ainsworth	1970 - 1975
Jean Pope	1976
Karen Wyld	1977
Leonie Shaw	1978
Susanne Ballantyne	1979
Bob Jordan	1980 - 1983
Peter Ashton	1984 - 1988
Lisa D'Errico	1989 - 1990
Andrew Nuske	1991 - 1992
Peter Willey	1993 - 1995
Craig Harper	1996 - 1998
David Greaves	1999 - 2001
Ann McGrath	2002 - 2003
Michael Ambrus	2004

SECRETARY

Alan Triscott	1964 - 1966
Alan Magher	1967 - 1968
Peter Woolcock	1969
Doug Stacey	1970 - 1975
Sandra Dunoon	1976
Jean Pope	1977 - 1979
Ann Kent	1980
Bob Jordan	1981 - 1982
Kerry Jaensch	1983
Daryl Rodda	1984 - 1986
Richard Greenhough	1987 - 1990
Julie Astill	1990
Kerrie Condon	1991 - 1993
Robyn McPhee	1994
Rachel Olney	1995 - 1996
Barbara Beattie	1997 - 1998
Ann McGrath	1999 - 2001
David Greaves	2002
Bern Smith	2003
Ann McGrath	2004
Karen Randall	2004

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Firth Cranstoun	1978
Alan Magher	1986
Bill MacDonald	1987
Ann Kent	1990
Kerrie Condon	1993
Harold Gibson	1994
Ron Podbury	1997
Bob Jordan	2000
Mike McCoy	2001

CONVERSION TABLES

All values given in this history are in the systems of measurement used at that time. Australia moved to decimal currency in 1966 and conversion to the metric system of measurement was phased in during the 1970s.

Volume

1 megalitres (1 million litres) = 220,000 gallons

1 gallon = 4.55 litres

1 million gallons = 4.54 megalitres

Length/distance

1 inch = 2.54 centimetres

1 foot = 30.5 centimetres

1 yard = 0.91 metres

1 mile = 1.61 kilometres

1 kilometre = 0.62 miles

Area

1 acre = 0.41 hectares

Weight

1 pound = 0.45 kilogram

1 ton = 1.02 tonnes

Currency

£1 = \$2

1/- = one shilling = 10 cents

1d = one penny = one cent

1/3 = one shilling and three pence = 13 cents

1/3 in the £ = 1 shilling and three pence in the pound = 13 cents in \$2

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The manuscript for this history was written with full referencing but the notes have been deleted from this book.

This is because the major sources used in the research for this history were internal Barwon Water records not available outside the authority. The main sources were the authority's minute books, cuttings books and annual reports and the reference notes are principally long, tedious lists of the sources and cutting dates that refer to material that cannot be accessed outside the authority.

Most of the older annual reports also are accessible only from within the authority, as are a wide range of additional miscellaneous documents and recordings of oral history interviews.

If anyone wishes to have access to the final manuscript version of the history which includes the references, they should contact the Barwon Water library, which also will be able to assist with access to most source documents.

The following bibliographic notes refer to more readily available sources for those who may be interested in the history of the water industry in Victoria and the history of Geelong.

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Reg Bugeja	Damian O'Doherty
Geoff Earp	Harry Peeters
Arnold Foster	Priscilla Pescott
Peter Hammerli	Doug Stacey
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Bob Lucas	Bruce Webster
Mike McCoy	Beryl Whiteside
Greg McFarlane	Gunter Wolf
Ian McLachlan	

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Remember, our world is a globe suspended in space. A self-contained world where all the forces of nature are intertwined. Think of it as Gaia, an ancient symbol for all these intertwined forces.

Seen from space, ours is basically a blue planet overlaid with great swirls of white. It is a world of water. Vast blue oceans cover most of its surface and the white clouds are water floating in the air, part of the great cycle on which the entire environment of our world depends. The power of the sun evaporates countless billion tonnes of water daily, purifying it, lifting it into the air and dropping some of it on our land as rain. All life on our land depends on water from that rain. Without it, life shrivels and dies.

The water we use is harvested from that land by organisations like Barwon Water, just as everything we eat is harvested. Since the inception of its predecessor almost a century ago, Barwon Water has known about the link between how we treat our sources of water, the natural environment and our health and daily lives. Throughout, it has been committed to protecting that link.

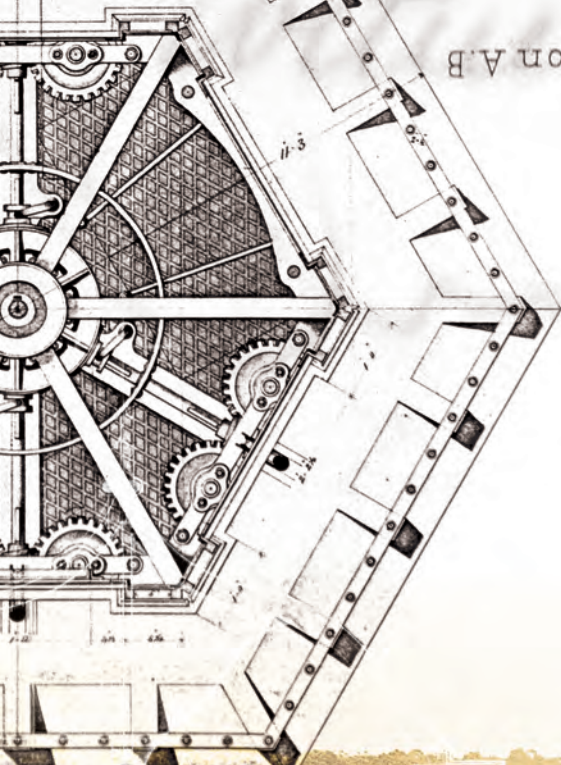
Today we all understand what Barwon Water has known; Gaia – the intertwined forces of nature – has to be preserved. We have to think again about how we treat our environment, particularly water that is fundamental to our daily lives. Each of us, from the smallest child to the largest industry, has to treat water with respect if our great and wonderful blue planet is to survive. Remember, we hold its future in our hands.

GAIA

The Australian Oxford Dictionary(1999)

1. Gk Mythol. the earth personified as a goddess....
2. the earth viewed as a vast living organism.





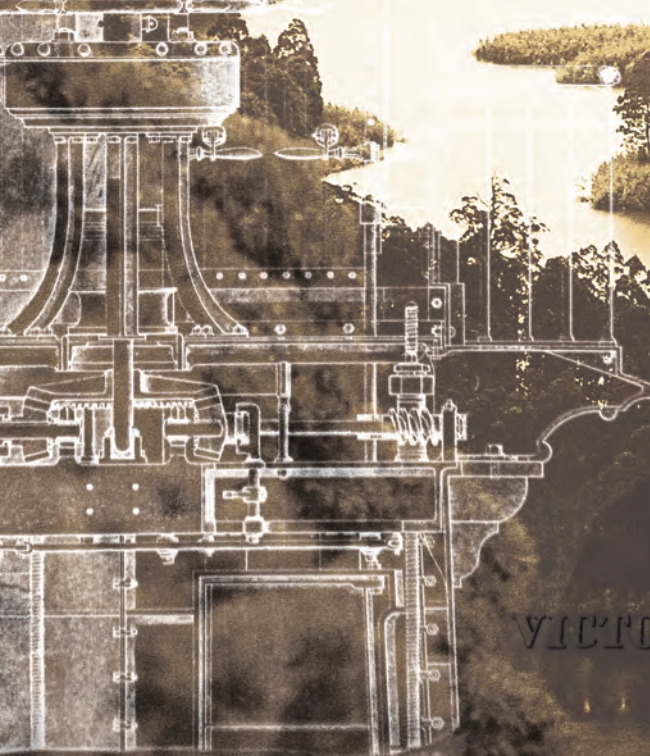
Section A.B

For almost a hundred years Barwon Water and its predecessors have supplied Geelong and the Barwon region with their most important services; a safe water supply and a sewerage system. Without these services the modern city and region could not have developed as it did. Water is vital to life and our modern community, without it public health would be poor and industry could not flourish.

Living By Water tells the story of how these vital services were provided. It tells of the conditions out of which Barwon Water emerged, of the people who played a major role in its work and the effect it had on the community. It is a story about what happened in the past and it gives us the perspective to glimpse what may come and what we should do in the future. Most importantly, it highlights the environmental awareness the authority has always had and its growth into a modern environmental business serving its community.

TONY CREEK RESERVOIR
OUTLET TOWER
DETAILS OF TOP OF TOWER.

Handwritten notes and signatures in cursive script, including 'M. J. ...' and '... 1914'.



Handwritten notes and signatures in cursive script, including 'M. J. ...' and '... 1914'.

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