Lake Margaret Conservation Management Plan 2016

Hydro Tasmania Standard				
Title:	**Lake Margaret Conservation Management Plan 2016**			**Version**
			Document Owner:	**Donna Brown, SRM Manager**
			Date Created:	**9/11/2015**
	Approver: **Evangelista Albertini, COO**		***Date Approved:***	**1/4/2016**
			Date Effective:	**1/4/2016**

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Executive Summary

The Lake Margaret Power Scheme was developed and operated by the Mt Lyell mining and Railway Company and its successors prior to being acquired by the Hydro Electric Commission in 1985. In anticipation of its closure, in 1994 the HEC commissioned Godden Mackay to undertake a cultural heritage study of the scheme. The lower station was subsequently decommissioned, however the upper station continued operating at reduced capacity until 2006 when it too was closed. At that time a new Conservation Management Plan was prepared for the site by Paul Davies in order to provide guidance for a range of potential future uses of the site. The power scheme was listed on the Tasmanian Heritage Register in early 2007 amidst an environment of uncertainty as to future direction.

The subsequent decision by Hydro Tasmania to undertake a substantial upgrade of the power stations invested new life into the Lake Margaret scheme. The refurbished upper station was recommissioned in 2009 with a new mini-hydro opened at the lower station the following year.

The capital revitalisation of Lake Margaret has been accompanied by a growing appreciation of the cultural values and multiple-use potential of the site. The Lake Margaret CMP has accordingly been revised to take account of changes in operating environment and broadening of the stakeholder base that have occurred since 2006.

The current revision builds upon the 1994 and 2006 studies and provides a flexible but robust platform on which to build a sustainable future for the Lake Margaret power scheme combining ongoing power generation with suitable public and commercial uses.

1. Introduction

1.1 Background

Lake Margaret power station is set in a wilderness area a short distance to the north-east of Queenstown. It has operated almost continuously since its opening in 1914 providing power for the mining operations at Queenstown, as part of the supply of electricity to the locality and more recently as part of the Hydro Tasmania power network. It was closed down from the period June 2006 until November 2009, initially due to concerns about the safety of a 2.2 km woodstave pipeline that had developed extensive leaks and subsequently for a major redevelopment which included rebuilding the woodstave and refurbishment of machines in the Upper Power Station.

Due principally to its private ownership and operation for most of its life the place has retained nearly all of its early infrastructure and equipment, including the dams, pipelines, two power stations, the village, penstocks and a range of associated structures and features.

A Cultural Heritage Study was prepared in 1994 by Godden Mackay (now Godden Mackay Logan). That plan proposed a thematic history of the site, assessed the significance of the site and its components and set out general policies to guide alteration and closure. The Lower station was decommissioned owing to deterioration of the penstock shortly after completion of the study. The village was also closed with the exception of three dwellings that continued to be used for staff and contractor accommodation until 2009.

By 2005 the Upper Power Station was also proposed for closure owing to concerns over the safety of the continued operation of the woodstave pipeline, prompting a review of the 1994 Cultural Heritage Study to help identify and guide the potential future uses of the site.

The review, undertaken by Conservation Architect Paul Davies, considered the upper and lower power scheme's developmental and operational legacies, re-assessed the heritage values of the place within the broader context of power generation in the State, and analysed the heritage impacts and opportunities of a range of future use options, including closure, retention and upgrade, and construction of a new station.

Davies' 2006 Lake Margaret Power Scheme Conservation Management Plan built substantially on the Godden Mackay study, retaining the historical background largely unchanged whilst updating it to reflect changes that had occurred during the intervening 11 years.

Completion of the Davies CMP in March 2006 coincided with Hydro Tasmania announcing its intention to close the Upper Power Station while investigating the feasibility of developing a new power station to use the Lake Margaret water resource, and supporting a study of the site's cultural tourism potential. To help guide this process, Hydro Tasmania commissioned consultants Ian Terry and Travis Tiddy to produce an Interpretation Plan for the site.

Public concern over the proposal to demolish the pipeline and decommission the upper station prompted Heritage Tasmania to nominate the Lake Margaret site to the Tasmanian Heritage Register, with permanent registration gazetted on 28 February 2007.

Based on the results of a detailed feasibility study (Hydro Tasmania 2007), Hydro Tasmania subsequently developed a proposal to re-furbish the upper station and construct a new woodstave pipeline from Lake Margaret. The project was approved by the Hydro Tasmania Board in June 2008. Implementation of a second stage, involving establishing a new pipeline and penstock connected to a min-hydro scheme at the Lower Power Station site commenced the following year. The redevelopments were guided by Heritage Impact assessments prepared by Austral Tasmania (2008 & 2009). The upper station redevelopment was officially opened on 12 November 2009 with the Lower station commissioned on 23 July 2010.

The refurbished upper and new lower Lake Margaret mini-hydro stations are designed to operate automatically without the need for staff. An expression of interest (EOI) process was subsequently initiated to identify a tourism operator to conduct guided tours of the site, primarily focussing on the Upper Power Station and environs. In support, the Lake Margaret Interpretation Plan was revised to account for changes in the tourism market and to identify specific audiences and themes in line with the overarching Hydro Tasmania Interpretation Strategy (Housego 2009, Tiddy 2010). A subsidiary operational plan, the *Lake Margaret Power station Visitor Experience Manual* (Tiddy 2013) was produced in mid-2013 as a template and resource for guided tours which commenced in November of that year.

The aim of the current review of the Lake Margaret Conservation Management Plan (CMP) is to update the document to take account of the changes to fabric and operational requirements arising from the redevelopments of the upper and lower power stations, and help shape the parameters for tourism and other uses of the site in line with Hydro Tasmania heritage management and interpretation requirements. The revised CMP applies to land managed by Hydro Tasmania only and not other areas of the THC listing (Refer Figure 1-3).

1.1.1 How To Use This Plan

This CMP comprises six principal sections:

Section 1 – Introduction

This section explains the background, the process and the context of the conservation management plan.

Section 2 – Historical Context

- This section provides a historical overview of the place and outlines its key developmental phases. Histories of the Lake Margaret site have been prepared for the previous two iterations of the CMP. In 2007 the Tasmanian Heritage Council prepared a summary history of the site that forms the basis for the significance assessments contained on the Tasmanian Heritage Register listing. That history has been reproduced here in full to facilitate the alignment of values and policies contained within this CMP and statutory heritage management obligations.

Section 3 – Physical Analysis of the Site

- This section defines site precincts and constituents to establish an inventory of interrelated heritage assets at the site.

Section 4 – Comparative Analysis

- This section looks at Lake Margaret in relation to other power schemes in Australia from the same period of construction and also of similar heritage value to provide an

understanding of how the place fits into the history of power generation in the State and country.

Section 5 – Significance

- This section sets out why the place is significant and looks to establish relative significance for the component parts of the extensive site. The significance of the site has been assessed in the previous two iterations of the CMP. In 2007 the Tasmanian Heritage Council produced a revised assessment as part of the statutory listing of the place on the Tasmanian Heritage Register. That assessment has been reproduced here in full to facilitate the alignment of values and policies contained within this CMP and statutory heritage management obligations. The Statement of Significance from the 2006 CMP has been revised in the light of the statutory listing.
- Comparative significance rankings are used to assist in understanding the place and as a basis for developing detailed policy.

Section 6 - Policy

- This section is the working end of the document or "Action Plan" where the issues that affect Lake Margaret are discussed, directions established, policy set out, and methods of implementation provided. The Plan provides a long-term vision for Lake Margaret. The vision is based on the Statement of Significance, historical context, ongoing and projected future uses, and the range of cultural values that Lake Margaret possesses.

1.1.2 Limitations

This plan relies on the historical analyses prepared by Godden Mackay and the Tasmanian Heritage Council, and site assessments undertaken by Paul Davies, Hydro Tasmania Consulting, Austral Tasmania and Travis Tiddy. This review has not included any additional primary research, site inspection, or significance assessments.

Reports provided by Hydro Tasmania have been relied on for information on the condition of assets, the outcomes of the scheme redevelopments, and associated future operational requirements

1.1.3 Authors

This review has been undertaken by Greg Jackman, Gondwana Heritage Solutions, on behalf of Hydro Tasmania and is based substantially on the 2006 CMP prepared by Paul Davies Pty Ltd, architects and heritage consultants.

Acknowledgments

The participation of the following individuals in this review of the Lake Margaret CMP is gratefully acknowledged:

- David Brown: Project Manager - Upper Lake Margaret station redevelopment;
- Tony Hodson: Project Manager - Lower Lake Margaret station redevelopment;
- Sandra Hogue: Former Hydro Tasmania Environment and Heritage Manager.
- Heritage Tasmania: Dr. Marita Bardenhagen and David Scott

Figure 1-1: Surveying Lake Margaret (undated)

(Lake Margaret collection)

1.1.4 Identification of the Place

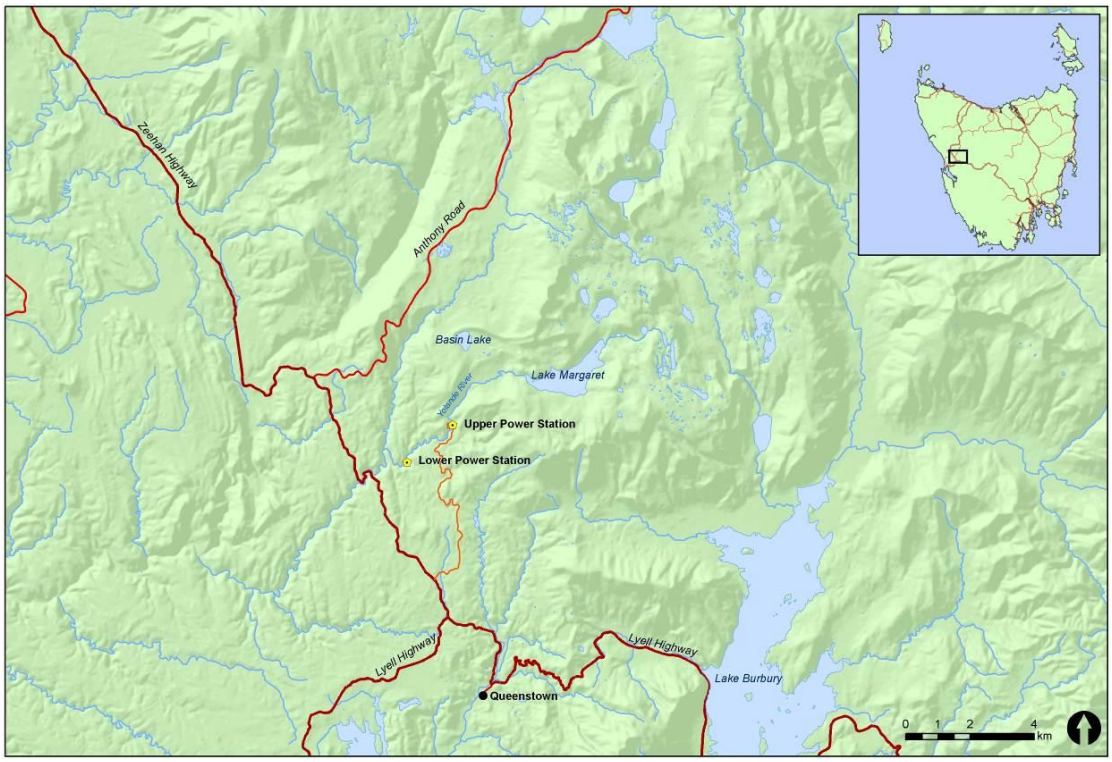

Figure 1-2: Location of Lake Margaret in relation to Queenstown and the West Coast

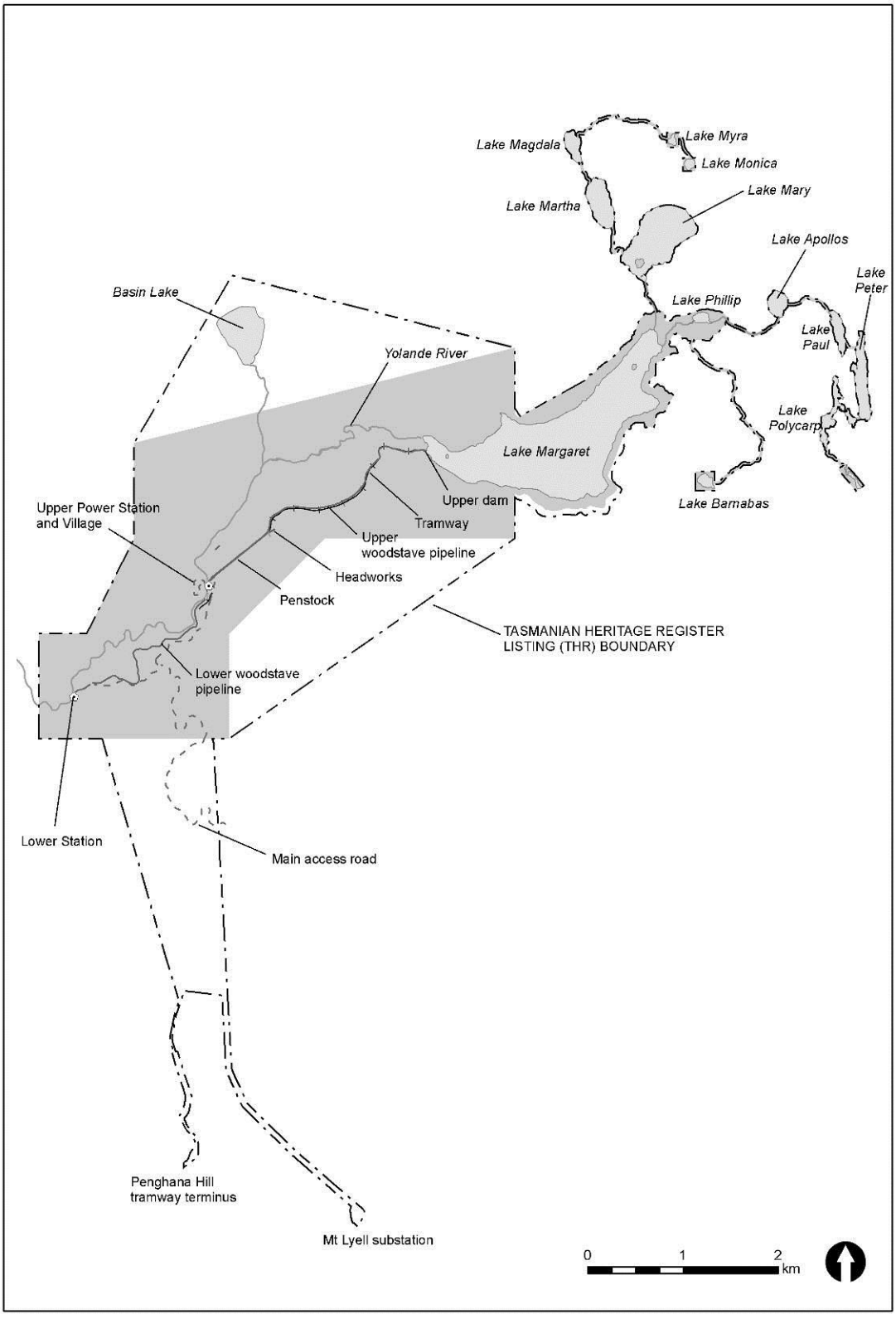

Figure 1-3: Lake Margaret Site Plan showing extent of THR listing (dashed outline) and area covered by this CMP (grey shaded portion)

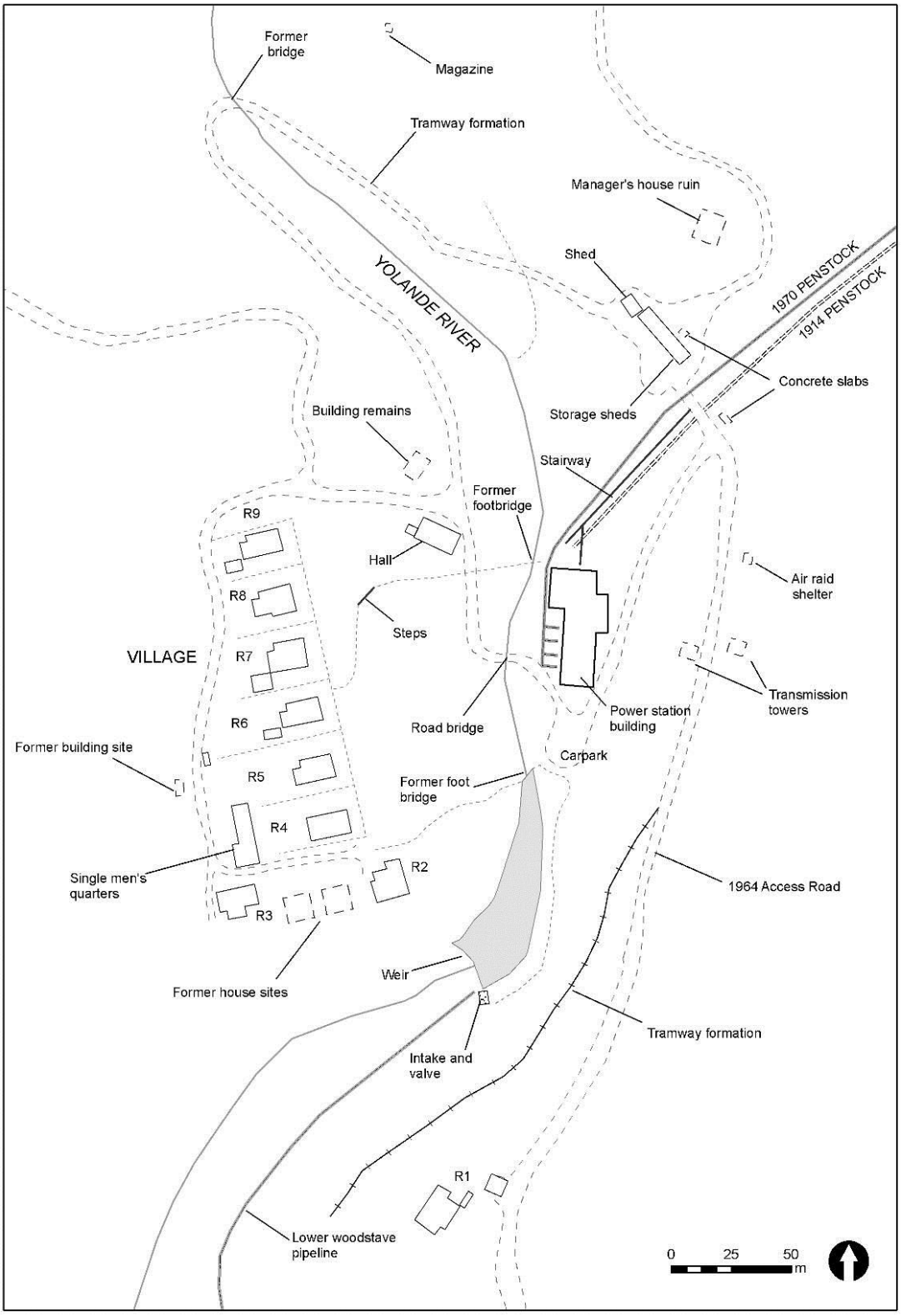

Figure 1-4: Site Plan of Upper Power Station and Village areas

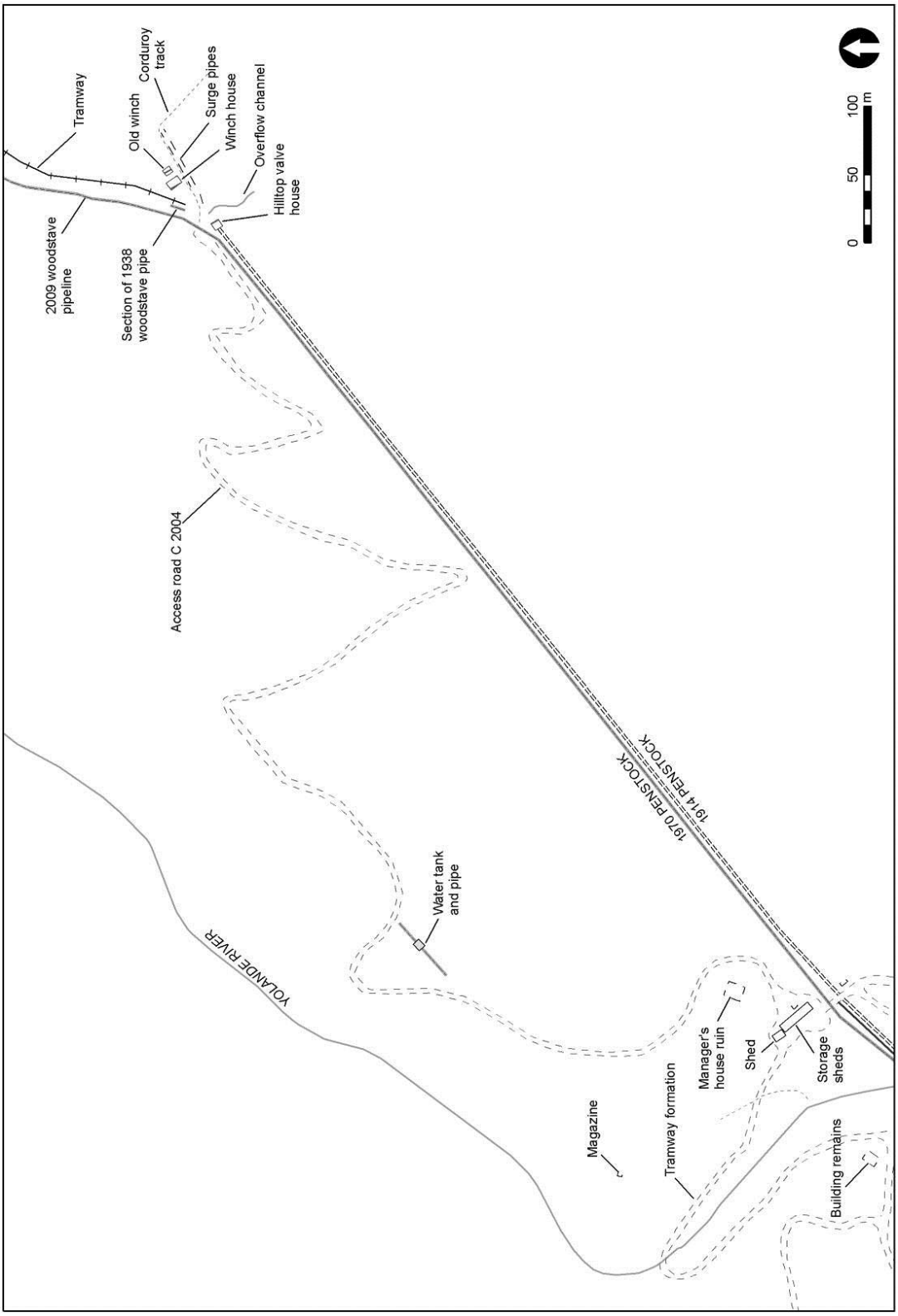

Figure 1-5: Site Plan of Upper Dam and Pipeline areas

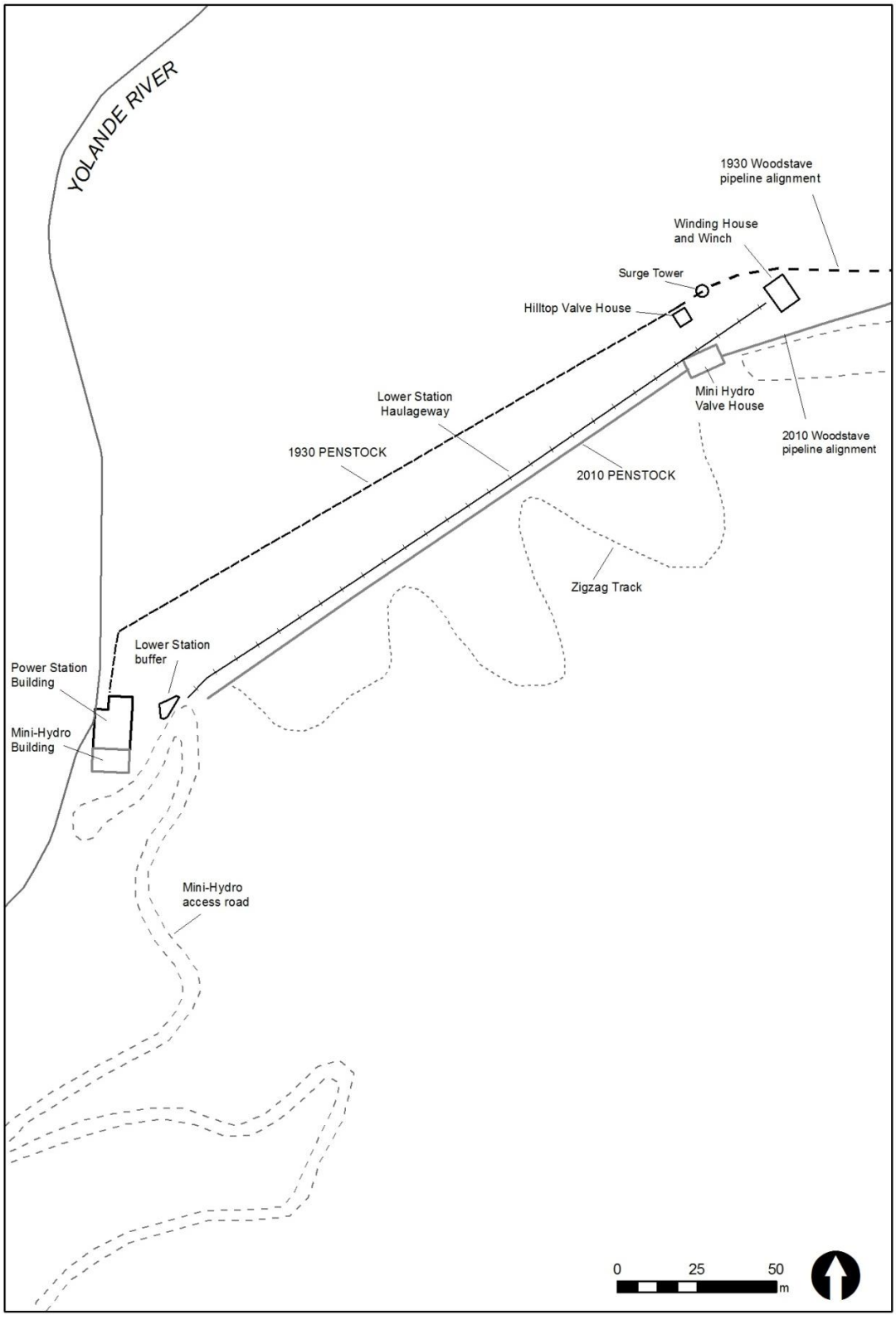

Figure 1-6: Site Plan of Lower Power Station area

2. Historical Background

2.1 Preface

A detailed thematic history of the Lake Margaret power development was prepared by Godden Mackay as part of their 1994 Conservation Management Plan. This was retained as an appendix in the 2006 CMP, being replaced by a succinct summary within the body of the main report. In late 2006 Heritage Tasmania revisited both versions during the preparation of their nomination to the Tasmanian Heritage Register, drafting a separate statement that strengthened the local connections and supported the statutory significance assessment. The Heritage Tasmania pre-2007 history has been adopted with very minor amendment for the current CMP.

No new historical research was carried out during the preparation of this plan, with the only amendments to the THC history being updates to reflect changes to the site and its operation since 2006. The summaries of key developmental phases contained in the 1994 study and 2006 CMP have been largely retained in this plan.

2.2 Summary History (Heritage Tasmania)

2.2.1 Early History of the Area

Lake Margaret was discovered by Thomas Bather Moore, west coast explorer, prospector and track-cutter who named the lake for Margaret Officer, a family friend. He had cut a track from Lake St Clair to the Pieman River in 1877, and passed through the upper Yolande River catchment leaving a blazed tree (now removed) on the shore of Lake Mary. Lake Mary was named for Jane 'Mary' Solly, Thomas' future wife whilst Lake Martha was possibly named after his mother (Binks Aug: 2006 and McShane, TB Moore 1982: 32). TB Moore was considered as the "greatest of all the West Coast explorers, his last major project occurred in 1915 which involved the clearing of the route for the Lake Margaret transmission lines" (Dickens 2001:36).

By 1900 the upper Yolande catchment had been partitioned into mining leases, although these were unlikely to have been subject to any activity more intensive than exploratory prospecting by individuals or small teams. The lower catchment, south of the penstock, appears to have been subject to substantial clearing with tracks and timber-getting camps established for the purpose of obtaining fuel for the Mt Lyell mine. Evidence of the early tram tracks and walking tracks remain.

The history of the Lake Margaret Power Scheme (LMPS) is inextricably linked with that of the Mt Lyell Mining and Railway Company (MLM&RCo) which developed and operated the LMPS for most of its life. Copper mining operations at Mt Lyell represent one of the most historically significant mining operations to date in Australia, with the MLM&RCo at one time being the largest copper producer in the British Empire and Australia's longest operating mining venture. The company is synonymous with the frontier spirit that led to the development of the West Coast and in the economic prosperity that mining brought to the region, and to the State.

One of the most successful periods of development for the MLM&RCo, which coincides with the development of the LMPS, occurred while Robert Carl Sticht was General Manager of the Mt Lyell mine from 1897-1922.

He successfully pioneered pyritic smelting, and had the vision to embrace the new hydro technology as part of the industrial reform at the site and to provide domestic electricity to his workforce as part of a social reform process. Sticht collected one of the finest private libraries in the Commonwealth, now part of the Mt Lyell Collection (Blainey 2000: 262) and part of which now resides in the National Gallery of Victoria (McShane Jan: 2007). The mineral stichtite commemorates his name.

By the early 1900s, fuel costs had become a serious issue in MLM&RCo operations at the Mt Lyell mine, where the furnaces were consuming over 2,040 tonnes of timber each week. The local area had been denuded of trees, whilst labour and infrastructure costs were escalating with a tramway network having to be constructed into the surrounding forest areas solely to transport the vast quantities of fuel needed.

Hydro-electric power generation had been trialled on the West Coast during the 1880s, when a small plant had been used for lighting at the Mt Bischoff mine. Other small plants were soon installed at the Moorina mine and for the Duck Reach Power Station at Launceston. In 1893 the Lake Margaret area was first surveyed by HM Chrisp for MLM&RCo as a potential source of hydro-electric power. By 1896 Huntley James Clarke concluded that the Yolande River was capable of sustaining a small power station.

2.2.2 Construction of the Scheme

At the instigation of Robert Sticht, in 1911 the MLM&RCo commenced construction of what is believed to be the fourth hydro-electric power station constructed in Tasmania, the Lake Margaret Power Scheme (LMPS). To provide power for machinery and lighting at Mt Lyell it needed to be substantially larger than any other scheme yet constructed, initially utilising four 1.2 MW Pelton-wheel turbines, with the flexibility of installing further turbines within the power station subject to operational needs. The initial stage required the substantial investment of £164,000. When hydro power was connected to the mines smelter in 1914, the saving over timber fuel costs was calculated at £50,000 per annum. (Blainey 2000: 178). Thus the LMPS was to facilitate the economic viability of the mine and lessen the deforestation pressure on the Queenstown landscape.

Commencement on the LMPS was delayed until June 1912 due a major strike at Mt Lyell in November 1911, national labour shortages and unfavourable working conditions. Maltese stonemasons and labourers were actively recruited for the LMPS development and would become the predominant workforce in constructing the key infrastructure (Tiddy 2005: 13), although migrant labour from the United Kingdom was a prominent force at Mt Lyell during this time and also used on the LMPS.

The first wave of 15 Maltese workmen was employed by the MLM&RCo in June 1912. They were described as the first “coloured labour” to be employed. (Mercury 21 June 1912: 6). By 1913 approximately 133 Maltese were onsite, and by August in excess of 140 Maltese were employed. (York 1990: 52-53).

The Maltese workers were housed in segregated camps “as a matter of company and union policy” but supervised by Australian foremen (York, 1986: 40). A camp named Valetta (after the capital of Malta) was established at Howards Plains, on a tram track previously built for timber-getting. Early photographs illustrate a camp of tents and corrugated iron buildings serviced by a corrugated tin shop called the FO Henry Store (Tasmanian Mail 29 August 1912: 19). There was also a camp-site near the dam (Site Survey Plan 1911), and one in the Sedgewick valley named Gozo (named after an island within the Republic of Malta).

The name Gozo was reused for the site of a temporary power plant (Whitington: 1914: 203) and the titling of the first house in the row at the Village as “Coza Cottage” may be a corrupt derivation of this name.

Initial tasks included scrub clearing and extending the existing timber-getting tramway to the Power Station site (York 1986: 38 & York 1990: 51). Bridges, rock cutting and heavy filling were finally completed by the end of the year (Wright, 1915: 162). At the dam site, work commenced with the Maltese sluicing sand and gravel from the original lake bed to a point below the Yolande Falls. These materials were hauled by a flying fox back up to the pink conglomerate rock outcrop that forms the rim of the lake to make the concrete for the dam wall, by which the natural lake level was raised by 6m. Channels were carved 50m long through the bedrock of the rim and around the island, and dry stone walls constructed to facilitate drainage of water from the deepest point at the middle of the cirque to the outlet valve house at the dam. Channels were also constructed, or alterations made to the natural drainage lines, to drain water from several of the higher lakes into Lake Margaret (Crocker 2006).

The Maltese built the freestone walls along the route of the wooden pipeline and its attendant tramway leading from the dam to the penstocks. Where the pipeline and tramway traversed the sheer conglomerate rock face, hammer and tap methods were reportedly used to excavate the ledge, with no explosives being used. (Crocker 2006).

The 2.2km woodstave pipeline conveying water from the dam to the penstocks above the power station was constructed of Canadian Douglas fir or Oregon (*Pseudotsuga menziesii*) by the Australian Wood Pipe Co of Sydney. The staves, 1 thick and 6 wide were formed utilising an imported German stave-making machine. The two penstocks were fabricated from steel to handle the increased pressure in the pipe as the water descended to the turbines.

The Maltese are also credited with construction of the Power Station building 1912-14 (York 1986:42) and, in later years, clearing and erecting of the transmission lines using poles of Celery Top pine (*Phyllocladus aspleniifolius*) (Binks Oct: 2006, LMPS Report: 1915). During 1913 a temporary hydro plant was installed to provide lighting so work could continue 24 hours a day. Twenty-four Maltese workers who refused to work on the Sabbath were sacked (York 1986: 41). Construction-period photos indicate a scattered workers camp on the hillside beside the penstocks, and suggest the Village housing to accommodate the station operators was one of the final items of development at the site. Little is recorded of the building of the Sub-station at Mt Lyell, which utilises the same construction methods as the Power Station whilst dating from this later phase.

Following the First World War, electricity generation at LMPS was expanded. Two additional Pelton-wheel turbines were installed and a third penstock added, with the works being completed by 1920. These works may have included labour from another wave of Maltese migrants. Their arrival in Australia in September and November 1916 coincided with a government call for conscription and promises by Prime Minister William ‘Billy’ Hughes against the importation of cheap foreign labour (York 1990:76, 80-96 & 2002). One group had arrived aboard the Arabia and out of 97, 47 were recruited by the MLM&RCo (York 1990: 75). A second group of 214 arrived aboard the *Gange* (York 1990:84). These Maltese, who were British citizens, were initially prevented from landing in Australia. After failing a dictation test given in Dutch, they were interned on New Caledonia, but after some time and considerable deprivations were allowed entry. Their story is part of the history of internment during the First World War, anti-conscription and the White Australia policy.

43 surviving Maltese are recorded as coming to Mt Lyell in 1917 following their release (York 1990: 75, 93-4, 99, 1986: 60). Descendants of LMPS Maltese workers remain in Tasmania today.

A cornerstone of Robert Sticht's social reform policy was the provision of electricity to mine workers and the supporting commercial and social infrastructure of Queenstown. By the 1920s electrical power from the LMPS was reticulated through Queenstown, and later connected to Zeehan and Rosebery. In 1948 the Hydro Electric Commission (HEC) made State-sourced power available to west coast communities through the construction of the West Coast transmission line, whilst the LMPS continued to provide power into the state grid and thus indirectly power regional communities until 2006.

A concrete fish hatchery for 100,000 ova was constructed nearby. Some claim this was to provide sport for the company directors of the MLM&RCo but it would, later if not originally, serve a higher function as part of the Inland Fisheries' hatchery network.

To accommodate increased operational and public demand, including the installation of a floatation plant at Mt Lyell, the generating capacity of the LMPS was expanded again in 1930-31, with the inclusion of a 7th Pelton-wheel turbine at the Power Station in a simple iron-clad addition, and the construction of the Lower Power Station. This included the construction of the lower weir, a 2km wooden pipeline constructed of Karri (*Eucalyptus diversicolor*) feeding a steel penstock above the lower station, which housed a 1.5 MW Francis turbine. This turbine type is better suited to the lesser vertical fall from the weir to the turbine. This was the first remote controlled [semi-automatic] station in Tasmania, and second in Australia after the four small stations of the Rubicon/Royston scheme [fully automated, state owned] constructed in Victoria in 1928 (McCutchan 2007).

A small construction camp known as Tin Town and made of corrugated iron houses was located nearby with a connecting tramway constructed off the main line into the Upper Power Station and Village. These have since been removed but archaeological evidence may provide insights into the lifestyles and conditions endured by the pioneers/migrants in the area (Godden Mackay 1994: 93).

2.2.3 Later Developments

In 1938, the main woodstave pipeline from Lake Margaret to the steel penstocks was replaced due to exterior deterioration of the original Douglas fir staves. King Billy pine (*Athrotaxis selaginoides*) sourced from the Tyndall Range was used for the replacement staves, with J Howard of Zeehan awarded the contract to supply the timber. The steel hoops were made by boiler-makers at the Mt Lyell workshops. To minimise disruption to power generation during the replacement process, the majority of the new pipeline was constructed alongside the original and keyed into the dam valve house and penstocks at each end.

During the 1940s or early 1950s, an additional staff house (#1) was constructed adjacent the tramway/road on its approach to the Upper Power Station. A further staff house (#3) was added within the Village during the 1960s. In 1954, a substantial section of the woodstave pipeline to the Lower Power Station was replaced with King Billy pine, and by 1970 the remainder had been replaced with hardwood.

One of the greatest social changes to the LMPS occurred in 1964 when the original 2ft (600mm) gauge tramway, running 11 km from the Upper Power Station to Penghana Hill, was closed down and road access provided from the Zeehan Highway. In the early years the

tramway had run a Kraus locomotive with carriages, which was later replaced with Riley and Vauxhall rail motors (Tiddy 2005:25), and an Alpha-Romeo petrol-driven locomotive. The tramway, which formed the only vehicular access into the power stations and village since construction, has been described as the life-blood of the community - conveying all supplies and people including the twice-daily run for school children. Consequently the residential occupation of the Village by MLM&RCo staff declined, as people progressively favoured commuting from Queenstown over living onsite. Prior to 1995, the existing sheds beside the penstock (that house the woodstave-making machine) were relocated to this site from the Penghana Hill tramway terminus, where they had been used to house the tramway locomotives and rail cars. By 1987 the original Station Managers House and two of the Staff Cottages (located between #2 and #3) had been demolished.

In 1965 the transmission line was replaced, and between 1969 and 1980 the Dam and Power Station had a number of key components upgraded by the MLM&RCo. A new single and larger diameter penstock was installed alongside the original triple-penstock, which ceased to operate. The main control boards within the power station were replaced with a modern integrated unit, around which a sound-proof control room was constructed. A range of upgrades to generating plant and the transformer yard were also undertaken.

In 1985 the MLM&RCo, suffering financial difficulties, negotiated the sale of LMPS to the HEC, with the MLM&RCo leasing the site back for a peppercorn fee. In 1993, the MLM&RCo disaggregated various engineering and fabrication functions, including the operation of the LMPS. LMPS station manager Scott Newitt established Lake Margaret Enterprises, subsequently the Lake Margaret Heritage Company (LMHC), and recruited previous LMPS operators. The LMHC undertook operations and maintenance of LMPS under contract to the MLM&RCo until its demise in December 1994 and thence under contract to Hydro Tasmania until April 2003 (Newitt 2007). The Lower Power Station was closed in 1994 due to concerns over the safety of the penstock (Newitt 2007). The woodstave pipeline, which had been drained as a precaution, soon shrank and collapsed (Tiddy 2005: 37).

Due principally to its private ownership and continuous operation, the LMPS retained nearly all of its early infrastructure and equipment including the dam and lower weir, woodstave pipelines, penstocks, manifolds and surge pipes, two power stations, the village settlement of seven original and two later cottages, single-mens' quarters and community (badminton/dance) hall, plus a range of associated structures and features. Hydro Tasmania, continued to operate the Upper Power Station until 30 June 2006, when it was closed due to concerns over the continued operation of the remaining woodstave pipeline.

2.2.4 Redevelopment 2007-2010

In response to public concern over its closure, Hydro Tasmania prepared a proposal to re-develop the upper station and its water supply (Hydro Tasmania 2007). The works involved repairs to the dam, installation of a new dam outlet valve, replacing the ageing low pressure pipeline with a new 1.22m diameter woodstave pipeline constructed from Alaskan Yellow Cedar, refurbishing the surge pipe and hilltop valve and tailrace and a raft of upgrades and modifications within the power station. These included refurbishing the generators and governors, including the fabrication of new runner buckets for two machines, and installing a safe shut-down system to allow unattended operation.

Concurrently with works at the upper station, the lower station was redeveloped through repairs to the Yolande River weir and intake, demolition and replacement of the collapsed pipeline with a new woodstave pipeline and Fibre Reinforced Plastic (FRP) penstock, and

extension and alteration of the power station building to incorporate a new 3.2 MW Turgo mini-hydro generator. The works at the lower station site included the construction of an access road, which required the demolition of the bottom section of the penstock haulageway. The upper station redevelopment was officially opened on 12 November 2009 with the Lower station commissioned on 23 July 2010.

The upper and lower stations deliver power directly to Copper Mines of Tasmania (CMT) switchgear at Queenstown, with an automated trip system in place to isolate the station from the state grid. In 2014 agreement was reached to export power to the grid following the closure of CMT. Both stations are remotely operated with no resident staff. The tourism potential of the site continues to be actively explored with a licenced operator commencing commercial tours of the upper station area in late 2013.

2.3 Life on the Scheme

The Lake Margaret Power Scheme (LMPS) was an integral part of residents' lives, and village life saw a blurring of boundaries between working and private spheres. Women cooked hot lunches and delivered them onto the work site. Children had to be restricted in their play areas to keep them away from sleeping shift workers. There was a playground of swings and slides located at the southern end of the Village, and a swimming pool and sports-field on a terrace below. Exotic trees and shrubs were planted around the Village and neat gardens maintained at the cottages. Many social gatherings were organised for the local residents but outsiders were excluded from participating. The Village Hall is most likely a recycled and adapted Mt Lyell building relocated to the site (Godden Mackay 1994: 48).

At least one marriage had taken place at the top near the lake. At least one child was born in the Village, although most women would leave the village some time prior to delivery rather than risk an emergency tram ride. There were no medical rooms or space allocated for emergencies in the village. Any accident victims or those with serious illnesses were quickly sent to the Queenstown hospital via the tramline emphasising the importance of this link to the outside world. During the Second World War prior residents recall that the women in the village undertook voluntary first-aid courses and a room was set up in the single-men's quarters. Children vividly remember the air-raid drills. Red Fire Boxes were located on trees alongside the front of the houses in the village. A pine tree outside the Martin's house (R5 Figure 1.4) was always decorated as a Christmas tree. At Christmas time the power station would shut down and only one generator would be operated (Crocker 2006).

The Superintendent's house was off-set at the southern end of the row of workers' cottages. It is a larger building and features a different floor plan to the other worker's cottages, with an additional bedroom. This house features a large return verandah that had external lighting. The front room of this house featured a Wunderlich pressed metal ceiling. Patterned linoleum and wallpaper were used throughout the houses. The uses of corrugated iron cladding, elevated floors and metal ceilings are all examples of adaptive innovations that reflect the extremely wet environment. The village is a unique pre-fabricated (by the MLM&RCo) corrugated iron group of buildings. The construction camp sites known as Tin Towns were less decorated but utilised simple iron structures for their ease of transport and construction.

The front garden of the Superintendent's house was wired with electrical heating elements by Frank Thomas, the Superintendent of the LMPS, to assist in the growing of vegetables, an innovation made possible by free power (Crocker 2006). The MLM&RCo encouraged the use of power by employees by subsidising the power to Queenstown and Gormanston residents and gave free power to Lake Margaret residents. Electrical appliances were also subsidised. *"On*

account of the very high cost of fuel in the district the Co. encourages its employees to use electric power for domestic cooking and heating, electric stoves, water heaters and smaller household appliances are sold to employees on a liberal time-payment basis." (Preston 1934: 31). Hot water cylinders, stoves, radiators, grillers, kettles and electric irons, light fittings were all items readily available to residents at reduced prices *(Electricity on the West Coast of Tasmania Activities of the Mount Lyell Mining and Railway Company in Tasmania, reprinted from "Australasian Electrical Times"* July 27, 1926).

The second house along from the Superintendent's house was where the Martin family lived. Sunday School lessons were conducted here once a month early on a Thursday evening and most children in the village attended. A church service was conducted later in the evening by Mr Ray, a visiting minister from Queenstown. Mrs Martin was a strict Methodist and during the services her husband, Ernie Martin, played a pedal organ that is still with the family (F Martin 2002: QVMAG & Martin: 2006). This house displays community values as a place of worship and meeting place. Former managers, Ed McDonald and later Don Russell, lived in the Manager's house on the other side of the hill overlooking the Power Station. (denoted as Manager's house ruin Figure 1.4)

Drainage around the houses in the village consisted of underground wooden stave pipes. Evidence of at least one piece of the pipe could be seen in 2006 at the front of one of the houses (R4 Figure 1.4). More recent pipes provide drainage and water for fire fighting within the village, whilst the sewer lines were located at the rear of the buildings (Crocker 2006).

The pipeline service tramway has been a popular walking track for residents and tourists since 1914. Appreciation of the wilderness was becoming a world-wide phenomenon at this time. Some residents were also keen photographers, with men such as George Barvich, a Czech operator at the power station, and his mate Frank Martin, often undertaking walks for photographic purposes. The pipeline was also walked on a daily basis by the Lake Margaret operators for meteorological readings and monitoring of water levels at the lake.

2.4 Major Stages of Development of the Site (after Davies 2006)

The following site plans illustrate the key stages of development:

1914 – Construction Phase

- Temporary worker accommodation erected
- Station building with four machines built
- Dam (with lower height), Oregon pipeline, tramway, headwords and penstocks constructed
- Access tramway from Queenstown connected
- Transmission line to Queenstown erected

1914-1918 – Early Additions

- Station building extended with two additional generators and third penstock
- Village completed
- Construction village mostly removed
- Dam raised

1918-1933 – Consolidation and Expansion

- Seventh generator installed in annex
- Tramway extended for construction of lower station and 'Tin Town' workers camp occupied
- Lower station built with weir, Karri pipeline, headworks and penstocks
- House R1 added
- Fish hatchery constructed

1933-1973 – Continued Operation and Upgrade

- Replacement of Oregon pipeline with King Billy and addition of new penstock
- New winding house and engine
- Replacement of lower Karri pipeline partially with King Billy and partially with hardwood
- House R3 added
- Tramway replaced by road from Lyell Highway
- Dam wall post tensioned and grouted

1973-2005 – Upgrade of Infrastructure and Changes in Use

- Upgrade of safety equipment and plant
- Three cottages removed
- Haulage winder house demolished
- Lower station closed
- Village abandoned (apart from 3 houses)
- Footbridges and road-bridge removed
- Construction of access track to upper station hilltop valve
- Upgrade to entry road

2006-2012 – Refurbishment of Upper and Lower Power Stations

- Refurbishment of upper dam and power station generators, including automatic control systems
- Replacement of upper pipeline with Alaskan Yellow Cedar
- Replacement of lower pipeline with Alaskan Yellow Cedar and construction of new Fibre Reinforced Plastic penstock
- Construction of lower mini Hydro scheme
- Guided tour operator contracted for upper power station area

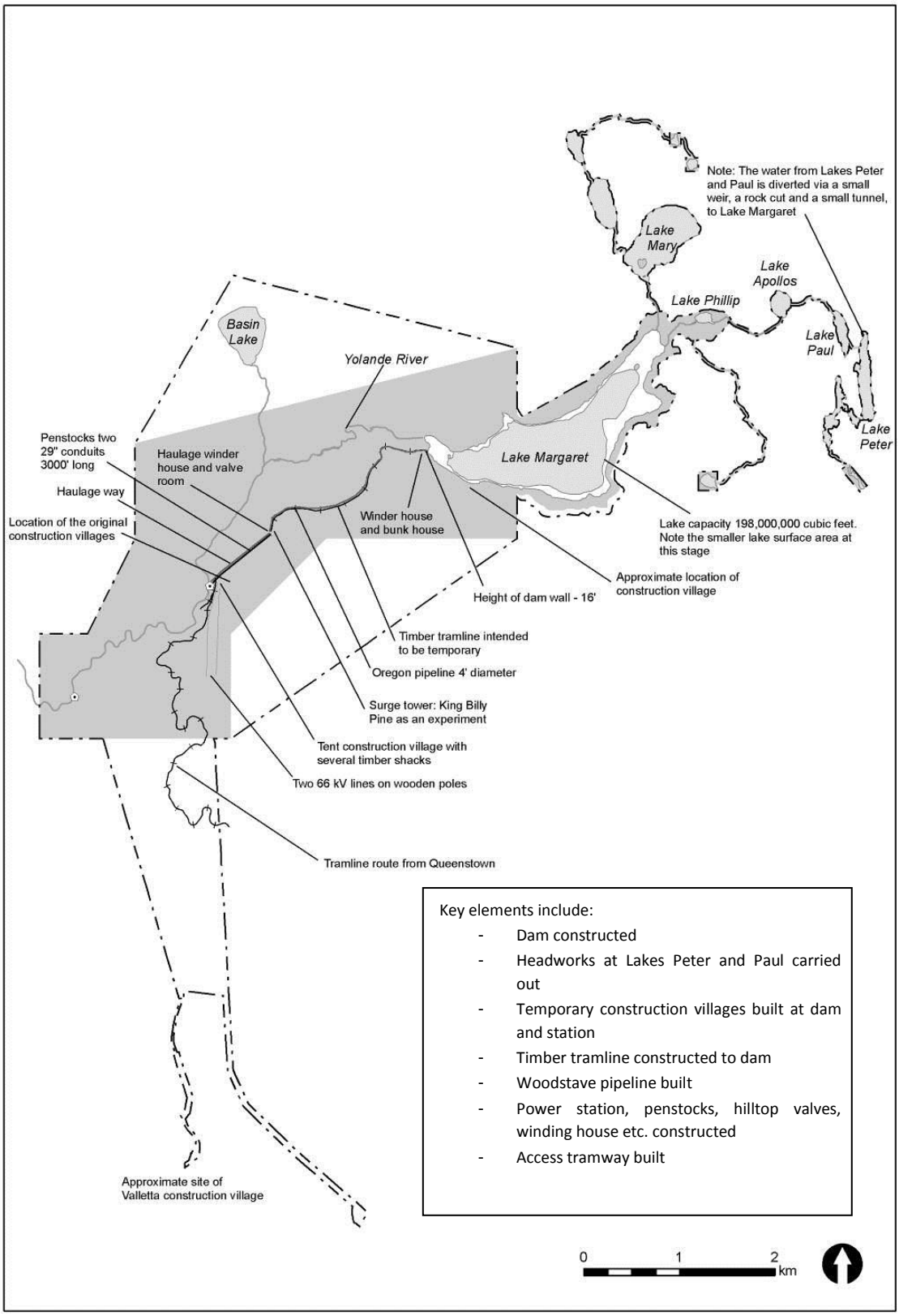

Figure 2-1: Lake Margaret Scheme c 1914 – showing main features at the time of opening of the station

(After Godden Mackay 1994)

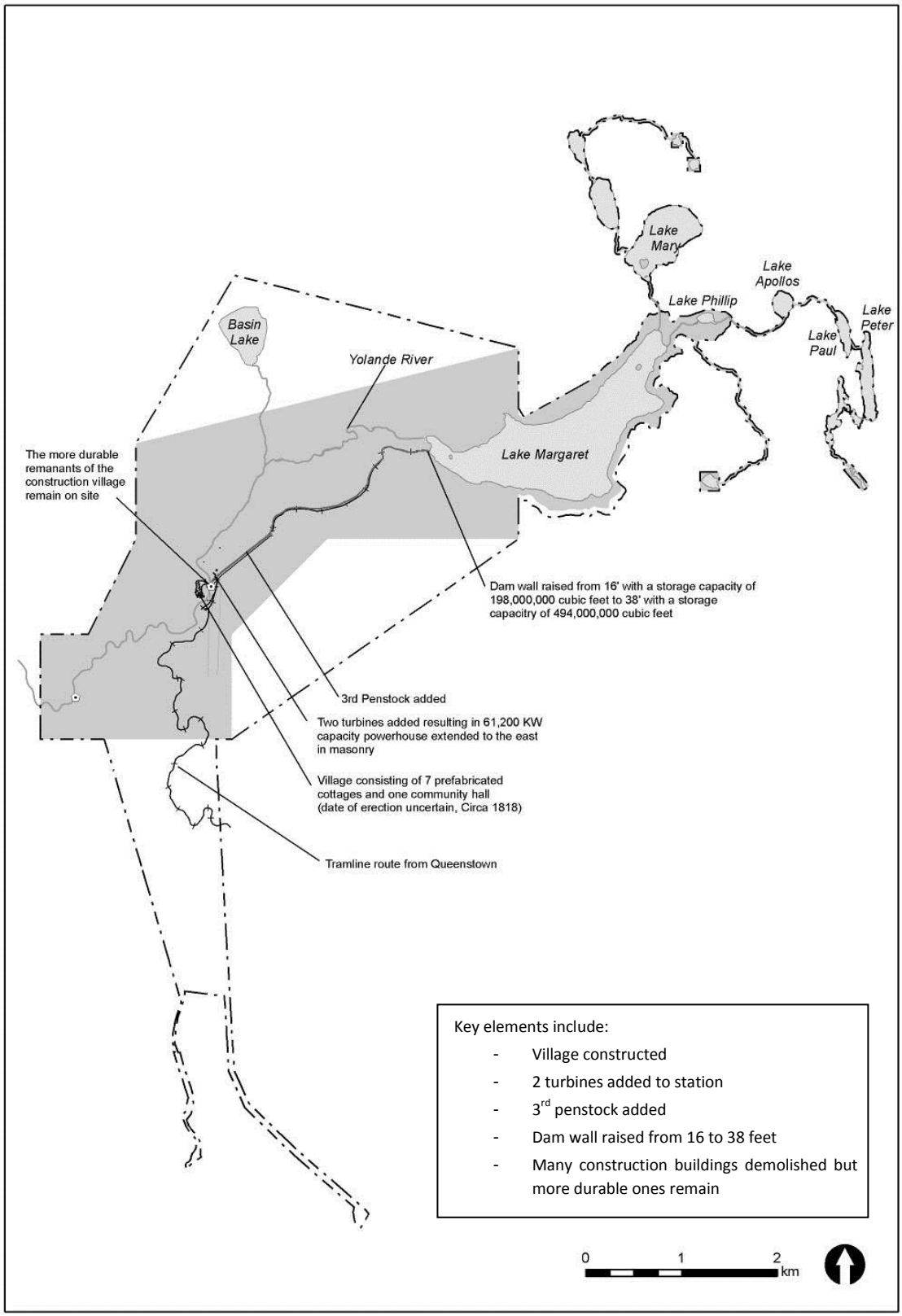

Figure 2-2: Lake Margaret Scheme 1918 – showing changes between 1914 and 1918

(After Godden Mackay 1994)

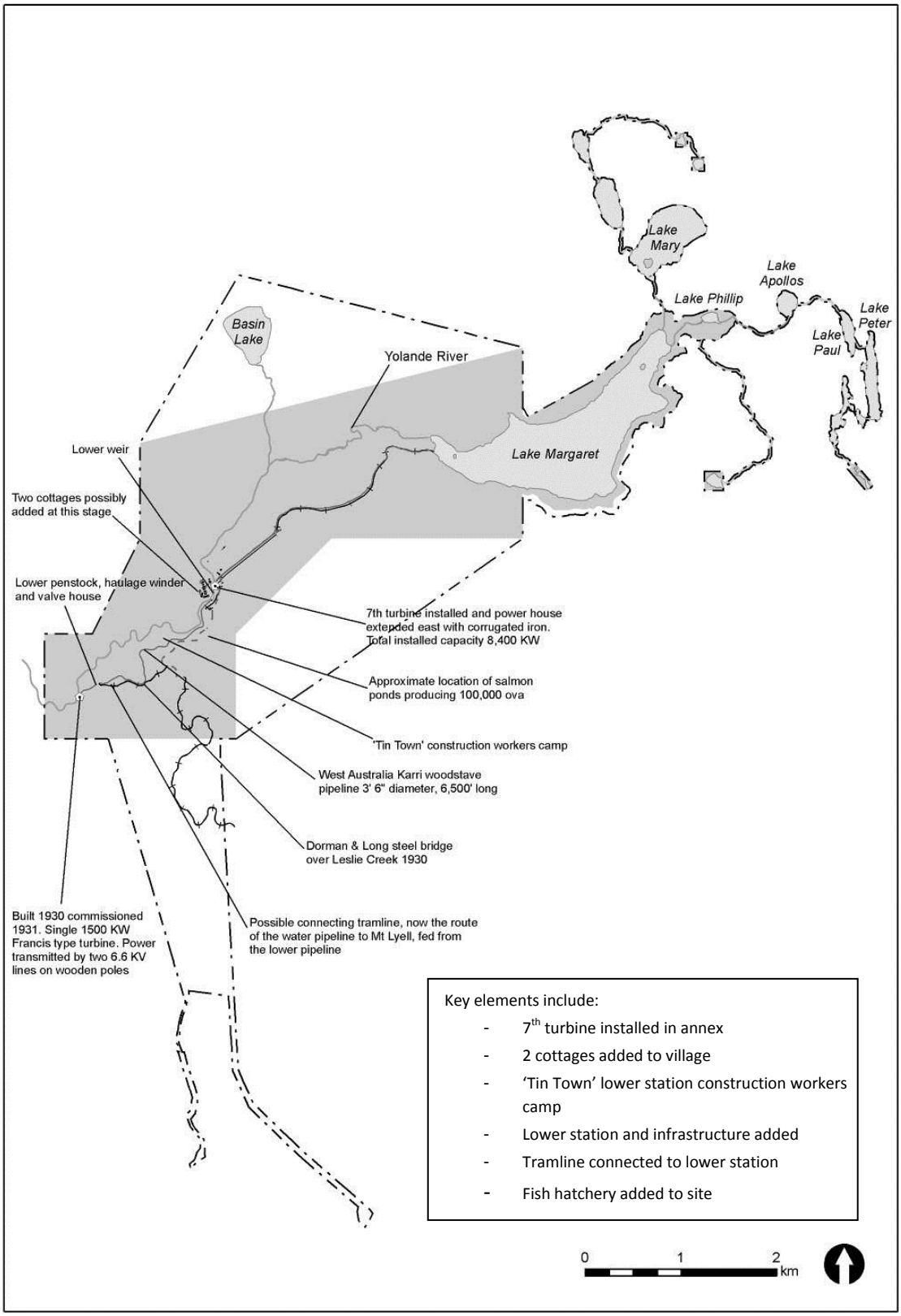

Figure 2-3: Lake Margaret Scheme 1933 – showing changes between 1918 and 1933

After Godden Mackay 1994)

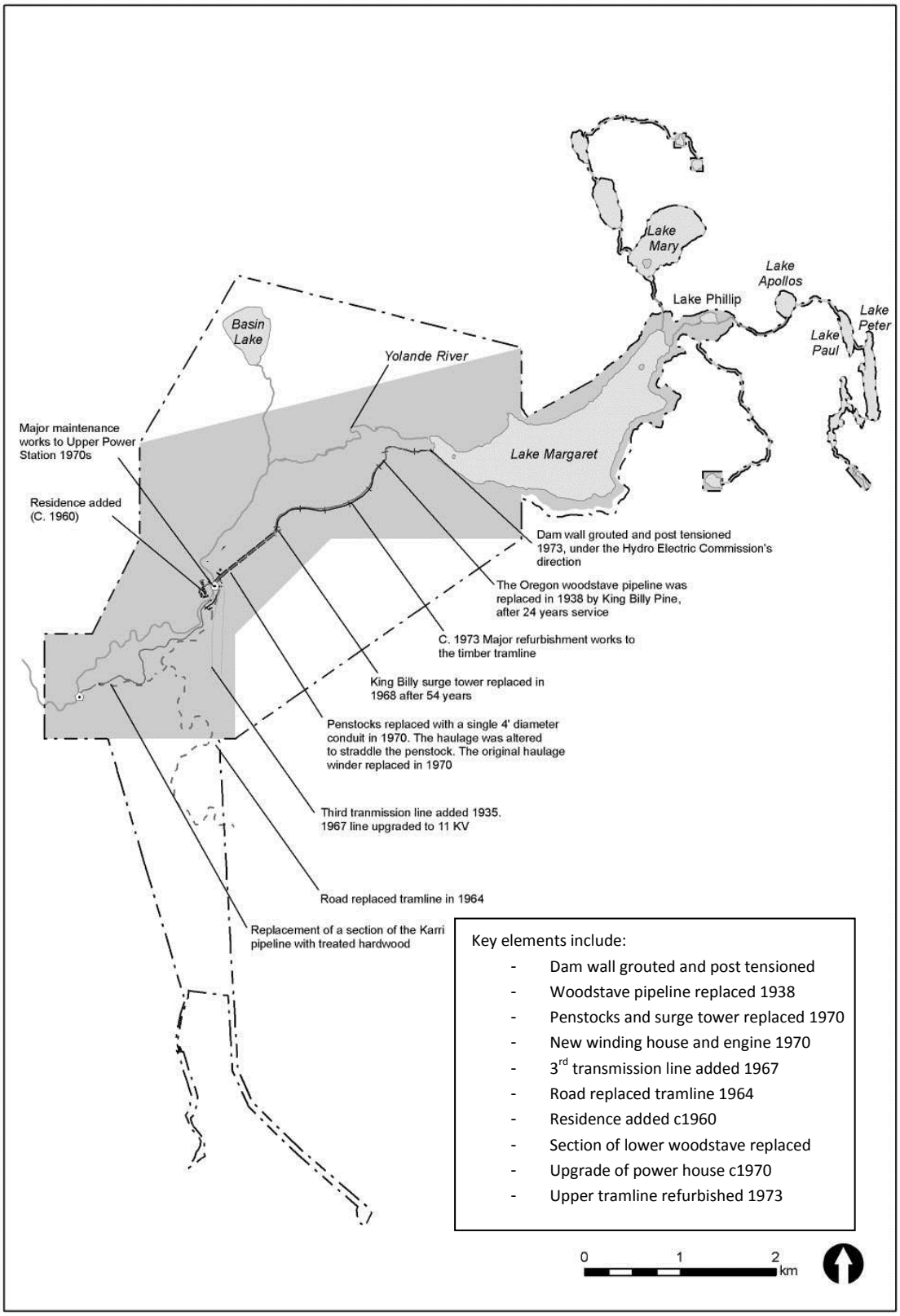

Figure 2-4: Lake Margaret Scheme 1973 – showing changes between 1933 and 1973

(After Godden Mackay 1994)

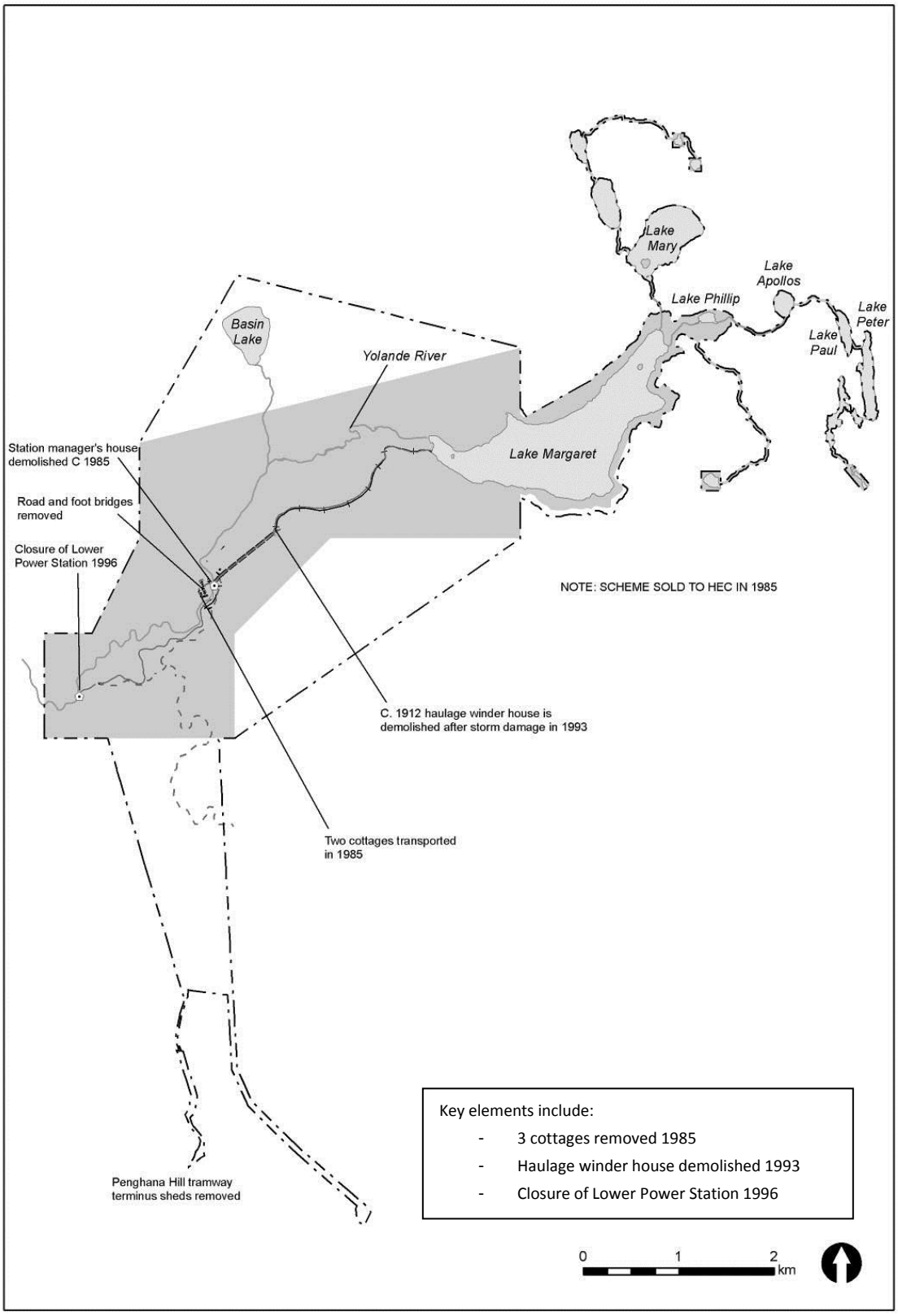

Figure 2-5: Lake Margaret Scheme 1994 – showing changes between 1973 and 2006

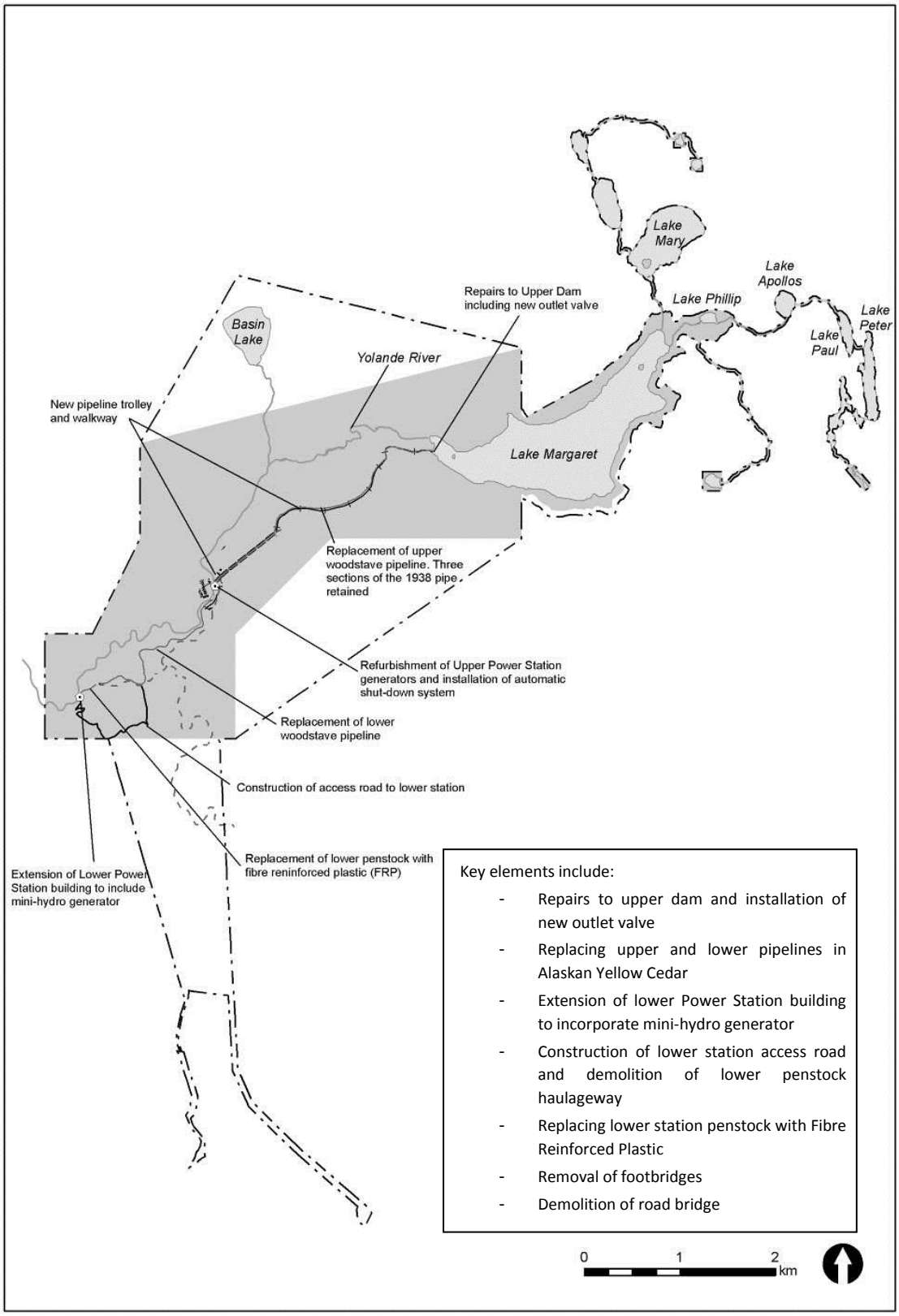

Figure 2-6: Lake Margaret Scheme 2012 – showing changes between 2007 and 2012

2.5 Development of the Upper Power Station Building

The upper station building went through several phases of growth after its completion in 1914. Initially accommodating 4 generator sets, by 1918 the building had been extended with two additional generator sets being fitted into a concrete formed addition. A final generator set was added in 1933 contained in a steel-framed and corrugated iron clad extension, the temporary end wall being demolished to allow it to be built.

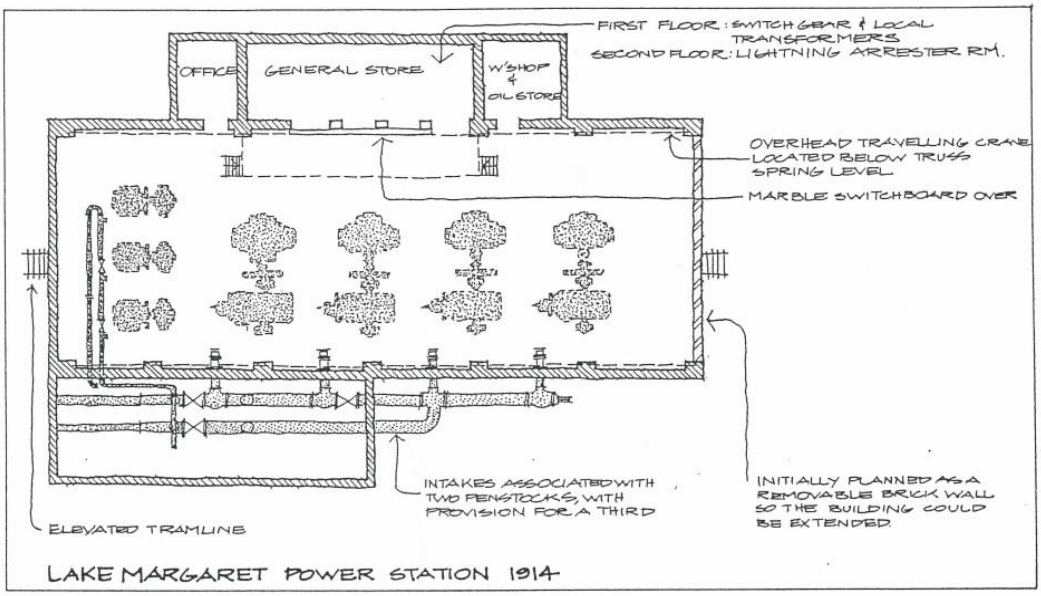

Figure 2-7: The Upper Power Station in 1914 on completion showing two penstocks and four generator sets

Note the temporary wall at the end to allow for expansion (Godden Mackay 1994)

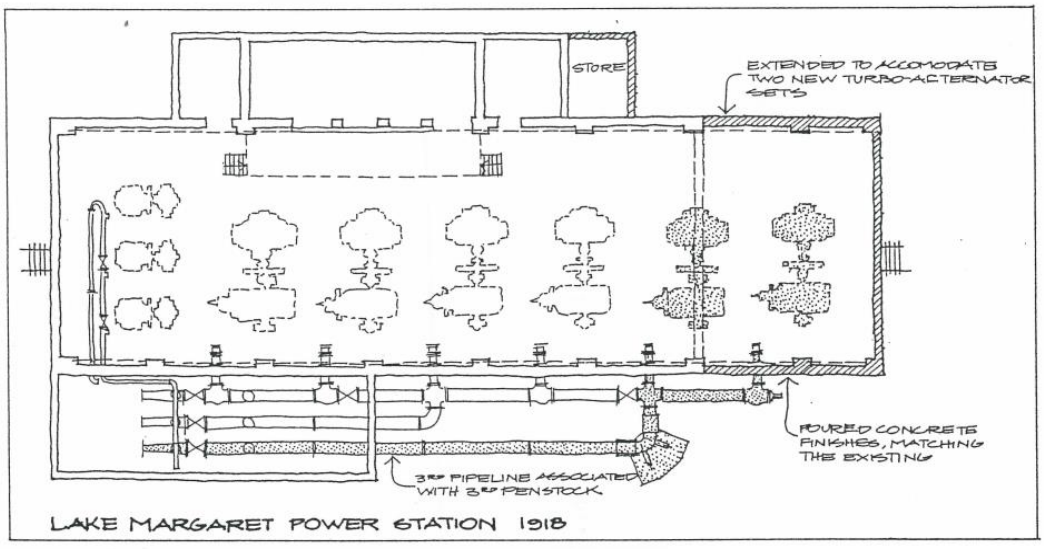

Figure 2-8: Layout of power station in 1918

Note the additional building, the two generator sets and the additional penstock and two take-offs. A small store was also added to the building (Godden Mackay 1994)

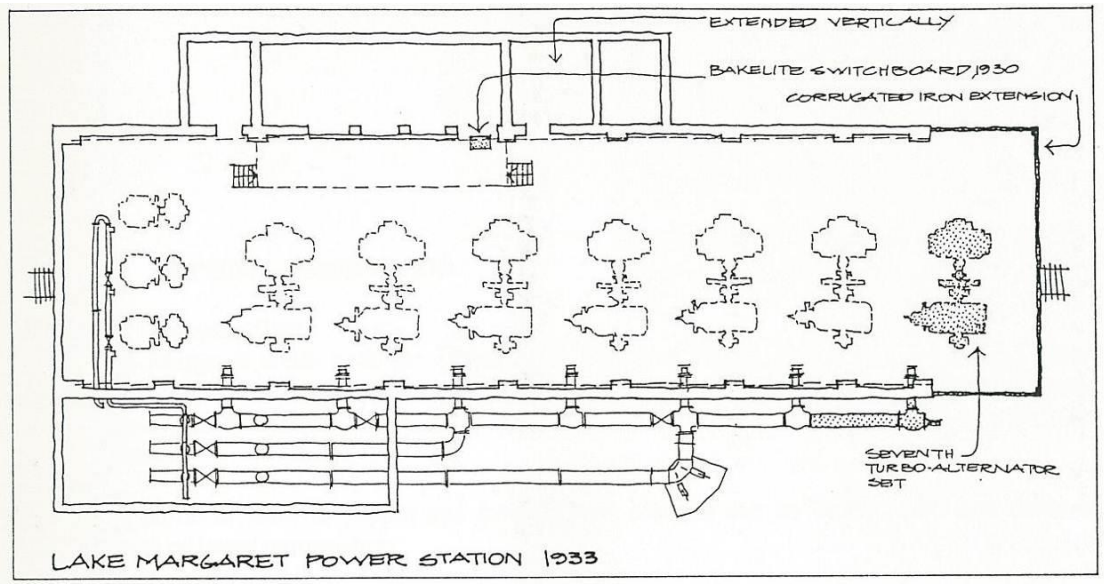

Figure 2-9: Layout of power station in 1933

Note the additional building constructed in corrugated iron, the generator set and the extension to the penstock (Godden Mackay 1994)

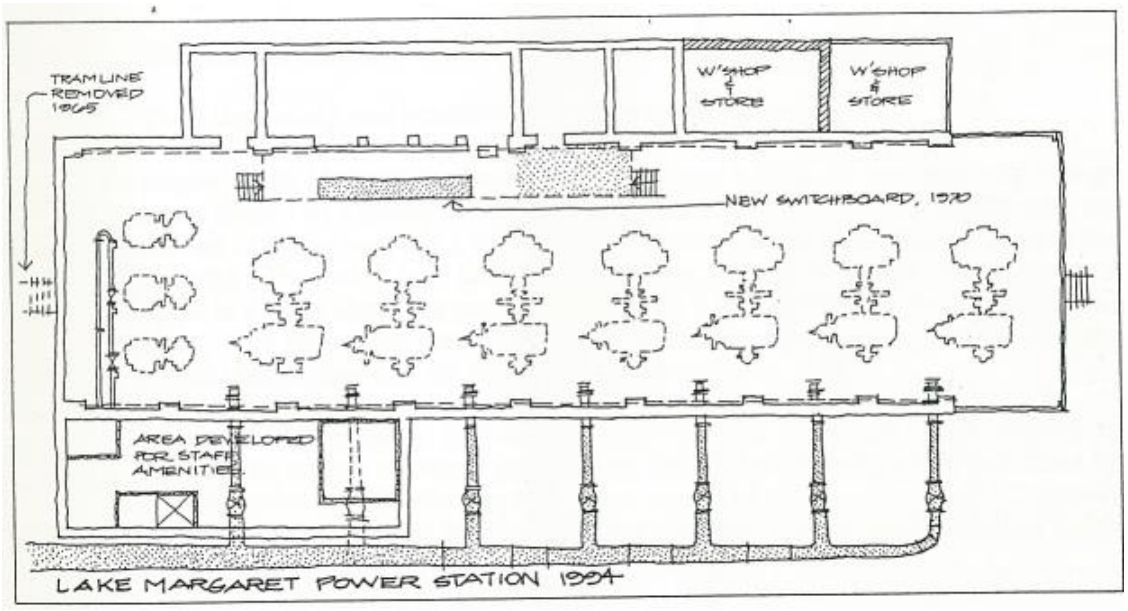

Figure 2-10: Layout of power station in 1994

Note the additions of workshops to the building. The drawing also shows the new penstock and the 7 new off-take. The former intake room has been converted to staff amenities. A new switchboard is also indicated (Godden Mackay 1994)

2.6 Early Plans of the Power Scheme

The following schematic plans and profiles from the archives held at the Upper Power Station illustrate the layout of the upper and lower stations and some of the site arrangements of the upper station, the early surrounds and the village. Most of the diagrams are undated.

The diagrams graphically illustrate the fall (head) between water storage and turbines, the operation of the surge towers and pipes and the topography of the area.

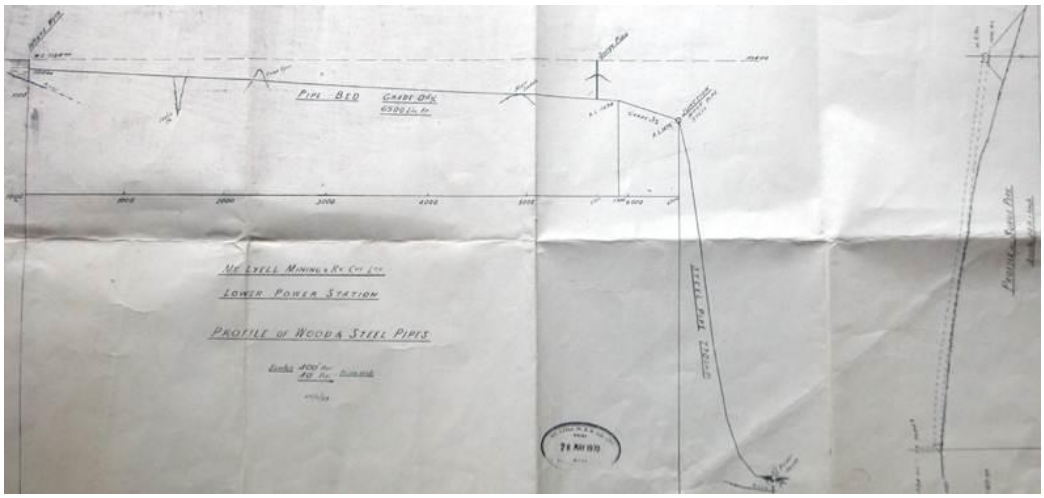

Figure 2-11: Schematic profile showing the pipeline from the weir below the Upper Power Station to the lower power station

Note the surge pipe aligned at the weir level and the steep penstock fall to the upper station (Lake Margaret Collection)

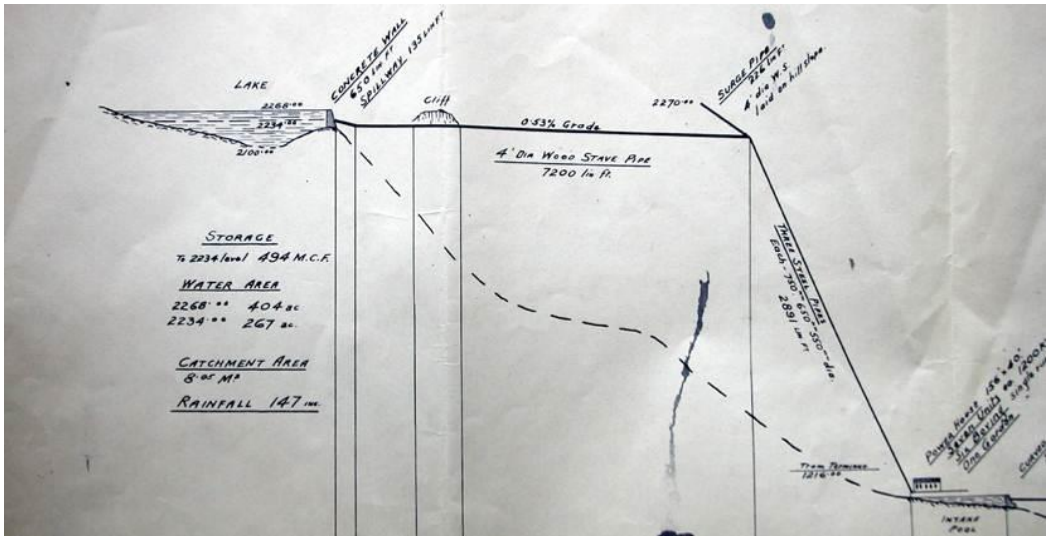

Figure 2-12: Part 1 of a schematic profile showing the alignment of the pipeline and penstock from Lake Margaret to the Upper Power Station

Note surge pipe laid up the slope of the hillside. Also note the lower weir below the upper station. The schematic shows the dramatic fall in level in the river and penstock, also the cliff cutting. The diagram shows the dam wall to be 650 feet in length, the spillway 133 feet long, the surge pipe 226 feet long, the woodstave pipe 7,200 feet long and the penstock at 2,891 feet in reducing sections (Lake Margaret Collection)

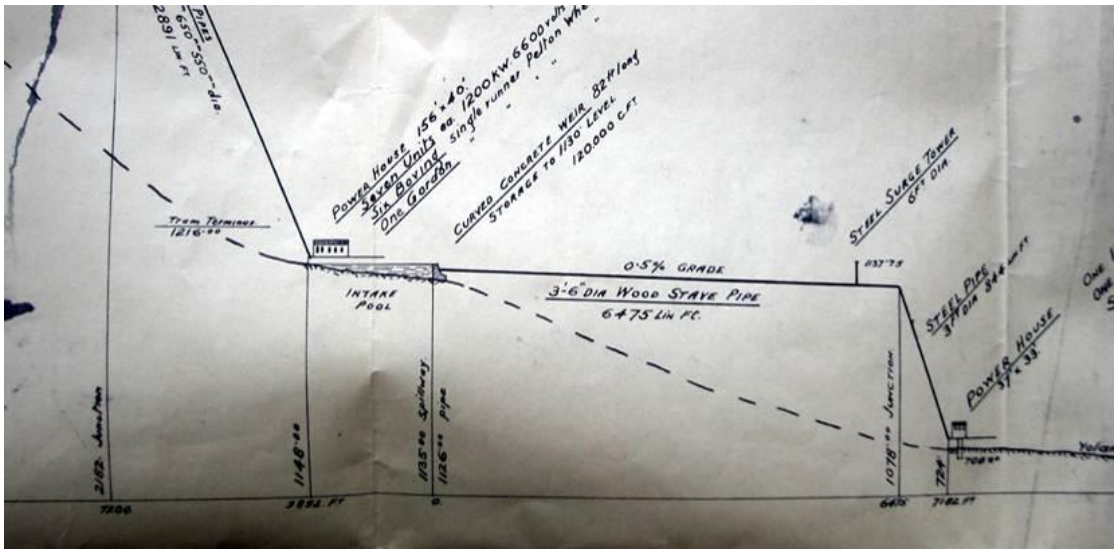

Figure 2-13: Part 2 of a schematic profile showing the Upper Power Station to the Lower Power Station

The drawing notes that the weir is 82’ long with a storage of 120,000 cubic feet, a woodstave pipe is 3’6” diameter and 6,475 feet long, the surge tower is 6’ diameter (the earlier surge tower) the penstock at 3’ diameter and the power house building with a footprint of 37’x33’. Also note the vertical concrete tailrace under the station building (Lake Margaret Collection)

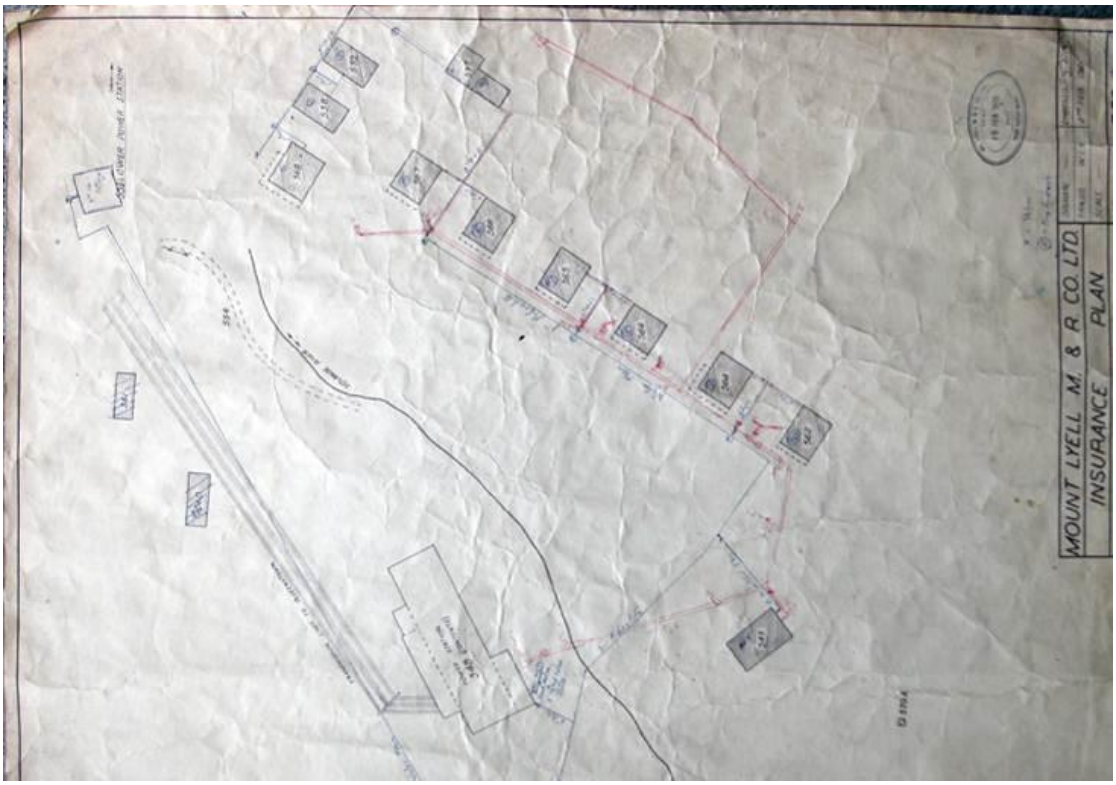

Figure 2-14: Site Plan showing station, residences, hall and other site features

This plan shows the seven original residences, the singlemen’s quarters and the two removed houses. It also shows the hall without additions, the power station building and several sheds since removed. The residences have slightly different footprints showing different rear additions, other sheds and outbuildings are not shown (Lake Margaret Collection)

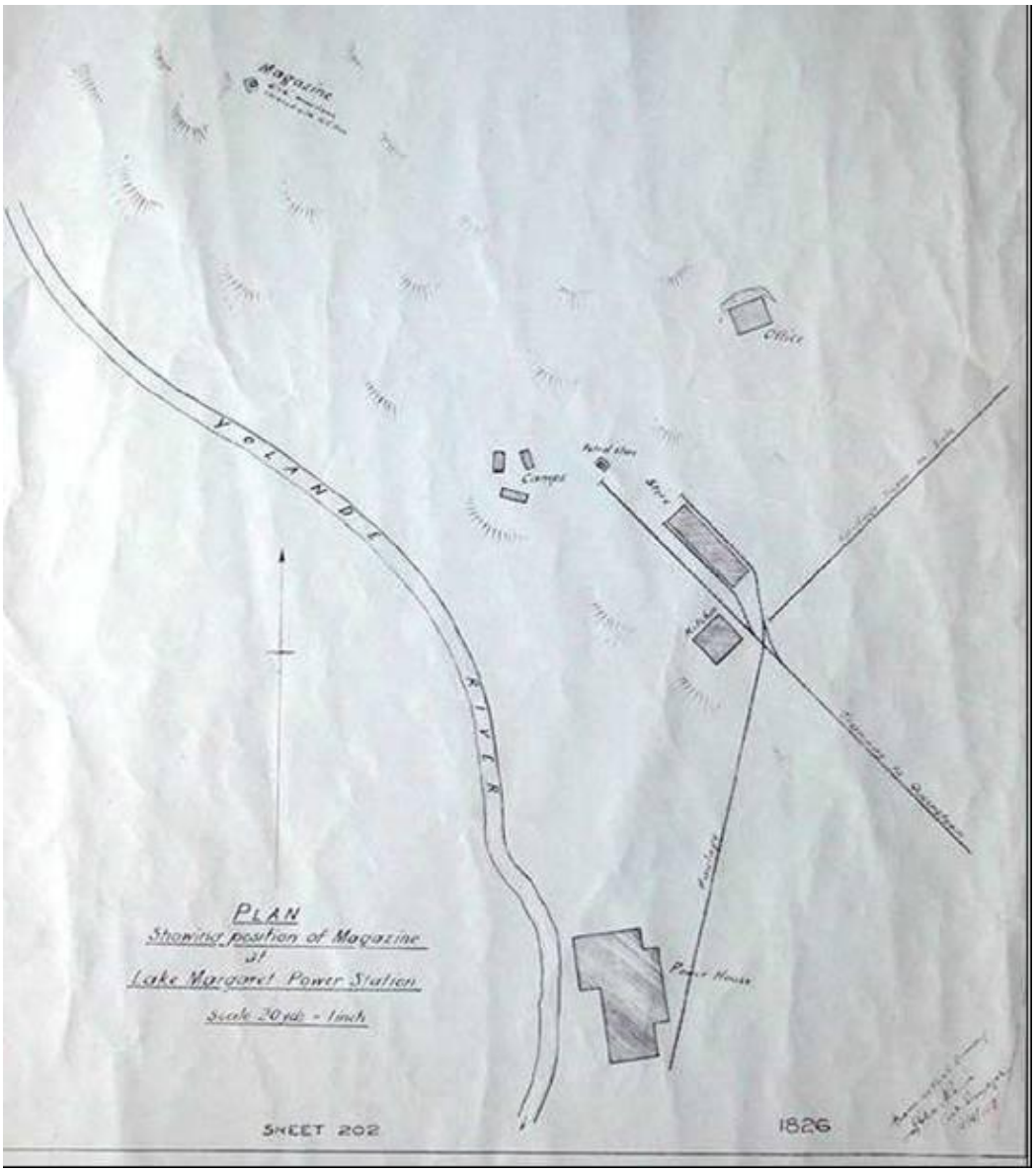

Figure 2-15: Site plan showing upper station, tramway and haulageway with associated buildings including the magazine, office, petrol store and camp

Note the tramway extending down the access road (current) to the upper station building in contrast to the earlier tramway route to the main entry. The building at the junction of the tramway with the penstock is noted as a kitchen. It was located on the levelled area now in front of the garages (Lake Margaret Collection).

3. Site Analysis

3.1 Introduction

The Lake Margaret site is large and contains a number of separate but related areas or precincts. For convenience in assessing the site and providing policy direction, the place is divided into the following areas:

- **Precinct 1 -** The upper penstock and dam including the tramway, hilltop valves and winch houses.
- **Precinct 2 -** The village and area to the west of the river including roads and infrastructure.
- **Precinct 3 -** The area around the Upper Power Station defined by the river and covering the penstock, entry road, lower weir, residence no 1 and the immediate setting.
- **Precinct 4 -** The lower penstock, hilltop valve house, winch house and Lower Power Station.
- **Precinct 5 -** The entry roads and surrounding bushland areas that comprise the balance of the site.

The operation of the site is not necessarily defined by these precincts but extends across them as the flow of water is controlled and managed to supply the two power stations. Sections 3.2 – 3.6 outline the main static and movable components of each precinct that contribute to the heritage significance of the place. A brief overview of the layout and operation of the scheme is provided below by way of context for the more detailed descriptions and assessments of elements.

The 1914 power station site was selected due to the location of Lake Margaret which was a deep tarn formed by glacial action and the relatively quick drop in river level that allowed a suitable water pressure to be achieved to drive generators.

The water storage capacity of the lake was greatly enhanced by the construction of the dam across the valley, taking advantage of the high rainfall of the area. From the dam, water was taken by woodstave pipeline around the contours of the hillside, laid almost level, to the hilltop valve where it was transferred to a set of steel penstocks (later a single steel penstock) that dropped to the Upper Power Station in the valley below. The location of the station was determined to maximise the available head of water (347 metres or 1,400 feet) from the dam.

The water delivered via the Penstock drives 7 Pelton wheel turbines which are directly coupled to alternators. The power generated was used to supply the Mt Lyell Mine, Gormanston, Queenstown and for a period the Zeehan Mines. The power scheme now serves the Copper Mine of Tasmania mine at Mt Lyell.

Water from the Upper Power Station discharges directly into the Yolande River, the station being constructed just above peak water level and close to the river bank.

Over time the upper station was expanded with additional generation units, the penstock was replaced, additional buildings were added to the village and around the site, the woodstave pipeline was replaced and the tramway was replaced in 1964 by an access road.

A major change to the site was the addition in 1931 of the Lower Power Station with its infrastructure of weir, woodstave pipeline, penstock and incline. The design of this station utilised the water discharged from the upper station, collecting it along with water from the Yolande River at a weir located approximately 100metres below the upper station building that charged a second woodstave pipeline. This follows a circuitous route involving excavation and a steel bridge before the pipeline reaches the top of an incline where it connects with the steel penstock descending steeply to the lower station, which is located on a cutting into the rock bank above the river. The lower station discharges water directly into the river through a short concrete tailrace under the building. This station houses a single power unit. The lower station ceased operation and was mothballed in 1996.

The upper station was closed in 2006, with both the upper and lower stations being substantially refurbished over the next three years. At present the scheme utilises all seven generators within the Upper Power Station, which receives water from Lake Margaret delivered via a new woodstave pipeline which required upgrade of the 4WD access track and a new trolley and walkway system. The refurbished hilltop valves, surge pipe and 1970s penstock have been retained in service. None of the houses are presently occupied. Disused buildings have not been maintained and a number of deteriorating structures, such as the footbridges, have been removed.

The main access road is maintained along with roads to access various parts of the site, while a new road has been constructed to the Lower Power Station. The lower station has been extended to house a Turgo 3.2MW mini-hydro generator, utilising water delivered via a new woodstave pipeline and Fibre Reinforced Plastic penstock. The original Francis turbine has been bypassed and is not in service but can be seen via a viewing gallery installed in the extended power station building.

Both stations supply power to the Copper Mines of Tasmania switchyard at Queenstown. Export to the State grid is prevented by a tripping system, although negotiations with Transend are in progress to allow transitory export of excess to reduce shut-down stresses on the vintage machinery.

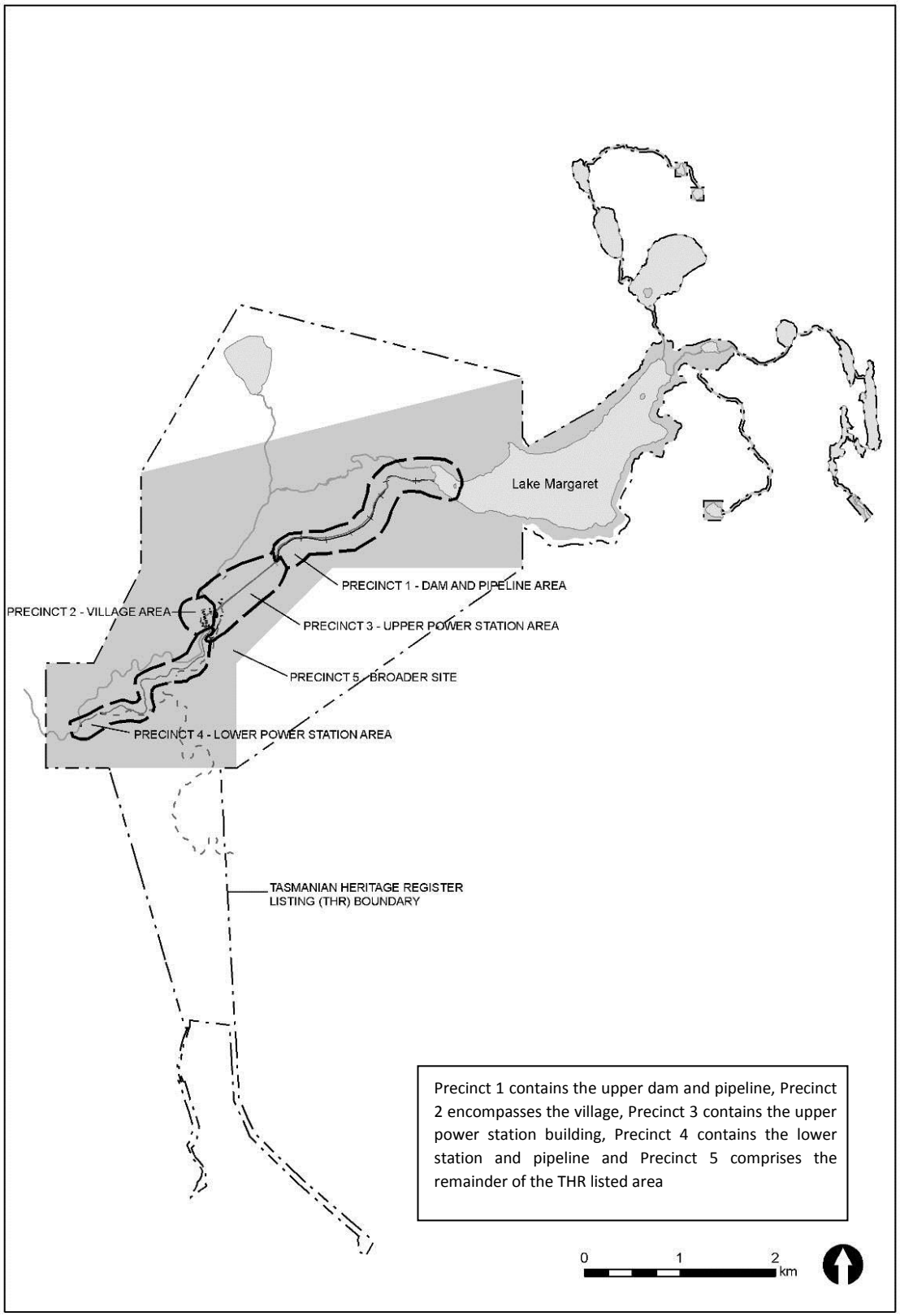

Figure 3-1: Site Precincts broad overview

(After Davies 2006)

3.1.1 Static Assets

The historic cultural heritage values of the Lake Margaret Power Scheme precincts are embodied in a wide range of built elements and engineered landforms that reflect key developmental phases in its history. These include:

- Water storages, including dams and weirs;
- Water conveyance infrastructure, including pipelines, surge towers and penstocks;
- Power station buildings and internal fixtures;
- Electricity transmission infrastructure, including switchyard, pylons and wires;
- Domestic structures, including private residences and corporate facilities;
- Transport infrastructure, including roads tracks, tramways and allied furniture;
- Archaeological evidence of former structures and activity areas.

Table 3.1 contains a list of static assets that have been documented for each precinct within previous studies, including the Lake Margaret Cultural Heritage Study (Godden Mackay 1996), Lake Margaret Conservation Management Plan (Davies 2006), Hydro Tasmania Cultural Heritage List/Inventory (based on Davies 2006 - with various amendments and omissions), and the current lake Margaret entry on the Tasmanian Heritage Register (Heritage Tasmania 2006).

3.1.2 Movable Cultural Heritage

In addition to the static assets within each precinct, the fabric of the Lake Margaret scheme is also embodied in movable items including both industrial and domestic artefacts and documents. These have been described and assessed in a separate study (Austral Tasmania 2009) and are summarised in Table 3.2, however the element numbering is taken from the Hydro Tasmania Cultural Heritage List/Inventory.

The principal categories of movable cultural heritage items identified and assed at Lake Margaret are:

- Generating machinery components comprising items both stored for use and/or redundant;
- Ancillary plant and equipment comprising non-functioning historic elements, tools, fittings, furniture and service infrastructure;
- Historic documentation both currently in use and archival in nature.

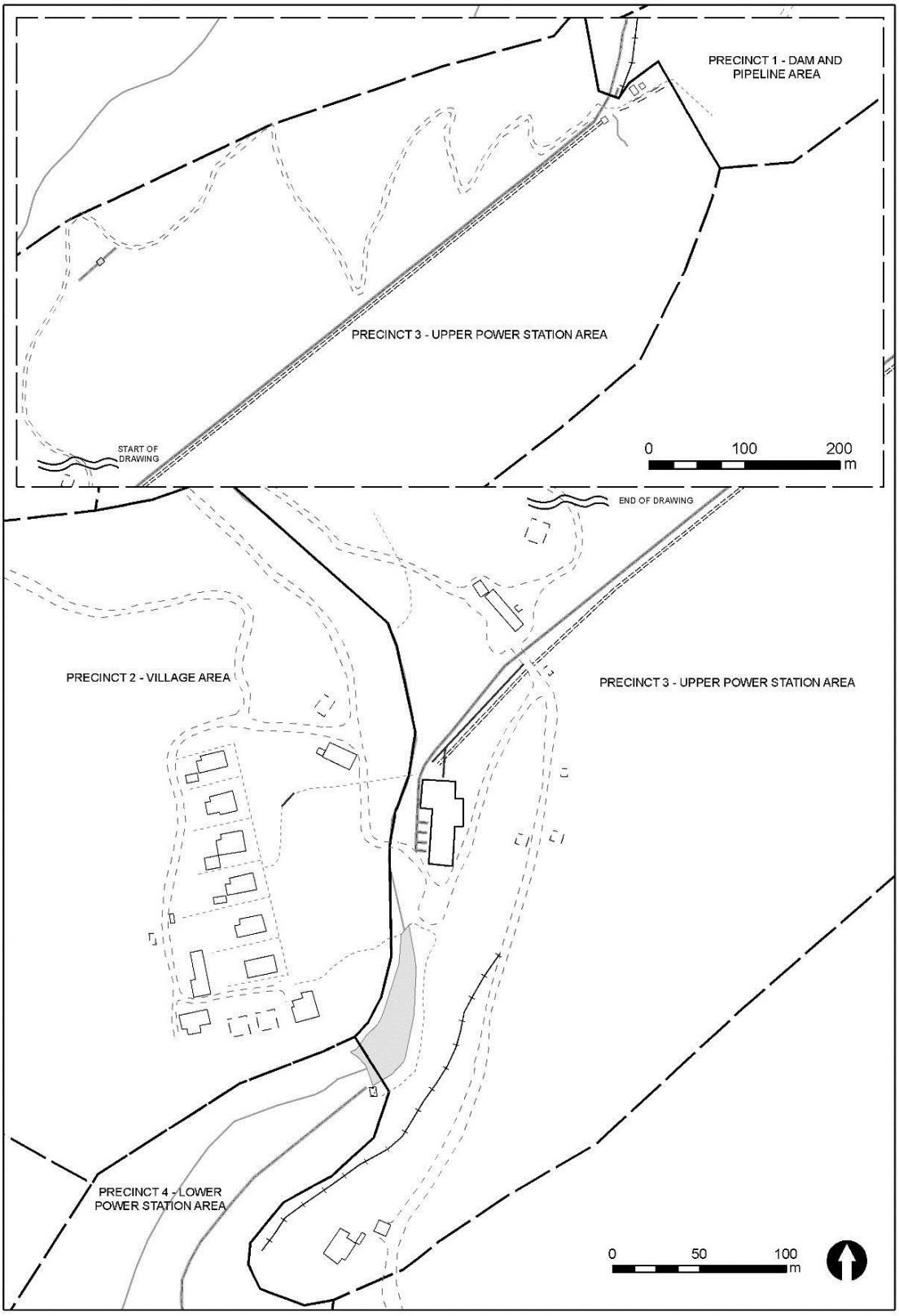

Figure 3-2: Site Precinct divisions, Upper Power Station and Village areas
(After Davies 2006)

3.2 Precinct 1 – Dam and Pipeline Area

This precinct comprises the landscape and built infrastructure for capturing and conveying water to the Upper Power Station. It also includes minor elements to facilitate staff access, operation and maintenance along with archaeological evidence from construction and pipeline rebuilding phases.

Apart from the woodstave pipeline and tramway most of the infrastructure is located at or near the dam. This part of the precinct is accessed via the tramway and walkway that flanks the pipeline from the headworks to the dam wall. The current Yellow Cedar woodstave pipeline has replaced the King Billy Pine and earlier oregon woodstave pipes following a parallel and in some locations the same route. Of particular interest is the section of the alignment set around the edge of the granite escarpment where a narrow shelf was cut from the rock to accommodate both the pipeline and the tramway.

Three sections of King Billy pipeline have been retained – one on steel framing near the dam, one near the cutting and one at the top of the penstocks. Two of these have purpose built viewing platforms while the other is next to the walkway. Evidence of both construction periods remains with saddles and frames from the first pipeline visible in a number of locations. The construction of the pipeline demonstrates a range of building techniques from concrete and steel saddles and frames set into or close to the ground, elevated steel framing constructed from pipe, railway track and purpose made brackets to sections supported on dry stone walling displaying very fine construction detail (some sections have since been grouted).

Near the mid-point of the route is a small corrugated iron clad shed that appears to have been an early blacksmiths shop. It is most likely that this dates from the second pipeline construction but may have been earlier. It is a modest structure and one of very few such elements to remain at the complex, most having been removed as work was completed. Little record apart from photographs remains of these buildings as they were lightly constructed and ephemeral. This is perhaps the last and most important of these structures.

Another shed is found at the dam. While its history is not known it appears to date from recent works and probably occupies the site of an earlier building as the ground is levelled. Again this building is one of a small number of utilitarian sheds that once extended widely over the site.

Also in this precinct is the very finely detailed and built winch-house at the dam. Clearly built as part of the main construction work, it exhibits the same attention to detail as the main power station building with its steep pyramid form roof with finial. This building interestingly combines detail with a robust form housing a winch. It is sited on a stone retaining wall.

The dam wall is the original construction with the now obvious addition of post tensioning blocks along its crest which resemble battlements. The dam is mass concrete with an overspill spillway in one section. The wall is in two distinct sections separated by a rock outcrop. One end contains the spillway with the other hosting the pipeline intake, trash racks and valve house. The valve house is a later addition, probably constructed with the 1938 replacement pipeline, and comprises a simple corrugated iron clad structure built against the dam wall housing the outlet valves. The original 1914 gate valves and their electric motors were replaced with a butterfly valve manufactured by VAG in 2009.

The new outlet directs water into the new woodstave pipeline or to a vent pipe into a rock-lined channel below.

The setting of the dam is dramatic and picturesque. The collection of features including the dam wall, the winch house, the flanking dry stone walls, the elevated pipeline and the valve house all combine to create a precinct of engineering interest as well as scenic value. The smaller elements of the place including remnant drains and minor features add to the historic value of the location.

The dam precinct provides an area of exceptional scenic value with the setting of the lake within a ring of hills with extensive views to the west provided from most parts of the area. The walk from the hilltop valve to the dam is of exceptional scenic value.

3.3 Precinct 2 – Village Area

This precinct currently comprises a complex of residential buildings and recreational elements constructed by the MLM&RCo to accommodate staff and their families on-site. The precinct also contains the archaeological remains of a construction camp comprising a number of timber and steel clad structures scattered around the hillside, which were removed following commissioning of the power station.

The village retains much of its early form with the loss of only two of the residences and the addition of a c1960-70 residence. Various garages and sheds were added to the site over time. The original village comprised a foreman's house (separate and located on the knoll above the river) and eight other houses of similar but slightly varying designs. The village hall appears to also date from or around the first period of construction.

The village is a now unique element in relation to a power station site in Tasmania. While a number of villages survive in part from later power station construction, most village features have been removed as part of site remediation works at station and dam sites or through relocation to new construction sites. This is the only intact village site remaining in the ownership of Hydro Tasmania, even though it was not constructed by them.

Other Tasmanian hydro-power villages that still exist in part include Moorina, (private scheme where three residences remain but only one is occupiable), Poatina (approximately half of its former buildings), Tarraleah (where only the staff house and several buildings remain from a once extensive complex), Wayatinah, Waddamana and Tullah (where some of the village remains).

The Lake Margaret village is also rare as, like Moorina, it was built not to construct the station but to accommodate the operating staff. The village buildings were not constructed until the power station was running. Other stations used parts of the village for this purpose, particularly later and remote stations where the staff house and a group of central more permanent buildings remained for operating staff, but at Lake Margaret all of the residential buildings used during construction were removed and the village constructed to compensate for the difficulties of access to the station.

The village is also rare as it survives with its original built form almost intact. Two early (but not original) houses have been removed and two newer buildings added, but the remaining 7 buildings present the village as built (despite their now deteriorated condition). Their strong linear arrangement with the foreman's house sitting forward demonstrates planning and hierarchy.

The village construction is also of interest. The buildings are built on a levelled platform that appears to be cut from the hill behind and filled in the area below and closer to the Yolande River. The levelled platform is extensive and indicates a clear intent to establish a formal order

in a remote location that contrasts starkly with the random arrangement of construction period dwellings that were randomly and conveniently (to topography) located across the site. The lower area of the village fronting the river is also set on a levelled platform that contained a swimming pool and a recreation ground. There is a distinct embankment separating the two levels that is now subject to some erosion and deterioration. Formerly open vistas of, and within, the village precinct is being reduced through the encroachment of native regrowth.

The village layout also provided for both pedestrian and tram access. Early photographs show the tramway extending across a bridge on the site of the later footbridge, and linking with the haulageway which, during construction, extended to the river bank. Later this bridge was removed and the timber bridge upstream was constructed allowing the tramway to extend around the escarpment to the rear of the village. This bridge in turn was converted to road use. The footpath network extended from the footbridge across the lower ground and via a set of formal concrete stairs and a long ramped walkway to the far end of the village. The second footbridge appears to have been a later addition that more directly connected the foreman's house to the station. The access stairs to this bridge are informal and reflect later construction.

Historical research suggests that the buildings were, at least in part, pre-fabricated and brought to the site in sections. This is not immediately clear from physical inspection. Given the amount of construction work that took place on the site, the construction of timber dwellings would have been a relatively straightforward process as the construction team completed the power station infrastructure.

Early photographs of the village reveal a number of attributes and features of the area:

- Each house had a rectangular skillion roof section at the rear housing the kitchen;
- Each house had a rear brick chimney that has now been removed;
- It appears that the buildings had a consistent colour scheme including red painted roofs (although this may have been added later over natural finish corrugated iron);
- Each house was set in a fenced garden enclosure with formal paths, plantings and a clear distinction between front and rear areas, there was some use of hedging as evidenced in photographs;
- The front fences were rustic pickets as illustrated in various photographs;
- The rear yards contained a range of outbuildings and structures of consistent form with the use of skillion roofs. The present laundry and probably extensions were added later c. 1960;
- A rear road was constructed (presumably after the closure of the tramway) and some garages provided but pedestrian access only was provided to the front entrances;
- The landscape was planned as, and retains, a combination of native trees and mostly introduced exotic plantings. The exotic plantings are confined to the formal cleared areas on the levelled ground;
- The hill behind the houses was cleared, presumably as a fire break, and remained cleared for most of the life of the village. This matched much of the surrounding site that was heavily cleared during the construction phases and has regrown from that time;
- The hall did not have a porch or rear kitchen when first built;
- The residence built on the opposite side of the river, was visually connected to the village as seen in several photographs.

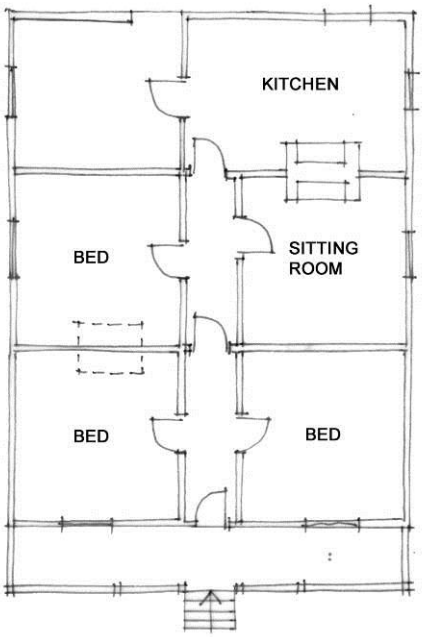

Figure 3-3: Plan of typical house with original layout
(Davies 2006)

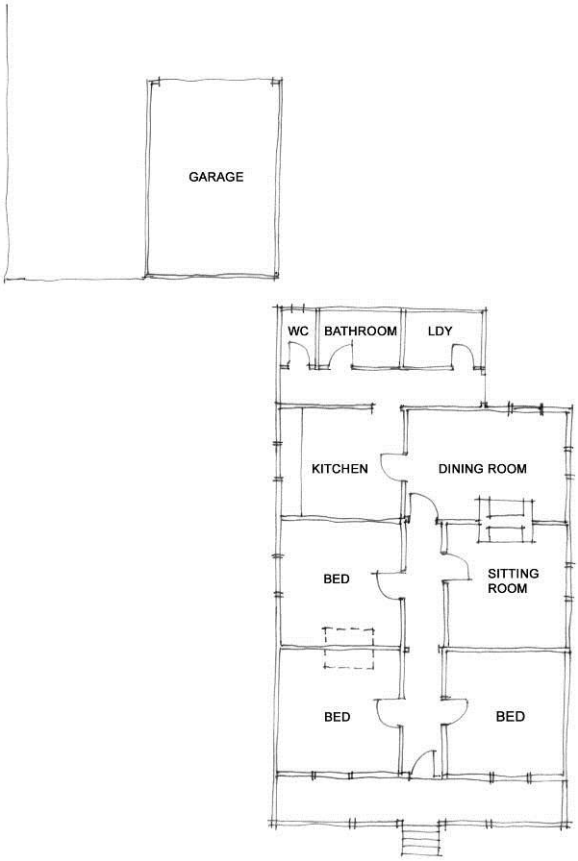

Figure 3-4: Plan of residence 9 with current layout including garage
(Davies 2006)

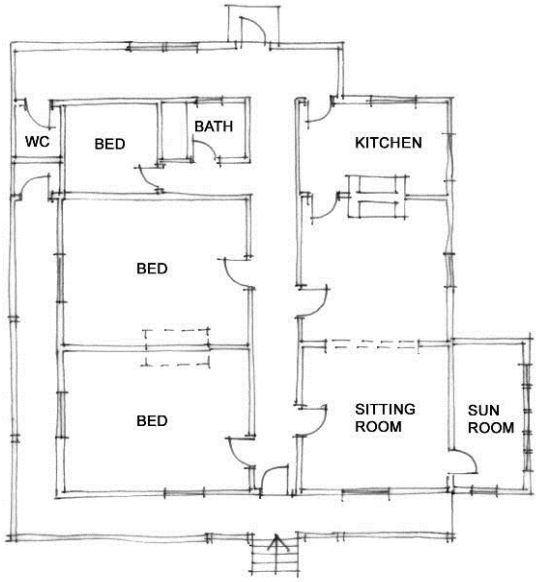

Figure 3-5: House plan of manager's residence (residence 2) with return verandah and additions Note the wall removed and the side addition (Davies 2006)

3.4 Precinct 3 – Upper Power Station Area

This precinct encapsulates the major engineering infrastructure for power generation, from the penstock and surge pipes to the power station, along with archaeological evidence from the construction phases.

Most of the station infrastructure was constructed around 1912-1914 with only a few elements added at later periods. The most significant changes to this area from its constructed form are the removal of the Queenstown tramway and its replacement with the access road - noting that this re-uses much of the same formation, the realignment of the access road from the former tramway to the power station entry, and the construction of the concrete road bridge near the station (which replaced the timber bridge) and the general regrowth over the site of vegetation.

The elements lost from the early phases of use are the timber rail bridge, the two footbridges, a residence near the haulageway and a powder magazine. There is also photographic evidence of extensive temporary housing and other structures occupying the hillside above the power station during the construction phase. While there may be some physical evidence of this occupation such as embankments for tracks and building platforms and archaeological debris, it is unlikely that much other material remains. This hillside is now heavily vegetated and is largely inaccessible.

Of particular interest in this area is the relationship between the surviving elements. The original construction and operational phase is demonstrated by the power station building, the foundations of the temporary power station, remaining early penstock, entry stairs, bridge abutments, pylons and road alignments. This is overlaid with upgrade fabric, including the new penstock with its inlets, altered road works and the c1960 residence adjacent to the main access road.

The alignment of the former access tramway is clear and the benched formation around the cliff face extending to the former rail bridge is a powerful reminder of that form of transport. The garage and store buildings fronting that former alignment also contribute to the understanding of the changes from rail to road transport.

The passage of water through the penstock to the station, into the river and to the lower weir, where it was again used for the lower station, is the connecting theme of the precinct. The Yolande river, in particular its relationship to the power station and the way it separates the village precinct from the operational area of the site, is another important structural element in the landscape.

The Upper Power Station precinct also contains important visual connections. The entry road provides the first overview of the station, looking across the station building to the village beyond. The junction of the entry road and the haulageway is a key location that provides a broad overview of the complex down the valley, and linking with the penstock and haulageway upslope.

The only later introduced element that breaks the early site arrangement is the concrete road bridge adjacent to the station that marks the change from rail to road access and which reduced the separation of village and power station provided by the river.

More recent changes in the visual setting have arisen from the regrowth seen along the river alignment and other margins of the precinct. Management of vegetation within the 'maintained' areas around the buildings will be important to recover some of the visual openness of the Upper Power Station precinct within the context of the heavily forested surrounding area. This will help retain the character of the site as a place carved out of the wilderness and controlled for the production of power.

3.5 Precinct 4 – Lower Power Station Area

This precinct encapsulates the major engineering infrastructure from the 1931 expansion of power generation, from the Lower Weir to the Lower Power Station, along with archaeological evidence from the construction and operational (1931-94) phases.

The lower station precinct extends from the lower weir near the upper station to the outlet from the lower station building into the Yolande River. The lower station was shut down and its Francis Turbine mothballed in 1994 and is no longer operational. A major refurbishment undertaken from 2009-2010 involved replacing the deteriorated pipeline from the lower weir with a new woodstave pipeline connected to a new FRP penstock delivering water to a Turgo generator installed in an extension to the 1931 powerhouse. A new road was constructed from the main access road to the powerhouse. The works also involved repairs to the steel-framed bridge spanning Leslie Creek, originally built using steel fabricated by the firm of Dorman and Long which also supplied steel for the Sydney Harbour Bridge.

Other external elements, including the original penstock, haulageway, and hilltop structures, including winchhouse, hilltop valve and surge tower have been bypassed and retained in situ.

The setting of the Lower Power Station is dramatic with the diminutive station building set far below the hilltop valve in a remote location. The place is evocative of the difficulties in the construction of power stations and the management of water to maximize its generation

potential. In this case the lower station utilises the water already collected and passing through the upper station.

The complete assembly of supply route, hilltop setting and power station at the base of the incline provides a small-scale but complete power installation.

3.6 Precinct 5 – The Broader Site

This precinct encapsulates the remainder of the Lake Margaret Power Scheme which forms the landscape setting of Precincts 1-4 and includes a number of broadly distributed historical elements.

The broader Lake Margaret site (within the THR listed area) is mostly natural or regenerated bushland containing a number of linear features such as tramways, tracks/roads and power lines. The 'natural' landscape of the LMPS is contiguous with the adjoining Crown Land and forms part of the overall 'wilderness' setting for the scheme.

The principal built features within the precinct comprise the existing access road which in part follows the original Penghana Hill tramway alignment but also bypasses sections of abandoned tramway.

Easily accessible parts of former tramway alignments were incorporated into the roadworks, but other sections, such as the segment passing between the lower weir and House No. 1and earlier woodcutting and exploration tracks were abandoned. Their remains reflect the early modes of site access and mainly comprise overgrown cuttings and embankments.

The other striking linear feature is the route of the Mt Lyell overhead power lines and towers with their associated access tracks. Most of the route of the transmission line is outside the THR listed area.

An interesting element associated with recreational activity is situated south-west of the Upper Station. The remains of a small fish hatchery comprising a small dam, intake pipes, settling pond and concrete formed holding tanks, are silted up and abandoned off the main access road.

Table 3.1: Static assets by precinct indicating current heritage listings and significance rankings

CHL	GM	THR	Name	THR Description	Integrity	Rank
Precinct 1 - Dam and Pipeline Area						
-	-	1.1	Lake Margaret	Lake Margaret as a modified natural feature.	*Glacial lake; level raised c1917*	N/A
-	-	1.2	Engineering works	Lake Margaret lake-bed engineering works, including channels carved through bedrock, stone walls and embankments directing water from the upper lake to the dam outlet.	*Intact c1914 features*	N/A
603	-		Boatshed			MEDIUM
604	**001**	**1.3**	**Dam**	**Mass concrete dam wall in two parts; the southern section including a channel carved through the bedrock to house the outlet with bulkhead gate & trash racks, the northern section incorporating a spillway.**		**VERY HIGH**
605	**001**	**1.4**	**Dam infrastructure - Outlet valve house**	Outlet valve house, formerly incorporating 2 screw valves, motors and surge pipes.*	*Former c1938 feature. The gate valves and motors have been upgraded**	**HIGH**
606	**002**	**1.5**	**Dam winch house & winch**	**Winch House & winch for bulkhead gates.**	***Intact c1914 feature***	**HIGH**
607	004	1.6	Workshed	Dam Work Shed (possibly on site of earlier building).	*Intact c1970 feature*	LOW
608	**-**	**1.10**	**Drystone walls**	**Refer 609**	**Refer 609**	**HIGH**
609	**003**	**1.10**	**Retained sections of 1938 woodstave pipeline**	**2.2km Wood Stave Pipeline, supporting structures, bench excavation & stone embankments.***	***Three retained sections of 1938 pipeline, excavation and embankments from c1914 tramway****	**HIGH**
610	**006**	**1.12**	**Tramway**	**2.2km Tramway & Walkway, including new boardwalk, supporting structure, bench excavation & stone embankments, equipment relics etc.**	***Mix of original/recycled c1914 iron rails and 1990s timber rails, excavation and embankments primarily from c1914 pipeline***	**VERY HIGH**
611	**006**	**THR**	**Evidence of early walkway**	**Refer 610**	**Refer 610**	**HIGH**
612	**-**	**1.14**	**Archaeological remains (drains)**	**Early Drains, Building Sites, Pathways & Stairs.**	***Archaeological evidence from various periods***	**HIGH**
613	**005**	**1.13**	**Halfway shed**	**Halfway Shed/Blacksmith's Shop.**	***Partly intact c1938(?) building - re-roofed & clad since 1996, Blacksmith equipment no longer present***	**HIGH**
-	-	1.9	Dam construction camp	Dam Construction Camp site, possibly at site of earlier timber camp.	*Archaeological evidence pre-1914*	MEDIUM
-	-	1.7	Lake Mary weir and diversion	Lake Mary weir and diversion canal (incl manual plank	*c1914 feature; integrity unknown*	N/A

CHL	GM	THR	Name	THR Description	Integrity	Rank
				gate) to Lake Margaret.		
-	-	1.8	Small lakes diversion structures	Weirs, diversion canals, water courses and tunnel from Lakes Paul, Peter, Apollos, Martha & Philip to Lake Margaret.	*c1914 feature; integrity unknown*	N/A
-	-	1.11	Original woodstave pipeline route	Original wood stave pipeline route with disused supports etc.	*c1912*	N/A
-	-	1.15	Mt Sedgewick works	Early Flumes and works, Mt Sedgwick.	*Archaeological evidence from c1914*	N/A
-	-	1.6	King Billy pines	2x King Billy pine trees (*Athrotaxis selaginoides*) adjacent track between Dam Work Shed & Dam	*Representative plantings of species used in wood stave pipeline*	N/A
-	-	-	Replacement woodstave pipeline, supports and accessway		*New element c.2009*	LOW
-	-	-	Viewing platform		*New element c.2009*	LOW
-	-	-	Reconstructed tramline		*New element c.2009*	LOW
Precinct 2 - Village Area						
615	**-**	**-**	**Village layout and overall value**			**VERY HIGH**
616	-	-	Former road bridge (collapsed)			MEDIUM
617	017	-	Footbridge 1 remains			MEDIUM
618	019	-	Remains of former footbridge 2			MEDIUM
620	**22**	**2.1**	**Residence 2 c 1914 (Superintendent's house)**	**Superintendent's House (House #2) & "heated" garden.**	***Intact c1914 feature***	**HIGH**
621	26	2.3	Residence 3 c 1965 (demountable)	1960 Staff House (House #3).	*Intact c1965 feature*	LOW
622	**23**	**2.2**	**Residences 4 c 1914**	**1914 Staff Cottages (Houses 4-9), garage/sites, fences & gardens.**	***Intact c1914 houses & archaeological evidence***	**HIGH**
623	**23**	**2.2**	**Residence 5 c 1914**	**Refer 622**	**Refer 622**	**HIGH**
624	**23**	**2.2**	**Residence 6 c 1914**	**Refer 622**	**Refer 622**	**HIGH**
625	**23**	**2.2**	**Residence 7 c 1914**	**Refer 622**	**Refer 622**	**HIGH**
626	**23**	**2.2**	**Residence 8 c1914**	**Refer 622**	**Refer 622**	**HIGH**
627	**23**	**2.2**	**Residence 9 c1914**	**Refer 622**	**Refer 622**	**HIGH**
629	25	2.4	Single men's housing	Single-Men's Quarters.	*Intact c1930 building; partly gutted 1980s*	MEDIUM

CHL	GM	THR	Name	THR Description	Integrity	Rank
630	**24**	**2.5**	**Community Hall**	**Community Hall.**	***Intact c1914 feature***	**HIGH**
631	-	2.8	Remnant steps and paths	Refer 633	Refer 633	MEDIUM
632	21	2.6	Swimming pool remains and sports field	Sports Field & Swimming Pool.	*Overgrown*	N/A
633	**-**	**2.8**	**Tramway Formation**	**Tramway embankments, roads, pathways, steps (various), street & path lighting.**	***Partly intact; overgrown***	**HIGH**
634	-	2.11	Archaeological sites – Village area	2x removed c1914 Staff Cottages, & Hut Ruin.	*Archaeological evidence from c1914*	MEDIUM
635	-	2.12	Air Raid Shelter remains	2x Air Raid Shelter ruins.	*Partly intact; overgrown, Archaeological evidence from c1942*	MEDIUM
636	-	-	Road bridge			NONE
Davies 2006	**-**	**2.9**	**Exotic plantings**	**Exotic landscape plantings including trees, flax and perennial garden plants**	***Partly intact***	**HIGH**
Davies 2006	**-**	**2.9**	**Mature tree plantings**	**Refer above**	**Refer above**	**HIGH**
-	-	2.7	Playground site	Playground site (adjacent House #2)	*Archaeological evidence*	N/A
-	-	2.10	Construction camp	Construction Camp (tent sites).	*Archaeological evidence from c1911-1918*	N/A
-	-	2.14	Water system	Stone/concrete water tanks timber water pipes, fire hose reels.	*Archaeological evidence from c1914-70s.*	N/A
-	-	2.15	Tip sites	Tip sites, various.	*Archaeological evidence from c1911-70s*	N/A
Precinct 3 – Upper Station Area						
614	-	3.12	Temporary Power house, other buildings sites including construction camp site	Hillside Construction Camp site, Magazine & Building Sites.	*Archaeological evidence from c1912-70s*	LOW
628	**027**	**3.13**	**Residence 1 c1940s/50s**	**Staff Cottage #1.**	***Intact c1960 feature.***	**HIGH**
635	-	3.11	Air Raid Shelter remains	Air Raid Shelter ruin.	*Archaeological evidence from c1942*	MEDIUM
636	018	3.9	Road Bridge 1990s	Road Network & Concrete Bridge.	*Intact 1965-2006 features*	NONE
637	019	-	Corded track			MEDIUM
638	-	3.6	Surge tower old	Early Surge Tower remains.	*Archaeological evidence from c1938*	MEDIUM
639	010	3.4	Surge tower new	Refer 646	Refer 646	MEDIUM
640	008	3.5	Winch and winch house	Haulageway, Gantry, Winchhouse & Winches.	*Rebuilt c1969 haulageway & winch house, intact c1914 winch*	MEDIUM
641	**007**	**3.5**	**Former hilltop winch**	**Refer 640**	**Refer 640**	**HIGH**

CHL	GM	THR	Name	THR Description	Integrity	Rank
642	**011**	**3.3**	**Valve House**	**Refer 644**	**Refer 644**	**HIGH**
643	-	3.3	Manifold and take-off	Refer 644	Refer 644	MEDIUM
644	012	3.3	1914 penstock	c1914 Triple Penstock, Manifold & Hilltop Valve House.	*Intact c1914/1931 features*	MEDIUM
645	**013**	**-**	**Old haulageway and stonewalls**			**HIGH**
646	012	3.4	1970s Penstock	Operating Penstock, Surge Tower & Excess Water Channel.	*Intact c1965 feature*	MEDIUM
647	**-**	**3.5**	**Incline and gantry**	**Refer 640**	**Refer 640**	**HIGH**
648	**014**	**3.7**	**Garage/store Buildings**	**Garage Complex & Wood Stave Machine.**	***Buildings relocated from Penghana Hill Terminus post 1964***	**HIGH**
649	**014**	**3.7**	**Woodstave Machine**	**Garage Complex & Wood Stave Machine.**	***Buildings relocated from Penghana Hill Terminus post 1964***	**HIGH**
650		**3.1**	Sites of former buildings – residence, magazine,	Manager's House	*Archaeological evidence from c1914(?)*	LOW
651	**-**	**-**	**Mature and exotic tree plantings**			**HIGH**
652	**-**	**3.10**	**Concrete entry stair and structures**	**Grand Entry Stair, Pathways & Footbridges.**	***Intact features & archaeological evidence from c1914-70s***	**HIGH**
653	**016**	**3.2**	**Power station building**	**Power Station Building including 7x 1.2MW generators driven by Pelton-wheels, associated Transformer Yard, Machinery, Fitout & converted Historical Display Room.**	***Intact c1914 feature and 1930 addition & upgraded equipment. Historical displays are movable cultural heritage items****	**HIGH**
654	-	3.2	Main inlet valves	Refer 653	Refer 653	MEDIUM
655	**-**	**3.2**	**Generator sets and turbines**	**Refer 653**	**Refer 653**	**VERY HIGH**
656	**-**	**3.2**	**Main crane**	**Refer 653**	**Refer 653**	**HIGH**
657	**-**	**3.2**	**Control panels 1914**	**Refer 653**	**Refer 653**	**VERY HIGH**
658	**-**	**3.2**	**Workshop, equipment and stores**	**Refer 653**	**Refer 653**	**MEDIUM**
659	**-**	**3.2**	**Station display room and archive**	**Refer 653**	**Refer 653**	**VERY HIGH**
675	**-**	**-**	**Water reservoir and pipe remains (associated with temporary power station used during construction)**			**HIGH**
Davies 2006	-	3.2	Main isolating valves	Refer 653	Refer 653	MEDIUM

CHL	GM	THR	Name	THR Description	Integrity	Rank
Davies 2006	**-**	**3.2**	**Exciters**	**Refer 653**	**Refer 653**	**VERY HIGH**
Davies 2006	-	3.2	Rectifiers	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Surge Diverters	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Switch gear and transmission	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Oil circuit breakers	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Fuse switches	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Service transformers	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Auto transformers	Refer 653	Refer 653	MEDIUM
Davies 2006	-	3.2	Tripping unit	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Standby charger	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Control panels 1965	Refer 653	Refer 653	LOW
Davies 2006	-	3.2	Enclosure of control room	Refer 653	Refer 653	NONE
Davies 2006	-	3.2	Later fitout of amenities area with kitchen etc.	Refer 653	Refer 653	LOW
Davies 2006	-	5.9	11kv transmission lines	Refer 679	Refer 679	MEDIUM
Davies 2006	-	-	Concrete slab of former buildings			MEDIUM
Davies 2006	-	3.7	Open shed at base of incline	Refer 648	Refer 648	MEDIUM
Davies 2006	**-**	**3.9**	**Access road to former road bridge**			**HIGH**
Davies 2006	-	3.3	Hilltop butterfly valves	Refer 644	Refer 644	MEDIUM
Davies 2006	20	3.8	Tramway formation and alignment around station	Tramway Cuttings, Bridge Sites and Track Remains.	*Archaeological evidence from c1914-38*	**VERY HIGH**
-	-	-	Toilet	Public toilet near upper station	*New element c.2012*	LOW
Precinct 4 - Lower Station Area						
661	**029**	**4.1**	**Lower weir and headworks**	Lower Weir and outlet	*Intact c1930-31 feature*	**VERY HIGH**
662	030	-	Trashrack and intake			MEDIUM
663	**031**	**4.2**	**Woodstave pipeline remains**	**2km Wood Stave Pipeline alignment, including earthworks, bridges & pathway.***	***Pipeline replaced with a new woodstave pipeline on original alignment c.2010.****	**HIGH**
664	**-**	**-**	**Leslie Creek Bridge**			**HIGH**
665	033	4.5	Winding House & Winch	Refer 669	Refer 669	MEDIUM
666	035	4.3	Valve House & Valves	Refer 668	Refer 668	MEDIUM

CHL	GM	THR	Name	THR Description	Integrity	Rank
667	032	4.4	Surge Tower	Surge Tower	*Intact c1960 replacement of 1931 tower*	MEDIUM
668	036	4.3	Penstock c1930s	Penstock & Valve House.	*Intact c1931 feature*	MEDIUM
669	**034**	**4.5**	**Haulageway**	**Haulageway, Traveller, Winchhouse & Winches.**	***Partially intact c1930-31 features***	**HIGH**
670	-	-	Haulageway buffer		***Intact c1930-31 feature***	MEDIUM
671	**037**	**4.7**	**Power Station building**	**Lower Power Station Building with its Machinery & Fitout including (dismantled)1.5MW generator driven by a Francis turbine**	***Partly intact c1931 feature***	**VERY HIGH**
672	**037**	**4.7**	**Francis Turbine**	**Refer 671**	**Refer 671**	**HIGH**
673	**-**	**4.7**	**Control panel**	**Refer 671**	**Refer 671**	**VERY HIGH**
773	**-**	**4.8**	**'Tin Town' construction site**	**'Tin Town' Construction Camp site.**	***Archaeological evidence from c1930s***	**HIGH**
-	-	4.6	Timber bridge near winch house	Haulageway bridge	*Partly intact c1931 feature*	MEDIUM
Davies 2006	**-**		**Transformers**		***Intact c1930-31 feature***	**VERY HIGH**
-	-	4.9	Road and track network	Road Network along early Tramway Alignments and 'Zig-Zag' Track	*Archaeological evidence c1931 & intact roads c1965-2006*	N/A
-	-	4.10	Copper Mines of Tasmania pipeline and pump house	Copper Mines Tasmania Water Pipeline & Pump House.	*Operating post-1994 features*	N/A
-	-	-	Lower Station Mini-Hydro development	Steel extension to power station building containing 1.5MW generator driven by a Francis turbine and new 3.2 MW Turgo generator*	*Post 2009 feature**	N/A
-	-	-	Replacement woodstave pipeline c2010		*Post 2009 feature**	N/A
-	-	-	FRP Penstock 2010		*Post 2009 feature**	N/A
-	-	-	Access road		*Post 2009 feature**	N/A
Precinct 5 - Broader Site						
676	028	5.3	Fish Hatchery	Fish Hatchery (Leslie Creek).	*Partly intact c1918 feature*	MEDIUM
677	**-**	**5.5**	**Former tramway route**	**Tramway Cuttings, Embankments & Bridge site.**	***Archaeological evidence from c1914-65***	**HIGH**
678	037	5.6	Main access road	Lake Margaret roadway & its coincidence in part with the original Tramway alignment.	*Intact 1965 feature over c1912-65 feature*	MEDIUM
679	-	5.9	Transmission Towers	Electrical Transmission Towers to Mt Lyell & Zeehan.	*Modern operational elements along historical alignments*	MEDIUM
680	-	5.8	Access roads and tracks	Modern fire-trails & transmission tower, access roads.	*Post-1965 operational elements*	MEDIUM
-	-	5.1	Yolande Waterfall construction	Yolande Waterfall.	*Potential archaeological gravel site*	N/A

CHL	GM	THR	Name	THR Description	Integrity	Rank
			site			
-	-	5.2	Early c20th timber and exploration tracks (incl Leslie Creek timber camp	Leslie Creek Timber Camp & early C20th Timber & Exploration Tracks.	*Archaeological evidence from pre-1911*	N/A
-	-	5.4	Maltese workers camps	1912-14 Maltese Worker's Camps 'Valetta' & 'Gozo'.	*Exact locations not yet defined; potential archaeological evidence c 1911*	N/A
-	-	5.11	Signage and lighting	Signage and exterior lighting across all precincts.	*Intact/modified*	N/A

CHL - Hydro Tasmania Cultural Heritage List
GM – Godden Mackay (1996)
THR – Element referred to in Tasmanian Heritage Register reference
THR Description – description reproduced in its entirety other than where updated to reflect change in condition since 2006 (indicated by *)
N/A – Not Assessed

Table 3.2: Movable Cultural Heritage by precinct with significance rankings

HT Inv No	Name	Rank	HT Inv No	Name	Rank
Precinct 1 - Dam and Pipeline Area			**Precinct 3 – Upper Station Area**		
816	Vice	MEDIUM	**853**	**Cardew Voltmeter**	**HIGH**
817	**Banding lever**	**HIGH**	854	Insulator	MEDIUM
818	**Hopper**	**HIGH**	855	Tool Room & Stores	MEDIUM
819	Light pole and shade	MEDIUM	**856**	**Stator Windings**	**HIGH**
820	Jack	MEDIUM	857	Trolley	MEDIUM
821	Valve spacer	MEDIUM	**858**	**Documents**	**VERY HIGH**
Precinct 2 - Village Area			**859**	**Documents**	**VERY HIGH**
119*	Stove	MEDIUM	**860**	**Documents**	**VERY HIGH**
120*	Scoreboard	MEDIUM	**861**	**Documents**	**VERY HIGH**
121*	Stoves	LOW	**862**	**Documents**	**VERY HIGH**
122*	**Railing**	**HIGH**	**863**	**Documents**	**VERY HIGH**
123*	Tram bogie wheels	LOW	864	**Documents**	**VERY HIGH**
124*	Fire hose	MEDIUM	865	**Documents**	**VERY HIGH**
Precinct 3 – Upper Station Area			865	**Documents**	866
822	Cupboard	LOW	867	Woodstave Pipe	MEDIUM
823	Shelves	LOW	868	Plaque	LOW
824	**Toolboard & tool rack**	**HIGH**	**869**	**Safety Railings**	**HIGH**
825	**Safety rail**	**HIGH**	870	Valve	MEDIUM
826	Framed map	MEDIUM	871	Handrails	LOW
827	Message board	LOW	872	Winch	LOW
828	Map cabinets	MEDIUM	873	Cable Guides	LOW
829	Timber frame	MEDIUM	874	Templates	LOW
830	Large metal bin	LOW	875	Cradles	LOW
831	**Intake level gauge for Lower Power Station**	**HIGH**	876	Sirens	LOW
832	**Pressure Gauges**	**HIGH**	**877**	**DC Motors**	**HIGH**
833	**Control equipment**	**VERY HIGH**	**878**	**Dashpot Pedestal**	**HIGH**
834	Operator's chair	LOW	879	Light Fitting	MEDIUM
835	Furniture	LOW	880	Valve Inner	LOW
836	Furniture	LOW	881	Needle Valve	MEDIUM
837	Lockers	LOW	**882**	**Valve**	**HIGH**
838	Door stop	MEDIUM	**883**	**DC Exciter Ring**	**VERY HIGH**
839	Furniture	MEDIUM	**884**	**Deflector**	**VERY HIGH**
840	Furniture	LOW	885	Misc electrical components	LOW
841	**Turbine name Plate**	**HIGH**	886	Haulage capel	MEDIUM
842	**Needle Valve & Bucket**	**VERY HIGH**	**887**	**Measuring tape**	**HIGH**
843	Chair	LOW	888	Instrument Cabinet	LOW
844	**Fire Bucket**	**HIGH**	**889**	**Lower Station intake screen lifting apparatus**	**HIGH**
845	Model	LOW	890	Blanks	MEDIUM
846	**Display Documentation**	**HIGH**	**891**	**Pipe assembly tool**	**HIGH**
847	Woodstave	MEDIUM	**892**	**Water supply pipe**	**HIGH**
848	Spanners	MEDIUM	893	Electrical equipment	LOW
849	**Rain Recorder**	**HIGH**	894	Winch motor parts	MEDIUM
850	Insulator	MEDIUM	895	Transformers	MEDIUM
851	**Telephone Switchboard**	**HIGH**	896	Blinding flange	MEDIUM

HT Inv No	Name	Rank	HT Inv No	Name	Rank
Precinct 3 – Upper Station Area			**Precinct 4 - Lower Station Area**		
897	Transformers	MEDIUM	803	Crane	MEDIUM
898	AC Motor	MEDIUM	804	Misc. fittings	LOW
899	Pulley wheels	LOW	**805**	**Misc. components**	**N/A**
900	**Pinion gear**	**HIGH**	**806**	**Machine guard rails and mesh fence**	**HIGH**
901	Motor	LOW	**807**	**Draft tube**	**HIGH**
902	Belt laces	LOW	**808**	Work Bench	**MEDIUM**
903	**Needle valve**	**VERY HIGH**	809	Cupboard	LOW
904	Work platform	MEDIUM	810	**Guide vane bushings**	HIGH
905	Open/shut mechanism	LOW	**811**	Wash basin	**LOW**
906	**Runner buckets and pins**	**VERY HIGH**	**812**	**Tool Board**	VERY HIGH
907	Compressors	MEDIUM	**813**	**Fire buckets**	HIGH
908	**Woodstave fittings**	**HIGH**	814	Telephone	MEDIUM
909	Woodstave rings	MEDIUM			
910	Drill press	LOW			
911	Reducers	LOW			
912	Valve	MEDIUM			
913	**Unidentified item**	**N/A**			
914	**Runners**	**HIGH**			
915	**Control valve union**	**HIGH**			
916	Chain blocks	LOW			
917	Joiners	LOW			
918	DC Motors	LOW			
919	Flanges	LOW			
920	Fittings	LOW			
921	Woodstave rings	LOW			
922	Chain block	MEDIUM			
923	**Stator windings**	**HIGH**			
924	**Oil tanks**	**HIGH**			
925	Contact breakers	LOW			
926	Circuit breaker	LOW			
927	Battery chargers	LOW			
928	Fire hoses	MEDIUM			
929	Stretcher	MEDIUM			
930	**Spanners**	**HIGH**			
931	Die holders	MEDIUM			
933	Rubbish dump	LOW			
Precinct 4 - Lower Station Area					
795	Winch remnant	MEDIUM			
796	Flange	MEDIUM			
797	**CMT off-take Tee piece**	**HIGH**			
798	**Gate valve**	**HIGH**			
799	Trolley	MEDIUM			
800	**Unidentified item**	**N/A**			
801	**Guide vanes**	**HIGH**			
802	**Turbine check plate**	**HIGH**			

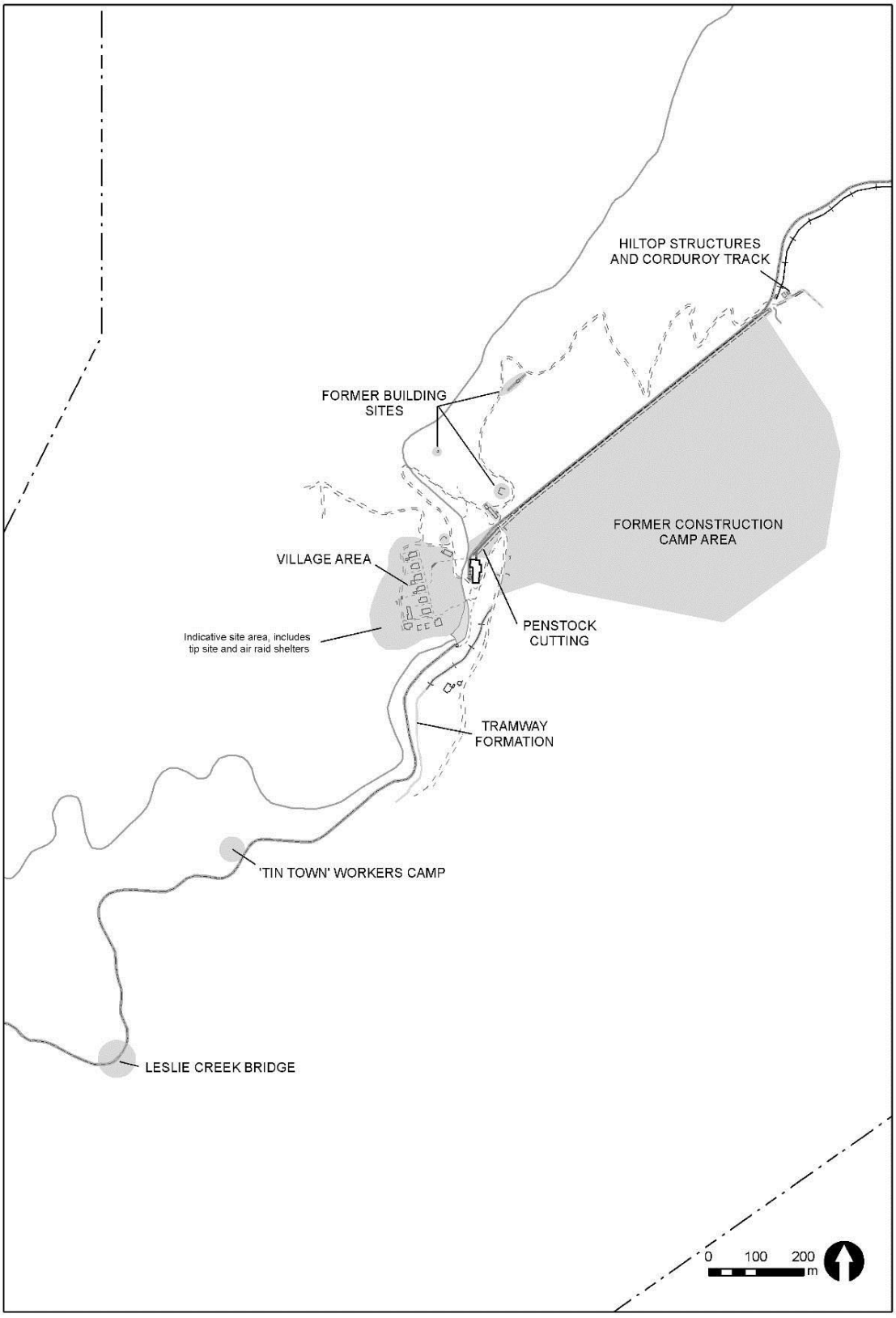

Figure 3-6: Areas of potential archaeological sensitivity

(After Davies 2006)

4. Comparative Analysis

4.1 Introduction

The Lake Margaret Power Scheme is unique within the context of power generation in Tasmania and Australia. It represents the last of the privately constructed and operated power schemes in Tasmania and has operated relatively continuously since 1914. It is also a scheme of some size and complexity with seven generating units in the main station and one in the lower station. The complex retains almost its entire original infrastructure and continues to generate power.

The following comparative analysis is based on the 1994 Godden Mackay Cultural Heritage Study. It is of relevance as it relates the station to the Australian context, the authors having undertaken at that time a broad study of power generation across Australia. The final section is a summary relating Lake Margaret to the four most comparable stations in Tasmania: Mt Bischoff, Duck Reach, Moorina and Waddamana.

4.2 Early Hydro-Electric Power Generation in Australia

Early developments in electricity generation in mainland Australia were almost entirely thermal based. Tasmania's topography and climate, being more suited to hydro-electric development, encouraged early mining companies to invest in local production. Hydro-electricity had been in use overseas since the early 1880s. In Australia however it had been used only on a small scale up until 1895 when Tasmania and, to a lesser degree New South Wales, adopted the technology on a more substantial scale. Prior to these undertakings water had only been used on a limited scale to supply electricity for local manufacturing or industrial use, examples being at Waverley Woollen Mills Tasmania (1872), at Waratah by the Mt Bischoff Tin Mining Company in Tasmania which installed five water wheels to generate power for lighting in 1883, at Jenolan Caves NSW (a single Leffel wheel) in 1889 and at Thargomindah in Queensland (a single Pelton wheel) in 1895.

1895 marked the advent of schemes in both states which were intended to produce electricity for both industrial and domestic use. The Gara River scheme, built to provide power for the town and mines of Hillgrove east of Armidale in NSW, was completed in late February 1895. The venture failed within 3 months but was reinvigorated in 1900 with limited success (Gojak 1988). The power station was described in 1899 as "... one of the finest electrical plants in Australia with four Pelton wheels and motors capable of supplying up to 1000hp (745 kW)". The station finally ceased operation around 1907. Only minor remnants now remain at the site.

Ten months after the commissioning of Gara River, the Duck Reach Power Station on Tasmania's South Esk River began operating. Built by the Launceston Town Council, the station provided both DC for arc lamps and AC for incandescent lamps and electric motors. The station was upgraded several times before closing in 1955 following commission of the Trevallyn power development.

In 1906 a hydro power station was established on the Styx River near Armidale, NSW but no information regarding scale is known.

Around 1907, the Mt Bischoff Tin Mining Company extended its Waratah Power Station adding two Encher-Wyss Pelton turbines coupled to Westinghouse alternators, each of 145kW. Two additional sets of Voith turbines and AEG 3765 kVA alternators were added in 1909 and 1912 respectively. The year 1907 also saw the construction of a small hydro power station at Deloraine in Tasmania. This station operated two turbines, one of which still survives in a museum at Deloraine, and produced power on a similar scale to the Latrobe station which was built one year later.

The Latrobe Electric Company began supplying power in 1908 from a small hydro station with two vertical shaft turbines. In terms of scale both these stations (Latrobe and Deloraine) do not rate beside the 1907 extension at Mt Bischoff or the 1909 undertaking at Derby (Moorina).

Pioneer Tin Mines Moorina Power Station situated near Derby in north east Tasmania opened in 1909. It consisted of three Pelton type turbines, coupled to AEG 37 kVA alternators. The scheme included Australia's first rockfill dam which is also one of the first in the world to be built with an upstream waterproof concrete membrane. Moorina Power Station ceased operating in March 2008.

The Lake Cumberland Power scheme near Mt Agnew north-west of Zeehan, was typical of a speculative mining field. It developed based on tin mining. The mining field was discovered in 1879 and extensive mine development occurred in the 1880s. Water turbines were reportedly used on the field prior to 1900 but their capacity and role is not known. A small battery and treatment plant driven by a Pelton wheel was set up in 1914 on the old Kelvin mine. The Federation Tin No Liability Co. floated in 1919 planned a power station at Wakefield Creek in 1919 but the Company ceased operations in 1922 prior to its construction. Federation Tin Mines Ltd commenced operations in 1927 and instigated the Cumberland Lake Power Scheme. The scheme as constructed comprised Lake Cumberland, the previous Company's water race suitably repaired, a concrete forebay boldly perched on a huge granite outcrop and nearly two thousand feet of pipe to a power station 232m (60ft) below on Wakefield Creek. The power unit comprised a 700 hp Boving Pelton Turbine and a BTH generator (522 kW). The scheme was completed in September 1928 but due to the Company's financial difficulties, the plant lay idle for seven years. The mine and hydro plant operated between 1935 and 1938. The mine reopened briefly in 1942.

The Federation hydro-electric generating set was purchased by the Bega Valley County Council NSW and modified by Boving and Co. to operate under nearly twice the head and put in service in the Bembolia Power Station in March 1944. It was taken over by the Electricity Commission of NSW in 1966 and is thought to be still in operation.

Development of hydro-electrical infrastructure in NSW and Victoria, on the scale that had already been achieved in Tasmania, did not occur until the 1920s.

During the 1920s three hydro stations were constructed in NSW that were of a similar scale to developments in Tasmania. In 1923 a relatively large hydro-electric power station was constructed at Nymboida with 7 Francis type turbines giving an output of 4.8MW. Following this in 1926 2 Pelton turbines (output of 144kW each) were installed at Mullimbimby whilst in 1927 2-5mw turbines were installed at Burrinjuck. In Victoria a similar story occurred with four hydro-electric stations being built in the 1920s. Rubicon Falls Power Station was constructed in 1926 with one 0.3MW turbine. This station is of particular interest because it is the first remote controlled, automatic station in Australia.

Following this Royston (1928, 1 x .8MW turbine), Rubicon (1928 2 x 4.6MW turbines) and Lower Rubicon (1928 1 x 2.7MW) power stations were constructed. All these stations are still extant. Queensland, Western Australia, South Australia and the Northern Territory were not as suited to hydro-electric development and therefore have no early examples for comparison.

4.3 Tasmanian Power Developments

4.3.1 Duck Reach

The Duck Reach Power Development was built on the South Esk River approximately two miles from Launceston and operated by the Launceston Town Council from 1895-1955. The layout originally consisted of a low masonry weir and eight, 21hp Thompson-Vonex type turbines by Gilbert, Gilkes and Co. Ltd of Kendell, coupled to 3 x l00kW AC and 5 x 60kW DC dynamos made by Siemen Brothers of London. The DC was produced at 1750 volts for street arc lamps and the AC at 2000 volts and 92 Hz for incandescent street lamps, domestic lighting and electric motors. Two more 100 kW AC sets were installed in 1899. Upgrades occurred in 1903-5 when five AC machines were replaced with 300 kW generators, two of the DC machines were removed and the remaining three DC sets converted for house use. Following the addition of an 800 kW AC set in 1921 the station capacity was rated at 2000 kW supplying 3 phase AC at 380/220 volts (Lee 2005: 4).

Water was supplied from a diversion weir across the gorge on the South Esk, and directed through a tunnel half a mile in length and five feet in diameter to a five foot diameter wrought iron penstock leading down the steep slope to the power station perched above the river bank 34m below (Lee 2005: 4).

The power station was badly damaged by flood in 1929, but reopened again in 1932, by which time Launceston was connected to the state grid. The station was acquired by the Hydro Electric Commission in 1944 and operated until relegated by the Trevallyn development in 1956. The plant was disassembled and scattered between collecting institutions. The powerhouse remains and one 1985 machine has been returned, and there are proposals to redevelop the site for tourism purposes.

The Duck Reach Power Station has been nominated to the Tasmanian Heritage Register, however as of December 2014 the assessment remains to be finalised.

4.3.2 Mt Bischoff

The station was built and operated to supply power for ore processing and eventually civic use by the Mt. Bischoff Tin Mining Co at Waratah, North-west Tasmania. Installed in 1883, the original power plant comprised a 50 lamp DC dynamo connected to the shaft of the main waterwheel on Waratah Falls. A 100 lamp dynamo was installed three years later, and actuators and further dynamos added in 1889, 1897 and 1892 to light extensions to the mill and offices (Groves et al 1972, quoted in Godfrey 1984, 20).

The main reservoir for the scheme was located to the east of the Waratah township on Stone Dam Creek, with water being conveyed via a 2km long tunnel, 2m high by 1.5m wide with several ventilation shafts along its length, to a regulation pond at the head of Waratah Falls.

A separate, smaller reservoir lower down on Stone Dam Creek delivered water to the top of the falls via a water race running to the north of the township.

The DC scheme was replaced in 1907 by a new power station constructed lower down the Waratah River. This contained four generators (2 x 145kw AEG and 2 x 145kw Westinghouse) supplying 2200v to substations at the mine where it was reduced to 550v volts for the 50 motors and 110V for lighting. A separate 660v DC current was supplied to power an 80hp electric locomotive used to haul ore from the mine to the mill (Wilson, J. quoted in Godfrey 1984, 27).

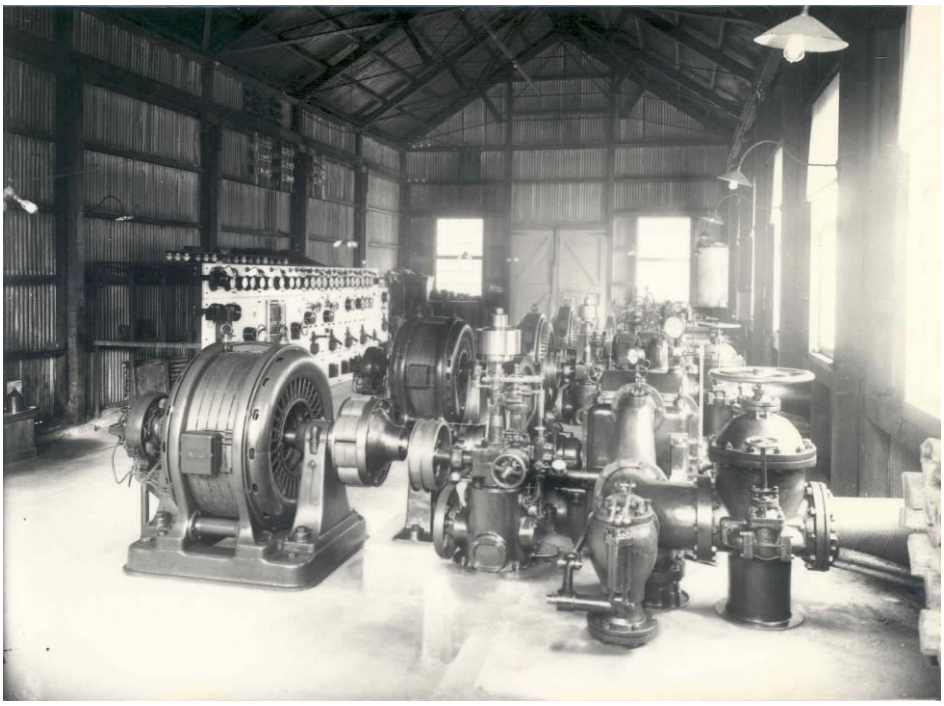

Figure 4-1: Mt Bischoff Power Station interior (undated)
(Waratah Museum)

To supply the new station, water was piped over the falls, and passing through the mill before entering another race with occasional pipe sections to a hilltop storage tank located 180m above the power station situated on the east bank of a deep gully below the mine. A 450mm penstock delivered the water downhill and across the river to the powerhouse (Wilson op cit).

Although the installed capacity of the plant was 1030kva, limitations in the water supply limited the average output to around 390kw (Wilson op cit).

Electricity was provided to homes in Waratah from the 1930s for a nominal rental, although reductions in mine output meant the power was switched off at the end of the shift (Harrington, K, quoted in Godfrey 1984, 27). The mine finally closed in 1947, although the power station continued to operate until 1952 when a landslip damaged the headrace (Godfrey 1984, 27).

The Mt Bischoff power station has essentially been left to the elements with the majority of movable fittings - including the marble control panels and gauges being stripped, however

the generator sets are still in place. The building is deteriorating and requires urgent repair. The site, which is located on land managed by Forestry Tasmania, is included on a tourism walk promoted by the Waratah Wynyard Council, however there is no security or interpretation at the site.

The power station and water system have been nominated to the Tasmanian Heritage Register with Permanent Registration anticipated in early 2015.

Figure 4-2: Mt Bischoff Power Station (undated)
(Waratah Museum)

4.3.3 Moorina

Within Tasmania the station most directly comparable to Lake Margaret is Moorina Power Station in the north-east of the State. The scheme was built and commissioned by The Pioneer Tin Mining Company scheme in 1909 to supply electricity for mining activities and water for sluicing operations. . The scheme includes a concrete-faced rockfill dam – reputedly the oldest in Australia, 2.7km of water race and flume, simple headworks, penstock, powerhouse, a tailrace and a secondary channel that supplies water to the adjacent township. The other buildings on the site comprise the remains of two early residences, a c. 1940 residence and a shed. The scheme also retains early infrastructure but of a lesser scale.

The powerhouse contains three generating sets each rated at 325kW, at 50Hz and 6.5kV. The turbines were built by J. M. Voight (now Voith AG) and the alternators by Allgemeine Elektrizitäts-Gesellschaft (AEG).

Moorina is also a station of high significance and at the time of its closure (March, 2008) was the oldest operating power station in Australia. However the infrastructure of Moorina has deteriorated since closure and does not compare with the completeness, scale and condition of the Lake Margaret scheme. Like the Lake Margaret Power Scheme however, the Moorina Power development is permanently entered on the Tasmanian Heritage Register.

4.3.4 Waddamana

Whilst private schemes such as Moorina and other mining ventures had started up, the scheme that can be said to be the father of all the large HEC schemes that exist today in Tasmania is the Great Lake Scheme. In 1908 the Complex Ores Company of Melbourne, under the leadership of Mr J.H. Gillies, approached the Tasmanian Government with a request for cheap electric power for the purpose of manufacturing electrolytic zinc. For financial reasons the Government was unable to embark upon the project but granted a concession to the company in 1909 to undertake the harnessing of the water power itself. A separate company, the Hydro Electric Power and Metallurgical Company Ltd was formed by Gillies and constructional work on the Waddamana Scheme commenced in 1911. However, financial difficulties occurred and the company lost its concession from the Government in 1914. The Government took over the scheme, forming the State Hydro Electric Department and the first power was transmitted to Hobart in 1916. The occasion marks the first time power was transmitted at 11kv in Tasmania which allowed transmission over large distances and set the stage for future Government hydro-electric schemes. After this the HEC built other hydro stations and increased the capacity of Waddamana, which by 1929, had doubled its original capacity. In 1934 Shannon power station was built followed by Tarraleah in 1938.

Waddamana is in many respects the antithesis of both Moorina and Lake Margaret. Started as a private station it quickly became a State project and the first of the Hydro Electric Department's system. The whole scheme was ambitious and marked a coming of age of Tasmania in terms of infrastructure. The complex is large, on a scale that dwarfs both Moorina and Lake Margaret, having been built to provide power for Hobart in contrast to power generated for relatively small local mining activities and their communities.

Waddamana is also a place of very high significance in the development of power generation in the State and, although no longer operating, remains a place of importance within the Hydro Tasmania development. The continued operation of Lake Margaret sets it apart from Waddamana as a place of exceptional heritage significance.

In August 2014 Waddamana A & B stations and elements of the water supply infrastructure were permanently entered on the Tasmanian Heritage Register as part of the Great Lake Scheme listing.

4.3.5 Later Power Schemes and Developments

Tasmania's Hydro Electric Commission constructed nine additional hydro-electric generation schemes in the thirty years following the end of World War II, being Tungatinah, Liapootah, Wayatinah and Catagunya in the Upper Derwent catchment, the Lower Derwent Scheme

comprising three dams and power stations, the Great Lake Scheme with two power stations, the Trevallyn Power Station, the Mersey Forth Scheme with seven dams and power stations and the Gordon River Scheme with one large power station.

The construction of the Great Lakes Scheme brought the retirement of the Commissions earliest stations, Waddamana "A" and Shannon, by 1965. The Duck Reach Power Station was superseded by the opening of Trevallyn Power Station nearby in 1955.

Within the ambit of power generation in Tasmania a number of stations and schemes are of importance in marking major changes in technology or approaches to generation. Places such as Tarraleah and Poatina for example are important places in the overall development of the power generation industry. However, there is no station that equates with the values of Lake Margaret in terms of the complete generating plant, the supporting infrastructure, continuity of use of early elements, innovativeness in design and development and the overall integrity of the place from original development to the present day. The place contrasts with most Hydro Tasmania sites where upgrade and removal of earlier phases takes place leaving only the last period of development evident.

4.3.6 Technological Context

The following information was supplied by the Hydro Electric Commission (HEC) to the Australian Electrical Supply Industry Research Board (AESIRB) Research Project being carried out by Godden Mackay Pty Ltd in 1994.

4.3.7 Comparative Size and Output

Moorina (1909), Lake Margaret (1914), Waddamana "A" (1916) and Tarraleah Power Stations (1938) are the oldest power stations in existence in Tasmania. Although Waddamana "A" is no longer operating it has been kept intact as it was made into a static museum by the HEC in 1988, 23 years after it ceased generating electricity in 1965. Moorina has not operated since 2008.

A comparison of machinery and output between these power stations shows the difference in scale between early private hydro developments and the later, government funded undertakings. Both Moorina and Lake Margaret Power Stations represent the endeavours of early mining companies to provide a cheap source of electric power to their works and small townships. The stations respective outputs, .9MW and 9.9MW are quite small in comparison with the outputs of the later stations, Waddamana "A" and Tarraleah which are 49MW and 90MW respectively. This is because Waddamana "A" and Tarraleah stations represent the beginning of Tasmania's integrated power supply system which relies almost solely on hydro power and the formation and early operation of the Hydro Electric Commission.

These differences are reflected also in the size of the generators installed at each station. Whilst nearly all generators installed in these four stations are Pelton type water turbines (Lake Margaret lower station has one Francis type turbine), the size of turbines vary. The three turbines at Moorina each have an output of 300kw (0.3MW) whilst Lake Margaret has seven turbines with an output of 1.2MW each and one 1.5MW turbine. In comparison Waddamana "A" station has two 3.5MW and seven 6MW turbines whilst the later Tarraleah station has six turbines with an output of 15MW each.

Another difference that can be noted is the voltage at which power was initially transmitted from both Lake Margaret and Waddamana "A". As mentioned in Section 2 Lake Margaret initially transmitted power at 6.6kV over a relatively small distance and experienced losses of 8.3%.

This was acceptable for the station as transmission over larger distances was not necessary in terms of the needs of The Mount Lyell Mining and Railway Company Limited. This is contrasted by the transmission voltages of both Waddamana and Tarraleah. These stations transmitted at 11kV (which became standard from c.1916) because they were supplying a much greater demand over larger distances and therefore could not operate with the losses experienced by Lake Margaret Power Station.

4.3.8 Summary

Whilst the financial difficulties of the Waddamana Scheme were occurring, R. Sticht, mine manager at The Mt Lyell Mining and Railway Company limited had decided to replace the steam plant the mine was using for electricity with a hydro-electric power station at Lake Margaret. The station began operating in 1914 making it the fourth major hydro station in Tasmania and fifth in Australia after Gara River (NSW) in 1895, Duck Reach in 1895, Mt Bischoff (after extension) in 1908 and Moorina in 1909. These stations were all supplying a small demand and transmitting power at low voltages over short distances. Lake Margaret was the largest of this type of station and was the last of this type as government owned schemes soon followed. With the 2008 closure of the Moorina station Lake Margaret became the oldest operating hydro-electric power station in Australia.

The major development for Tasmania's government-owned hydro-electric schemes came in 1916 with the opening of Waddamana Power Station and the transmission of power to Hobart at 11kV.

The lower Lake Margaret station constructed in 1931 was a single turbine station intended to be automatic and controlled from the main station. However, since installation, the machinery required manual start up by two operators. This 1.5MW station was the first remote controlled station in Tasmania, second in Australia to the much smaller 0.3MW Rubicon Falls station constructed in 1926 in Victoria.

The development at Lake Margaret marks the last of the private sized hydro-electrical developments in Australia. Following its construction hydro technology was adopted on a wider scale to service a much wider need. This trend, which began in Tasmania with the construction of the Great lake Scheme, was followed in the 1920s in NSW and Victoria and again in the 1940s in NSW with the construction of the Snowy Mountains Scheme.

Considered within the context of the history of hydro-electricity generation in Tasmania, and Australia generally, the Lake Margaret power scheme is unique and stands alone in terms of its ability to demonstrate the essential characteristics of an early private power development.

5. Cultural Significance

5.1 Previous Studies

Cultural significance is defined in *The Australia ICOMOS Charter for Places of Cultural Significance* (The Burra Charter) as *'aesthetic, historic, scientific, social or spiritual value for past, present and future generations.'* Consideration of these values helps us understand the range of past and present meanings attached to a place and the relative contribution each element makes to its overall significance. It is essential in developing approaches to future use and works that help retain a place's important qualities for the future.

The cultural significance of the Lake Margaret Power Scheme has been assessed in several previous studies, including the Godden Mackay 1994 Cultural Heritage Study and Davies 2006 Conservation Management Plan. A reappraisal of the site's extent, history and values undertaken in 2006 by Heritage Tasmania drew from these studies as well as from additional documentary and oral history research and site inspection. The Heritage Tasmania assessment formed the basis for the 2007 listing of Lake Margaret on the Tasmanian Heritage Register. For the purposes of aligning the policies developed within the current CMP with external statutory obligations, the assessment against HCH Act criteria contained within the THR listing for Lake Margaret is reproduced in its entirety below.

The Tasmanian Historic Cultural Heritage Act 1995 defines the statutory criteria met by the Lake Margaret site.

- *it is important in demonstrating the evolution or pattern of Tasmania's history*
- *it demonstrates rare, uncommon or endangered aspects of Tasmania's history*
- *it has potential to yield information that will contribute to an understanding of Tasmania's history*
- *it is important as a representative in demonstrating the characteristics of a broader class of places*
- *it is important in demonstrating a high degree of creative or technical achievement*
- *it has strong or special meaning for any group or community because of social, cultural or spiritual associations*
- *it has a special association with the life or work of a person, a group or an organisation that was important in Tasmania's history*

Criterion A: ***It is important in demonstrating the evolution or pattern of Tasmania's history.***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it is important in demonstrating the evolution or pattern of Tasmania's history, inclusive of it being:
    - an outstanding example of one of the earliest hydropower stations developed in Australia, and the fourth hydro scheme developed in Tasmania aft Mt Bischoff, Duck Reach and Moorina;

- a landmark site in the evolution of hydro technology on two levels;
  - the LMPS demonstrated the early potential of the technology for large scale industrial and domestic power generation trough multi-turbine installations, heralding the development of vast hydro schemes in Tasmania, Victoria and NSW. The LMPS has exceptional ability more than any other power station in Tasmania to demonstrate early twentieth century hydro technology within Australia, including the demonstration of engineering aspects derived from nineteenth century mining technology.
  - the LMPS was the largest privately developed hydro power station in Australia and potentially the Southern Hemisphere, reflecting the role of the mining industry in the introduction and development of hydro technology within Australia, and delineating the transition point after which hydro schemes (and electricity supply generally) became publicly funded and State-run.
- a landmark site in the evolution of industrial practices at the Mt Lyell mine, where hydro was introduced in response to the escalating cost of provided power by wood burning, the demand of 2000 tonnes of firewood per week having been a key factor in denuding the Queenstown landscape of its forest cover;
- a landmark site in the early provision of electrical power for private domestic use in Australia, whereby the My Lyell company established electrical supply from the LMPS to the homes of its workers within Queenstown (subsequently Zeehan and Rosebery), provided subsidised electrical appliances and actively promoted domestic use;
- historically associated with early twentieth century discriminatory immigration policy under Prime Minister Billy Hughes, where the arrival of a second wave of Maltese migrant labourers (British citizens) in 1916 coincided with the national conscription debate and 214 Maltese were refused entry to Australia because of their potential to threaten the jobs of Australian soldiers fighting abroad. After a national backlash many of these workers were eventually sent to work at the LMPS. This event is significant in the political and nation building identity of Australia;

- The LMPS is also of outstanding significance for its strong associations with historical phases and themes that have shaped Tasmania and its community:
  - the development of mining on the West Coast and specifically at Mt Lyell bing developed and operated to service the mine, its subsidiary mining activities and the communities;
  - the development of hydro power and domestic electrical services in Tasmania - the LMPS being one of a small group of highly significant hydro sites, and having associations with the HEC which has contributed to Tasmania's identity as a hydro state;
  - the use of migrant labour in the construction of major infrastructure - a contingent of Maltese labourers and stonemasons being recruited for the major civil engineering components at the LMPS;

- the development of on-site accommodation within close proximity to work that illustrates the complexities of private and public space overlapping and also illustrates the continuous association of housing employees on site for 92 years.

Criterion B: ***It demonstrates rare, uncommon or endangered aspects of Tasmania's heritage.***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it demonstrates rare, uncommon or endangered aspects of Tasmania's heritage, as:
  - the second oldest hydro power station in operating condition, the largest and ultimate technological expression of a privately operated hydro power station;
  - the first semi-automated power scheme in Australia through the 1931 development of the lower station;
  - incorporating a 2.2km woodstave pipeline which is likely to be the largest, or at least one of the largest, surviving structures in the world made of King Billy pine, an endemic Tasmania timber of historical and social value and which is now a scarce resource. Industrial woodstave pipelines are exceptionally rare nationally, if not internationally, and this pipeline represents the largest of four examples surviving in Tasmania.
  - the village constituting one of the earliest known hydro workers' villages in Australia;
  - a rare example of a continuously manned station in the Tasmanian context.
  - of specific importance is the exceptional integrity of the fabric relating to the development of LMPS from 1914 – 1931 which makes the site an exemplar of pioneering hydro technology and the related social history of a semi-isolated industrial settlement.

Criterion C: ***It has the potential to yield information that will contribute to an understanding of Tasmania's history.***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it has potential to yield information that will contribute to an understanding of Tasmania's history. The fabric and records pertaining to the LMPS have the potential to yield information of outstanding importance in respect of early hydro technology and its application to mining and domestic power.

- The LMPS is an outstanding example of industrial archaeology, especially as an example of an early power station site and associated village. A vast array of archaeological evidence, derived from the construction phase (including transport networks and pipelines from different periods, workshops and construction camps), and the operational phase (including transport networks, hatchery, air raid shelters, housing and recreational sites, exotic garden plantings, tip areas adjacent to the village) have the potential to yield information in respect of the development of the site and its social history. The surrounding areas including the old camp sites and particularly the village have research potential into early twentieth century hierarchical practices of social space and cultural practices including class and race distinctions in a work environment.

The village illustrates a close-knit community that had class distinctions on a micro scale, families vs. single men quarters, outside community vs. LMPS community interactions.

- The potential information from this site may also contribute to wider research frameworks nationally and internationally. For example the place of women and families living in industrial and work environments and the innovations that evolve as a result of living in small and remote communities is a new area of research internationally.

Criterion D: ***It is important as a representative in demonstrating the characteristics of a broader class of places.***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it is important as a representative in demonstrating the characteristics of a broader class of cultural places, in that:
  - it is of outstanding importance as an early hydro scheme in Australia;
  - it possesses an exceptional ability to demonstrate the principal characteristics of a complete power scheme and associated outbuildings and residential complex in the twentieth century. It is one of a few sites in Australia whereby the whole process of power generation, construction, staffing and community life at an industrial settlement is readily evident.

Criterion E: ***It is important in demonstrating a high degree of creative or technical achievement.***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it is important in demonstrating a high degree of creative or technical achievement. The LMPS has an exceptional ability to demonstrate early twentieth century hydro, hydraulic and civil engineering technology, better than any other site in Australia. Of specific importance is:
  - The exceptional integrity of the operational equipment (dam intakes and valves, pipeline, penstock manifold and surge pipe, penstock and haulage, turbine intakes and valving, dc exciters, Pelton wheel turbines and governors, ac generators, control and switching gear, etc.), most of which originates from 1912-1938, with two key elements being:
    - two types of turbines from the early 20th century – 7 Pelton wheels in main station and a Francis turbine in the lower station;
    - woodstave pipelines, nationally rare and only one of four examples remaining in Tasmania, incorporating use of local King Billy pine.
  - the general retention of any superseded equipment in-situ
  - the ready visibility of the equipment due to the above ground installations at publicly accessible locations
  - design innovations that reflect the extremely wet environment including the elevated floor, and use of metal wall and ceiling claddings in a unique corrugated iron village and no longer extant camp site known as 'Tin Towns'

The LMPS has outstanding significance for its exceptional ability to demonstrate the settlement infrastructure of a remote industrial site, as provided by the site owner, with specific reference to:

- Variation in the siting, size and detailing of accommodation buildings (Manager's House, Superintendent's House, Staff Cottages, Single Men's Quarters, distinct Maltese camps) that demonstrate a strong social and racial hierarchy;
- application of a uniform cottage design for the general staff housing, that demonstrates a higher standard than the equivalent miners housing at Mt Lyell;
- early 20th century provision of electrical services (cooking, heating, lighting) within the accommodation, and the exceptional occurrence of electrical power being used at the Superintendent's House to provide in-ground heating for the vegetable garden, lit walkways and exterior lighting on verandahs etc. and the free or subsidised provision of electricity to entice workers' families to live on-site.

Criterion F: ***It has a strong or special meaning for any group or community because of social, cultural or spiritual associations***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it has strong or special meaning for the Tasmanian (and potentially the Australian) communities because of social and cultural associations. These cultural associations encompass its aesthetic values-patronised by a cross-section of the Tasmanian community, photographers and tourists-derived from:
  - the LMPS displays dramatic visual qualities of the natural landscape setting with variation between the rainforest of the settlement to the sub-alpine setting of the dam, vistas to the sea, and the array of sprays from the woodstave pipeline – together with the introduced equipment, structures and relics;
  - auditory and other sensory quality of the power station in operation and of the woodstave pipeline water movement and leakage.
- The LMPS is of major social value at a regional level, and through its local role as a key service provider and place of work or recreation, its heritage and tourism value as an iconic piece of civil infrastructure and hydro technology, and its integral association with mining at Mt Lyell. These social values occur to a lesser degree state-wide, through the re-settlement of persons with strong work-based or social connections to Lake Margaret and Mt Lyell.
- The LMPS is of special importance to past residents and operational staff, due to the inevitable overlap of work and social life that occurs in semi-remote settlements that draws the community together. The dependence upon others within the community renders it close-knit, through a sense of pride in the contribution of the LMPS to the economic and domestic well-being of the region, which provides strong emotional attachments evident in oral histories and interviews undertaken during the assessment.
- LMPS forms a prominent visual and cultural landmark on the outskirts of Queenstown.

Criterion G: ***It has a special association with the life or work of a person, a group or an organisation that was important in Tasmania's history***

- The Lake Margaret Power Scheme (LMPS) is of historic cultural heritage significance because it has a special association with the life or work of a person, a group or an organisation that was important in Tasmania's history. The LMPS is of outstanding significance for its integral role in the development of Mt Lyell by the Mt Lyell Mining and Railway Company, which developed and operated the LMPS for most of its life. The company was at one time the largest copper producer in the British Empire and the longest operating mining venture in Australia, and is synonymous with the frontier spirit that led to the development of the West Coast and in the economic prosperity that mining brought to the region, and to the State.

- The LMPS is of historic cultural heritage significance because it has a special association with the life and work of Robert Carl Sticht, a person who was important in Tasmania's history. The LMPS was established at the direction of Sticht, General Manager of the Queenstown mine of the Mount Lyell Mining & Railway Co. Ltd from 1897-1922. He successfully pioneered pyritic smelting and is credited with much of the successful development of Mt Lyell. He had the vision to embrace the new hydro technology as part of the industrial reform at the site, and to provide domestic electricity to his workforce as part of a social reform process. Sticht also held one of the finest private libraries in the Commonwealth, a library that now forms part of the Mt Lyell Collection (Blainey 2000: 262). The mineral stichtite commemorates his name.

- The LMPS is of historic cultural heritage significance because it has a special association with the life and work of a large group of people that were important in Tasmania's working class and immigrant history.

5.2 Relative Significance Rankings of Scheme Elements

Individual significance rankings for constituent Static Assets are provided in Table 3.1. Significance rankings for Movable Cultural Heritage items are given in Table 3.2. Significance ratings are based on the criteria utilised in the Hydro Tasmania Cultural Heritage List, as outlined by Davies (2006b).

- **Very High**: features of exceptional significance within the development of the Lake Margaret Power Scheme and that should be retained in their significant form. Items with this ranking meet THR thresholds.

High: features that are very important in telling the story of the development of the Lake Margaret Power Scheme and that should be retained in their significant form. Items with this ranking would meet THR thresholds.

Medium: features that represent the typical, standard, often utilitarian aspects of the system, but that collectively contribute to the significance of the Lake Margareta Power Scheme. Items with this ranking may meet THR thresholds and should be retained wherever possible.

Low: features that contribute little to the overall understanding of the Lake Margaret Power Scheme, including those that use technology or construction forms that are not novel or unique to the scheme, or that have been significantly altered or degraded. Items with this ranking are unlikely to meet THR thresholds.

Neutral: features that have no assessed heritage value, including temporary works or new items that are neither intrusive nor low value. Items with this ranking do not meet THR thresholds.

Intrusive: features that reduce the historic cultural heritage significance of the Lake Margaret Power Scheme and that should be removed or altered to allow aspects of High or Very High significance to be recovered or understood. Items with this ranking diminish THR listed heritage values.

The rankings used in this study allow a comparative understanding of the contribution of various component elements to the significance of the Lake Margaret site. However, it is important to understand that the overall value of the site and all of its component parts is very high. It is the completeness of the Lake Margaret Power Scheme that gives it much of its cultural heritage value, which is understandably greater than the sum of its parts.

While relative significance rankings are often used to determine appropriate actions in relation to a particular element, the grading used within this assessment is not intended, and must not be used, as a unilateral "cut-off" or threshold to determine which parts of the site can be removed without consideration of their associated values and the contribution they make to the overall scheme.

Due to the very high overall level of significance of the place, it is the intent of this assessment that most aspects of the place will be retained and conserved and that only items that are neutral or intrusive may be removed. Other changes may be made to accommodate new uses or required upgrades provided their impact is considered in the context of the site as a whole. This is discussed further in the policy section of the report.

6. Policy

6.1 Introduction

The development of policy to guide the future of the Lake Margaret Power Scheme is predicated on a number of factors including:

- The overall very high heritage value of the whole place in terms of Hydro Tasmania's and THR criteria;
- The relative heritage significance of the various elements of the place;
- The requirements of Hydro Tasmania as it seeks to operate a compliant power generation system into the future;
- The potential for the site to support new and complimentary uses;

The ongoing use of an industrial site may sometimes conflict with conservation of heritage values. Retaining cultural significance when upgrade, modification or replacement of significant fabric is required to ensure operational viability may present challenges. Sustainable ongoing use and conservation objectives may be achieved through raising awareness of heritage values and having in place the decision-making framework to identify suitable alternatives and opportunities for the long term.

Lake Margaret is rare, not only with regard to its heritage values but also in respect of its potential to accommodate a range of uses. The location and layout of the site provide opportunities for power generation infrastructure, cultural and eco-tourism and community access to the place, and to allow the various uses to be managed safely and effectively. This is in part achieved by the broad extent of the site and the way the scheme has been laid out with clear and separable zones of activity.

The following policies aim to accommodate the operational imperatives and cultural heritage management requirements and opportunities. They propose approaches for helping structure and achieve key functions to ensure the long term viability of the place as an economic and social asset.

6.2 Hydro Tasmania Operational Requirements and Future Uses

The following policy headings are intended to reflect Hydro Tasmania's operational imperatives as well as the attendant requirements for managing and realising the heritage values of the place. The policies are informed by previous studies undertaken into the site at various periods over the past 16 years when the future of various scheme elements was uncertain. The decision by Hydro Tasmania to refurbish the power scheme provides much needed certainly for the future of significant generation infrastructure for the medium term, and the stability necessary to explore and develop complimentary uses.

Previous Lake Margaret heritage studies were prepared in an environment where partial or total closure of the scheme was being contemplated. Following the resolution of this important issue, this CMP moves forward and considers the future of the site as a vital generation asset and cultural attraction.

6.3 General Conservation Policy

The general policies reflect the key requirement to conserve and manage the heritage values of the place within the context of it being a power generation asset managed by Hydro Tasmania. They establish broad parameters for its ongoing industrial use, conservation of its heritage values and appropriate facilitation of complimentary uses.

- **Policy 6.3.1**: The Lake Margaret Power Scheme, with all its aspects and significant components, will be conserved as a place of high cultural heritage significance
- **Policy 6.3.2**: The facility will be retained in use as an operating power scheme with appropriate allowances for compatible uses.
- **Policy 6.3.3**: The heritage values of the place should be conserved and managed in accordance with the guidelines and philosophy of the ICOMOS Burra Charter.

Reason for Policies

These policies aim to ensure that the heritage values of the place are maintained and managed in accordance with best practice principles. Maintaining the economic and social viability of the complex is essential for conserving the cultural heritage values of the place. Ensuring the continued operation of the upper and lower stations for power generation will provide for maintenance of the asset while allowing for compatible public and commercial use will facilitate continued community support for heritage management outcomes into the future.

Preservation and maintenance are generally the most appropriate means of conserving machinery and components as well as the built elements of the Lake Margaret complex (refer above). Where restoration is required it should be undertaken by tradespeople skilled and experienced in heritage work. Reconstruction should only be considered where sufficient evidence exists of known earlier forms and conjecture is minimised. Adaptations, permissible where essential for operations or to support the ongoing viability of the place, should adhere to the philosophy of 'changing as much as necessary and as little as possible', and be reversible wherever feasible.

Strategies and actions

- Endorse this CMP as the guiding document for future management and conservation of the place;
- Lodge a copy of this CMP with Heritage Tasmania to support future heritage approvals;
- Ensure that the policies in this CMP are known and understood by relevant Hydro Tasmania staff, relevant planning authorities, future users and any contractors or others engaged to undertake works or activities at the site.
- Ensure that all works are undertaken by suitably qualified and skilled personnel working to an approved scope.

6.4 Ongoing Power Generation

The following policies primarily relate to continuing the existing use of the site for electricity generation. The preferred option for conserving the cultural heritage values of the place is to combine ongoing power generation with uses that conserve and realise heritage values. Polices for new compatible uses are given under 6.11.

- **Policy 6.4.1**: Maintain the upper station, new lower mini-hydro plant and allied water storage and conveyance infrastructure for power generation.
- **Policy 6.4.2**: Link future generation upgrades to a fully costed plan for the assessment of impacts, conservation and maintenance of the heritage values of the site.

Reason for Policy

This policy aims to ensure that the potential impacts of ongoing power generation, including upgrades, on cultural heritage values are understood and sustainably managed.

Preparing a Heritage Impact Assessment in accordance with Hydro Tasmania's Cultural Heritage Procedure[1] will ensure that heritage values at risk from proposed generation upgrades are identified at an early stage. This may enable the identification of alternatives to, or modification of, the proposed changes to achieve a better heritage management outcome. A Heritage Impact Assessment will generally not be required for routine and or cyclical maintenance activities, provided these are carried out in accordance with endorsed conservation policies and works schedules and statutory exemptions.

Strategies and actions

- Continue to supply electricity to the state grid to extend the viability of power generation.
- Maintain and conserve the working assets and engineering works with the aim of extending the working life of historic plant and infrastructure.
- Assess the potential heritage impacts of future modifications or upgrades to generation infrastructure in accordance with Hydro Tasmania's Cultural Heritage Procedure and statutory requirements.
- Ensure that the costs for undertaking heritage assessments and acquitting conservation requirements are costed within the budgets for proposed works.

6.5 Buildings and Structures

- **Policy 6.5.1**: Buildings, including interior and exterior fabric, fixtures and fittings, should be retained and conserved in their significant form and layout.
- **Policy 6.5.2**: The introduction of new materials into the existing buildings should be undertaken only where it is essential for the conservation of cultural significance or to maintain the functionality of the asset.

[1] Currently HSEP0912

- **Policy 6.5.3**: New buildings should generally not be introduced to, or constructed within the site unless there is no prudent or feasible alternative for maintaining the continued used or viability of the place.
- **Policy 6.5.4**: Existing buildings and structures that constitute low significance or intrusive elements may be removed for operational purposes provided their removal does not diminish the heritage values of the Lake Margaret complex as a whole.

Strategies and actions

- Prepare a cyclical maintenance plan detailing work schedules with time frames and costings for all significant built elements. Integrate these into Hydro Tasmania's asset management system. General maintenance to be implemented includes but may not be limited to:
  - Cleaning the interiors of the buildings;
  - Keeping timberwork and metalwork in good painted condition;
  - Clearing gutters and downpipes and ensure the water is removed from and around buildings;
  - Keeping houses free of vermin, birds and insects;
  - Ensuring the structural stability of buildings and additions;
  - Maintaining any original colour schemes throughout the site;
  - Replacing any damaged or missing fabric on a like-for-like basis.
- Do not introduce new fabric or finishes unless necessary to maintain the functionality of the place, for approved interpretation purposes or where there is no prudent or feasible alternative.
- Repair and maintain fire and/or security systems and ensure that upgrades are of appropriate and sympathetic design and that installation is carried out sensitively with respect to the existing fabric and systems;
- Any proposals for introducing, removing or modifying buildings and structures within the site should be subject to a Heritage Impact Assessment and may require statutory heritage approval. Any new buildings or structures should be designed and located sensitively and sympathetically with consideration given to minimising impacts on aesthetic and archaeological values.

6.6 Machinery and Components

- **Policy 6.6.1**: All working plant and machinery should be maintained in its significant form and location unless there is no prudent or feasible alternative to modification or redundancy.
- **Policy 6.6.2**: The introduction of new materials, plant or machinery should be undertaken only where it is essential for the conservation of cultural significance or to maintain the functional viability of the place.

Reason for Policy

Much of the machinery at Lake Margaret is 'original' and has been continually maintained, with relatively minor modification, since installation. Changes to machinery and components should aim to preserve the overall historical integrity of the power station whilst facilitating ongoing use for power generation. Policies for managing redundant machinery and/or components are given under 6.10.

Strategies and actions

- Existing plant and machinery should be retained *in situ* and in use and the station should continue to operate (or be presented) in its existing form;
- Maintain plant and machinery to a high standard to ensure condition and viability. Alterations to plant and machinery should only be considered where they are vital to the ongoing viability of the station;
- Fabricate new replacement parts on a 'like-for-like' basis rather than scavenge significant plant and equipment for spare parts;
- Retain all of the original control panels in the control room;
- Where it is essential (i.e. no prudent and feasible alternative) to update plant or equipment to maintain viability or efficiency (especially control panels, meters and instruments), design and locate any new infrastructure sensitively and sympathetically (i.e. in a non-intrusive fashion).

6.7 External Infrastructure

- **Policy 6.7.1**: All operating infrastructure external to the power station buildings, including dams, pipelines, valves, penstocks and power transmission assets should be retained in use and maintained in their existing form unless there is no prudent or feasible alternative.
- **Policy 6.7.2**: All remnant evidence of decommissioned infrastructure, including relict pipelines, penstocks, haulages, winches etc. should be retained and appropriately conserved.

Reason for Policy

The Lake Margaret power scheme retains great deal of early water management infrastructure in operating condition. A raft of decommissioned items, including penstocks, haulageways, tramways and evidence of original pipelines remains in the landscape, contributing strongly to the sense of historical layering at the site. These polices aim to preserve the story of hydro-engineering for the scheme whilst facilitating ongoing use for power generation. Policies for managing redundant machinery and/or components are given under 6.10.

Strategies and actions

- Maintain operating external infrastructure to a high standard to ensure working condition and viability. Alterations or upgrades to operating external infrastructure should only be considered where they are vital to the ongoing viability of the station;

- Where it is essential (i.e. no prudent and feasible alternative) to upgrade external operating infrastructure, design and locate any new elements sensitively and sympathetically (i.e. in a non-intrusive fashion);
- All remnant evidence of significant decommissioned infrastructure should be retained in situ unless relocation is essential for conservation reasons.

6.8 Landscape

- **Policy 6.8.1**: Conserve the modified landscape setting, views and visual catchment of the dam, upper station, village, lower station and connecting infrastructure.

Reason for Policy

The aim of the policy is to ensure that the modified and culturally significant landscape is conserved and managed to demonstrate the imposition of industrial designs and cultural preferences on the natural environment. Mature exotic trees and controlled garden plantings characterise the village and upper station precincts and set them apart from the surrounding regenerating wet forest. The relationship between the modified landscape and its natural setting is an important aspect of the cultural significance of the place.

Strategies and actions

- Conserve the modified landscape by undertaking assessments of mature plantings, and carrying out maintenance of the various specimens and generally maintain the former park-like character of the site.
- Remove unwanted weeds and regrowth from currently cleared areas.

- **Policy 6.8.2**: Maintain well-defined edges between the modified and natural landscape on the hill behind the village, the clearings around the penstocks, the alignment of the pipelines and areas defined by access roads and structures.

Reason for Policy

To ensure that the native vegetation does not randomly encroach on and obscure the village and station buildings and cultural plantings, to allow native vegetation to regenerate a managed way to recover a sense of the 'wilderness' setting, to protect archaeological sites and to reduce risk of fire.

Strategies and actions

- Maintain the cleared areas and demarcations of the site including paths and tracks but do not extend clearing into other areas.

6.9 Archaeology

- **Policy 6.9.1**: Undertake an archaeological survey of the site to identify and map historic heritage features.
- **Policy 6.9.2**: Undertake appropriate archaeological assessments in areas of potential archaeological sensitivity prior to works in accordance with statutory guidelines and standards and Hydro Tasmania's Cultural Heritage Management Procedure.

Reason for Policy

The aim of the policy is to ensure that the important archaeological heritage values of Lake Margaret are identified, protected, conserved and maintained for the future. This policy provides for appropriate professional input should areas of archaeological potential be affected or if materials are discovered that relate to significant developmental phases.

Areas of potential archaeological value are as listed below and illustrated in Figure 3 6, and include:

- Former upper station construction camp area
- Village Precinct
- Former building or feature sites;
- Upper tramway and footway formations;
- Main access tramway formation;
- Fish hatchery area.
- Corduroy Track;
- Penstock cutting and embankments to front of station;
- Lower pipeline formation;
- Site of 'Tin Town', lower station construction camp
- Lower station building surrounds;
- Fish hatchery area.

Strategies and actions

- Undertake an archaeological survey and prepare an archaeological zoning plan to guide future use and development of the site;
- Where work is proposed in areas of identified archaeological sensitivity, obtain the input of an archaeologist into Heritage Impact Assessment and statutory heritage approval processes;
- Undertake all archaeological investigations in accordance with statutory guidelines and standards.

6.10 Movable Cultural Heritage

The Lake Margaret complex contains a wide range of movable heritage relating to both its industrial and social history. These items include tools and plant and documents contained within the station and village buildings but also larger objects scattered around the site. The movable heritage contributes to the integrity of the complex and is a resource for future site interpretation. The presence of plant, equipment, furniture and fittings from all phases of site development and operation contributes to the cultural significance of the place.

Lake Margaret was subject to an audit of movable cultural heritage items in 2009 in accordance with the Hydro Tasmania Movable Cultural Heritage Guidelines (Austral Tasmania

2009). Assessed items are contained within the Hydro Tasmanian Cultural Heritage List and reproduced summarised in Table 3.2.

- **Policy 6.10.1**: All items of movable heritage (including plant and portable items, paper based documents etc.) shall be considered for use in operational contexts in the first instance prior to being assessed for their suitability as interpretive elements in response to a site based Interpretation Plan/Strategy endorsed by Hydro Tasmania.
- **Policy 6.10.2**: All identified significant (that is, those rated of very high or high significance) superseded plant shall be retained in situ unless it is unavoidable for operational reasons or in response to conservation imperatives.
- **Policy 6.10.3:** All identified significant (that is, those rated of very high or high significance) superseded plant shall be subject to assessment/s to ensure their conservation in perpetuity and to Heritage Impact Assessment/s where changes are proposed that affect in situ plant and componentry.

Reason for Policies

The policies aim to ensure that all items of movable heritage remain available for use. The Lake Margaret complex provides a meaningful historic and operational context for these items. By defining a process that considers in the first instance the usefulness of the items for generation purposes, the policies provide the opportunity to maintain and in some cases restore the integrity of significant plant.

Once the decisions regarding operational primacy have been made, the next management priority is to determine the interpretive potential of any redundant or movable heritage.

Strategies and actions

  - Retain significant redundant or movable cultural heritage items in-situ unless there is no prudent or feasible alternative to removal and safe storage or other uses;
  - Heritage Impact Assessment/s shall be prepared by suitably qualified heritage practitioners where changes are proposed that affect significant redundant or movable heritage items;
  - Conservation assessments on significant redundant/movable items shall be undertaken by suitably qualified and experienced materials conservators.
- **Policy 6.10.4**: Any changes to the location or status of movable heritage items in the Cultural Heritage List shall be recorded and the database amended and updated accordingly.

Reason for Policy

The policy aims to ensure that the currency of the Hydro Tasmania Cultural Heritage List is maintained through appropriate updates, and that changes in the condition, location or management requirements of items are suitably tracked and actioned.

Strategies and actions

- HT shall maintain integrated with Hydro Tasmania's HSE or asset management system a record of movable cultural heritage items that documents condition and management issues/responses, including details of storage location, use, assessments, treatments, and any associated timeframes;

- **Policy 6.10.5**: Improve management of, and access to, the collection of movable cultural heritage items contained within the 'history room' of the Upper Power Station.

Reason for Policy

This policy allows for cataloguing and management of the history room collection and improved access and interpretation. It enables the history room collection to be managed as a discrete entity for conservation and display purposes. The policy allows for the potential future relocation of the collection to an environment suitable for improved public access and interpretation.

Strategies and actions

- Prepare inventory and assess the condition, ownership and copyright status of material within the history room collection;
- Secure ownership or reproduction rights, as required, in accordance with HT Movable Cultural Heritage Guidelines acquisition criteria, and with reference to the interpretive themes for the site.
- Assess proposals for relocating and displaying the history room collection against the Hydro Tasmania Movable Cultural Heritage Guidelines, the conservation requirements of collection elements, the current Interpretation Plan for Lake Margaret, and a museum plan prepared for any proposed new location.

- **Policy 6.10.6**: Movable heritage plant and/or items that do not meet HT eligibility criteria for retention and are not required to be retained in accordance with the processes outlined in Policies 6.10.1 – 6.10.3 may be considered for disposal in the manner outlined in the HT Movable Cultural Heritage Management Guidelines.
- **Policy 6.10.7**: The HT Movable Cultural Heritage Management Guidelines will define the process for accepting donated or loaned items specific to the site, taking into account the current interpretive themes for the Lake Margaret site in determining significance.
- **Policy 6.10.8**: The list of movable cultural heritage items elements (including conservation assessments for those items rated very high or high) shall be reviewed and updated at no more than five yearly intervals from the initial 2009 audit.

Reason for Policies

These policies allow for judicious disposal and acquisition of movable heritage items. Decisions regarding disposal do not apply to those items that are rated of very high or high significance, or to items that will extend the functionality of the plant, or that are otherwise

determined as suitable for interpretation. This policy does not apply to paper based records which are required to be retained in accordance with the HT Information Management Policy. The policies acknowledge the terms and processes required to be implemented when items specific to Lake Margaret are offered by external organisations or individuals. Furthermore, the policies aim to ensure that the Lake Margaret movable cultural heritage inventory is subject to periodic review including condition monitoring and re-assessment of conservation requirements.

Strategies and actions

- HT shall maintain, integrated with Hydro Tasmania's HSE or asset management system, a record of movable cultural heritage items that are disposed of (deaccessioned) or acquired in accordance with the Hydro Tasmania Movable Cultural Heritage Management Guidelines.
- The justification for, and terms of any donations, loans or acquisitions will be recorded, along with any evidence of the acquittal or implementation of those terms.
- Review the list of movable cultural heritage items at maximum 5 yearly intervals.

6.11 New Uses

While power generation should continue to be the main function of the Lake Margaret scheme, the introduction of new uses, such as tourism and education, may increase the viability of non-generation assets and support the overall heritage management objectives for the place. Diversifying the range of activities and experiences available at Lake Margaret has the potential to increase public awareness of and community support for ongoing conservation initiatives. While the potential advantages of new uses are acknowledged, it is not appropriate for changes to diminish the cultural significance of the place.

- **Policy 6.11.1**: New uses and activities on the site may be supported provided they are compatible with the aims of ongoing power generation and heritage management.
- **Policy 6.11.2**: New uses should aim to generate community benefit by supporting public access, interpretation, education and tourism.

Reason for Policy

The policies will allow the important heritage values of the power stations and their environs to be experienced and valued by others, including visitors, local businesses and the broader Tasmanian community.

Strategies and actions

This CMP does not propose an actual schedule for implementing this policy. Implementation will be determined for site precincts in response to proposals and in consultation with potential users and other stakeholders, and in view of other plans and strategies for the site including the Lake Margaret Interpretation Plan.

- Assess proposals for new uses and non-generating activities with regard to the operational needs of ongoing power generation.

- Undertake a Heritage Impact Assessment for all proposed new developments or uses that affect significant fabric. Proposals for new uses may also be required to have heritage approval.
- Ensure heritage conservation requirements are considered early in the design process for proposed new uses and non-generating activities.

6.12 Interpretation

Lake Margaret is a place that presents excellent opportunities for interpretation. The place can be interpreted for a range of themes that touch upon its natural values, its history of power generation, its role in the development of the West Coast or in relation to Hydro Tasmania power development of the Tasmania developments, as well as more intimate areas such as the life of early staff and workers. The location of the site with easy access to Queenstown and the main road make the place an obvious and easy access site for tourists and visitors.

An interpretation plan was prepared for Lake Margaret in 2006 within the context of an uncertain future for the site. The plan was revised in 2010 to account for the refurbishment of the Upper and Lower power stations, and to bring it into alignment with the overarching Hydro Tasmania Cultural Heritage Interpretation Strategy (HTCHIS) (Housego 2009). The revised Lake Margaret Interpretation Plan identified potential audiences and proposed a raft of interpretive themes designed to integrate with the HTCHIS framework (Tiddy 2010). An implementation guideline document, the *Lake Margaret Power station Visitor Experience Manual* (Tiddy 2013), was subsequently prepared to structure the development of guided tours within the village, dam/pipeline and upper station precincts, with tours commencing in November 2013.

The following general policies are reproduced from the 2010 Lake Margaret Interpretation Plan. The policies aim to ensure that future visitor and operational uses respect the interpretive and historical values of the site.

- **Policy 6.12.1**: Interpretation of the Lake Margaret site will utilise the themes identified in the Lake Margaret Interpretation Plan within the context of the Hydro Tasmania Cultural Heritage Interpretation Strategy.
- **Policy 6.12.2**: Interpretation of the site will be based on best practice and contemporary research and design.
- **Policy 6.12.3**: The installation of interpretive media will be consistent and where appropriate will adhere to signage guidelines established in the Hydro Tasmania Cultural Heritage Interpretation Strategy.
- **Policy 6.12.4**: The Lake Margaret Oral History Project will provide a resource for using memories, stories and original voices in the interpretation.
- **Policy 6.12.5**: The identified audiences will experience the site through a range of communication methods recognising the differing audience backgrounds, needs and interests.

Reason for Policies

The aim of polices 6.12.1-6.12.5 is to enhance the experience of visitors to Lake Margaret by providing quality, place-based interpretation, that iterates appropriately with the broader Hydro Tasmania communications strategy.

- **Policy 6.12.6**: Development and installation of interpretive media and activities will be in accordance with policies contained within current management plans and provisions, including but not limited to this CMP, the Lake Margaret Power Station Movable Heritage Audit & Inventory (Austral Tasmania 2009) and guidelines contained within relevant Heritage Impact Assessments and statutory heritage approvals.
- **Policy 6.12.7:** Interpretive media will respect the existing built fabric of the site and will not intrude upon the visual setting of buildings, power generating infrastructure, or the physical landscape.

Reason for Policies

The aim of polices 6.12.6 and 6.12.7 is to protect the cultural and natural heritage of the Lake Margaret landscape through requiring all interpretation and tourism developments and activities to be sympathetic and sustainable. This shall be achieved through adherence to relevant management plans and guidelines and by minimising unnecessary intrusion of interpretive infrastructure and installations.

- **Policy 6.12.8**: Interpretation of the Lake Margaret site will reflect the operational and environmental requirements of a working power station asset, including all necessary safety inductions and the application of safety equipment and procedures.
- **Policy 6.12.9**: Any instances of environmental or infrastructure damage associated with visitor use will be reported and assessed in accordance with the Hydro Tasmania Health Safety and Environment (HSE) system.

Reason for Policies

The aim of policies 6.12.8 and 6.12.9 is to protect those visiting and working at Lake Margaret from harm, by suitably designing and locating interpretation, creating awareness of risks and requiring adherence to relevant site safety measures. Any non-conformances, including instances of vandalism or environmental degradation associated with visitor use or public access, are to be reported in order to identify and rectify issues.

- **Policy 6.12.10**: The Lake Margaret site may be used for educational and community events provided they do not impact the heritage significance of the place.
- **Policy 6.12.11**: Selected village buildings should be conserved to support interpretation and compatible community use.

Reason for Policy

The aim of this policy is to contribute to the community's sense of identity and support for Lake Margaret through providing opportunities for suitable community use and benefit.

Strategies and actions

- Continue to implement the Interpretation Plan and Visitor Experience Manual.
- Revise the manual or develop complimentary guideline documents as required to respond to new tourism or interpretation proposals.
- Restore one house and the Village Hall to original finishes and fit-out for interpretation purposes.
- Prepare a specific museum plan for interpretive installations that involve Movable Cultural Heritage items or modifications to significant buildings for interpretation purposes.
- Undertake regular evaluation and reviews to ensure that tourism and interpretation outcomes are being achieved. Changes should be supported by evidence including audience research.

6.13 Database Alignment and Archival Recording

- **Policy 6.13.1**: Heritage management databases should be comprehensive and aligned to facilitate organisational management and external statutory processes.
- **Policy 6.13.2**: Prior to any upgrade, new works or redevelopment, affected significant static or movable cultural heritage elements should be recorded to an archival standard.

Reason for Policy

There are numerous descriptions of the Lake Margaret complex courtesy of 20 years of heritage planning and documentation for organisational and statutory purposes. This has resulted in discrepancies between the Hydro Tasmania Cultural Heritage List, various generations of conservation management plans and Tasmanian Heritage Register. Given the foreseeable future requirement for heritage approvals for works, it is important that alignment between internal and external heritage databases, and integration with Hydro Tasmania's management systems, is achieved in order to effectively manage heritage values and approvals processes.

Archival recording may be required in advance of a change of use or adaptation of parts of the place in order to provide a record of the site and features prior to that change taking place. Archival recording should ensure that important operational aspects are recorded rather than simply documenting elements as mute entities. The recording may involve a range of activities including detailed photographic recording, video recording of the operation, oral history of current and former workers and tenants of the place and measured drawings.

Strategies and actions

- Prepare datasheets for items identified in the THR listing that are not currently on the Hydro Tasmania Cultural Heritage List.
- Undertake appropriate archival recording in advance of upgrade, new works or redevelopment. The archival recording should be carried out to current best industry

standards and should involve all methods necessary to record the history of the place.

- Completed recordings should be integrated with Hydro Tasmania's HSE or asset management system.

6.14 Site Security

- **Policy 6.14.1**: Factor effective provisions for maintaining the security of the whole site into current and future management arrangements

Reason for Policy

Security arrangements should be put in place to minimise the risk of vandalism and other damage to significant fabric when the site is unstaffed.

A minimum level of security will require regular inspection along with remote measures, such as alarms, external lighting, locked gates etc.to prevent and detect unauthorised access to the site.

Security should be a key component of any future management or tourism arrangements.

Strategies and actions

- Provide for continued baseline security at the site.
- Develop and implement a security plan for the place as part of any future management arrangements.

6.15 Review

- **Policy 6.15.1**: This conservation plan will be reviewed at 5 yearly intervals following its endorsement, or a lesser period in the event of major development or upgrade proposals.

Reason for Policy

Conservation Management Plans should not be static documents but be regularly reviewed to ensure they remain relevant. Reviews are generally undertaken at five yearly intervals after adoption, or a lesser period if required to assist in the management of major change.

Strategies and actions

This CMP should be reviewed every five years from the date of endorsement by Hydro Tasmania.

This CMP should be reviewed as required to cover major works or changes to the place that are outside the scope anticipated in this plan.

7. Implementation

The imperatives of conserving cultural significance, maintaining ongoing operational viability and meeting statutory obligations establish the minimum requirements for heritage management at Lake Margaret. Other avenues for conserving or presenting heritage values may accompany specific proposals or changes in circumstance, consequently the strategies and actions outlined in the preceding section should be augmented as needs and opportunities arise.

Table 7.1 outlines the priority for broad CMP strategies and actions. Baseline recommendations and timings for conservation works on individual site elements are given in Table 7.2. Appropriate modifications to this schedule should be made in response to proposals to change significant fabric, to introduce new developments or uses, or in response to specific events such as storm damage or vandalism.

Note that for many actions indicated in the table a Heritage Impact Assessment may be necessary to comply with Hydro Tasmania's Cultural Heritage Procedure, and relevant heritage approvals may be required from the Tasmanian Heritage Council.

A Heritage Impact Assessment will generally not be required for routine and or cyclical maintenance activities, provided these are carried out in accordance with this CMP, approved works schedules and statutory exemptions.

Table 7.1: Management strategy implementation priorities

Strategy or Action	Priority
General Conservation Policy	
Endorse CMP (COO/MPM)	High
Lodge CMP with Heritage Tasmania	High
Promulgate awareness of CMP within Hydro Tasmania	High
Ensure works are undertaken by suitable personnel	High
Ongoing Power Generation	
Continue to supply electricity to grid	High
Maintain working assets	High
Prepare HIAs and heritage approvals for works and upgrades	As required
Conservation costs to be covered by upgrades	As required
Buildings and Structures	
Prepare and implement cyclical maintenance program for significant buildings	High
Minimise introduction of new fabric and finishes	High
Maintain services and upgrade sympathetically	High
Prepare HIAs and heritage approvals for building introductions, modifications or removals.	As required

Machinery and components	
Retain plant and machinery *in situ* and operational	High
Maintain plant, minimising modifications or alterations	High
Replace fabric on a like-for-like basis	As required
Retain original control panels	High
Design and implement generation and control upgrades sympathetically	As required
External Infrastructure	
Maintain operating assets in good condition	High
Design and implement asset upgrades sympathetically	As required
Retain significant decommissioned infrastructure *in-situ*	High
Landscape	
Assess and maintain significant plantings	Low
Manage weeds and reduce fuel loads	High
Maintain cleared areas and boundaries, including paths and tracks	Medium
Archaeology	
Undertake archaeological survey	Medium
Obtain necessary archaeological input into HIAs	As required
Undertake archaeological assessments in accordance with statutory guidelines/standards	As required
Movable Cultural Heritage/Records	
Retain significant items *in-situ*	High
Prepare HIAs for changes to significant items	As required
Conservation assessments to be undertaken by qualified personnel	As required
Changes in location, condition or use to be tracked	High
Prepare inventory of History Room collection	High
Secure ownership or reproduction rights to History Room Collection	Medium
Assess proposals to relocate History Room collection against the MCH Guidelines, and relevant conservation and display requirements	Medium
Disposals, loans, new acquisitions and associated terms to be in accordance with MCH Guidelines	Medium
New Uses	
Ensure new uses and activities are compatible with operational requirements	As required
Prepare HIAs and heritage approvals for new uses and activities that affect significant fabric	As required
Ensure conservation requirements are considered early in the design process for new developments/changes in use	As required

Interpretation	
Implement interpretation Plan and Visitor Experience Manual	High
Revise or develop new manual to guide new tourism/interpretation proposals	As required
Restore example house and Village Hall	Medium
Prepare a museum plan for interpretation involving significant fabric	As required
Evaluate and review interpretation installations/products and tourism activities	Medium
Database alignment and archival recording	
Prepare additional datasheets for heritage items included in THC listing	High
Prepare and retain archival records of significant fabric affected by proposed upgrades or new uses	As required
Integrate archival records with Hydro Tasmania's HSE or asset management system	Medium
Site security	
Continue to provide basic site security, including gates and alarms	High
Develop a Security Plan as part of future tourism or use arrangements	Medium
Review	
Review CMP at 5 yearly intervals or more regularly if required	Medium

Table 7.2: Conservation Works implementation schedule

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
Precinct 1 - Dam and Pipeline Area									
THR 1.1	Lake Margaret modified natural feature.	N/A	Conserve the environmental setting.	High					
THR 1.2	Lake Margaret lake-bed engineering works	N/A	Retain and document evidence of engineering works during outages or as opportunities arise.	High					
CHL 603	Boatshed	MEDIUM	Retain as store building, maintain if required.	Low					
CHL 604	Dam	VERY HIGH	Retain dam wall, repair or adapt as required. Design any new elements to be compatible with the heritage values of the dam structure.	High					
CHL 605	Dam infrastructure - Outlet valve house	HIGH	Retain valve house, replacing fabric on a like-for-like basis as required. Reinstate stairs and maintain area generally.	Medium					
CHL 606	Dam winch house and winch	HIGH	Maintain conserved features.	Medium					
CHL 607	Workshed	LOW	Adapt, reconfigure or replace to suit operational needs.	Low					
CHL 608	Drystone walls	HIGH	Retain all dry stone walls *in situ*. Design future works around walls.	High					
CHL 609	Retained sections of 1938 woodstave pipeline	HIGH	Interpret retained *in-situ* sections subject to planning.	Low					
CHL 610	Tramway	VERY HIGH	Retain original section, ensure safety if new walk way installed.	High					
CHL 611	Evidence of early walkway	HIGH	Retain original section, ensure safety if new walk way installed.	High					
CHL 612	Archaeological remains (drains)	HIGH	Retain in current form.	Medium					
CHL 613	Halfway shed	HIGH	Retain in current form.	High					
CHL 614	Temporary Power house, other buildings sites including construction camp site	MEDIUM	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
THR 1.9	Dam construction camp	N/A	Document evidence of engineering works and prepare HIAs for any proposed upgrades.	High					
THR 1.7	Lake Mary weir and diversion	N/A	Document evidence of engineering works as opportunities arise. Continue use of temporary sandbagging to control seasonal flow and prepare HIAs for any proposed upgrades.	High					
THR 1.11	Small lakes diversion structures	N/A	Retain evidence of route and document fabric while allowing for natural deterioration.	High					
THR 1.15	Original woodstave pipeline route	N/A	Retain and document evidence as opportunities arise.	Medium					
THR 1.6	Mt Sedgewick works	N/A	Retain in current form.	Medium					
Post 2009	Replacement woodstave pipeline,	N/A	Maintain in good condition.	Medium					

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
	supports and accessway								
Post 2009	Viewing platform	N/A	Maintain and upgrade as required.	Medium					
Post 2009	Reconstructed tramline	N/A	Maintain and upgrade as required.	Medium					
Austral 2009	Movable heritage items	HIGH	Retain in situ	Medium					
Precinct 2 - Village Area									
CHL 615	Village layout and overall value	VERY HIGH	Retain the village layout and vegetation buffer zone. Retain evidence of fences, paths etc. and consider reinstating if opportunities arise.	Medium					
CHL 616	Former road bridge (collapsed)	MEDIUM	Retain where practicable and document evidence as opportunities arise.	Low					
CHL 617	Footbridge 1 remains	MEDIUM	Retain where practicable and document evidence as opportunities arise	Low					
CHL 618	Remains of former footbridge 2	MEDIUM	Retain where practicable and document evidence as opportunities arise	Low					
CHL 620, 622-627	Residence 2 & 4-9 c 1914 (Superintendent's house) and adjacent playground site	HIGH	Maintain houses in weatherproof condition. Retain the original room configuration with the current additions. Maintain or upgrade services as required. Maintain remaining outbuildings, garages, sheds etc. Retain and document evidence of earlier structures such as walls, slabs, footings, fences, paths etc.	High					
CHL 621	Residence 3 c 1965 (demountable)	LOW	Maintain as required.	Low					
CHL 629	Single men's housing	MEDIUM	Maintain in structurally sound and weatherproof condition.	High					
CHL 630	Community Hall	HIGH	Retain in structurally sound and weatherproof condition. Retain kitchen addition and markings. Space may be used for interpretation purposes subject to planning. Investigate option for reinstating original finishes.	High					
CHL 631	Remnant steps and paths	MEDIUM	Retain and conserve as part of future use of the place.	Medium					
CHL 632	Swimming pool remains and sports field	N/A	Manage vegetation to reduce fire risk. Interpret if opportunities arise.	High					
CHL 633	Tramway Formation	HIGH	Retain and document evidence as opportunities arise.	Medium					
CHL 634	Archaeological sites – Village area	MEDIUM	Retain and document evidence as opportunities arise.	Medium					
CHL 635	Air Raid Shelter remains	MEDIUM	Retain and document evidence as opportunities arise.	Medium					
CHL 636	Road bridge	NONE	Repair, maintain or upgrade as required.	Low					
Davies 2006	Exotic plantings	HIGH	Retain and document evidence and undertake arboricultural assessment as opportunities arise.	Low					
Davies 2006	Mature tree plantings	HIGH	Retain and document evidence and undertake arboricultural assessment as opportunities arise.	Medium					

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
THR 2.7	Playground site	N/A	Retain evidence in situ.	Medium					
THR 2.10	Construction camp	N/A	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
THR 2.14	Water system	N/A	Maintain area and retain items *in situ*	Medium					
THR 2.15	Tip sites, various.	N/A	Document and retain significant archaeological evidence *in situ*	Low					
Austral 2009	Movable heritage items	HIGH	Retain in situ	Medium					
Precinct 3 – Upper Station Area									
CHL 628	Residence 1 c1940s/50s	HIGH	Retain and maintain buildings as required. Reinstate evidence of fenced enclosure.	Medium					
CHL 635	Air Raid Shelter remains	MEDIUM	Retain and document evidence as opportunities arise.	Medium					
CHL 637	Corded track	MEDIUM	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
CHL 638	Surge tower old	MEDIUM	Retain *in situ*.	Medium					
CHL 639	Surge tower new	MEDIUM	Retain *in situ*.	Low					
CHL 640	Winch and winch house	MEDIUM	Retain winch and maintain building in weatherproof condition	Medium					
CHL 641	Former hilltop winch	HIGH	Retain *in situ*, document and conserve evidence as opportunities arise	High					
CHL 642	Valve House	HIGH	Retain and maintain.	High					
CHL 643	Manifold and takeoff	MEDIUM	Retain *in situ* with dismantled elements, clear around area and remove intrusive growth, clear outlet channel.	Medium					
CHL 644	1914 penstock	MEDIUM	Control vegetation and retain remaining pipe lengths *in situ*	Medium					
CHL 645	Old haulageway and stonewalls	HIGH	Retain *in situ* and undertake works as necessary to prevent further deterioration.	High					
CHL 646	1970s Penstock	MEDIUM	Retain *in situ*	Medium					
CHL 647	Incline and gantry	HIGH	Maintain and upgrade as required	Medium					
CHL 648	Garage/store Buildings	HIGH	Retain and maintain to ensure watertightness and security, undertake routine maintenance.	High					
CHL 649	Woodstave machine	HIGH	Retain machine under cover and conserve	High					
CHL 650	Sites of former buildings – residence, magazine, temporary powerhouse etc.,	LOW	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
CHL 651	Mature and exotic tree plantings	HIGH	Retain, undertake arboricultural assessment and undertake any required work	Low					
CHL 652	Concrete entry stair and structures	HIGH	Retain *in situ* and maintain. Conserve if required for public access.	High					

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
CHL 653	Power station building	HIGH	Retain the building generally in its current form or where possible with reinstated earlier detailing and elements. Generally do not alter the building unless essential for ongoing power generation requirements	High					
CHL 654	Main inlet valves	MEDIUM	Retain *in situ* and maintain in working condition.	Medium					
CHL 655	Generator sets and turbines	VERY HIGH	Retain all generators *in situ* in working condition.	High					
CHL 656	Main crane	HIGH	Retain *in situ* and maintain in working condition.	High					
CHL 657	Control panels 1914	VERY HIGH	Retain *in situ* in original form.	High					
CHL 658	Workshop, equipment and stores	MEDIUM	Retain and maintain in original form.	Medium					
CHL 659	Station display room and archive	VERY HIGH	Prepare inventory and identify/secure ownership or reproduction rights.	High/ Medium					
CHL 675	Water reservoir and pipe remains	HIGH	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
Davies 2006	Exciters	VERY HIGH	Retain *in situ* and maintain in working condition.	High					
Davies 2006	Main isolating valves, Auto transformers	MEDIUM	Retain *in situ* and maintain in working condition.	Medium					
Davies 2006	Rectifiers, Surge Diverters, Switch gear and transmission, Oil circuit breakers, Fuse switches, Service transformers, Tripping unit, Standby charger	LOW	Retain *in situ* and maintain in working condition. Upgrade as required	Low					
Davies 2006	Control panels 1965	LOW	Remove or retain as required.	Low					
Davies 2006	Enclosure of control room	NONE	Remove or retain as required for operational needs	Low					
Davies 2006	Later fitout of amenities area with kitchen etc.	LOW	Retain or alter to suit future uses as required.	Low					
Davies 2006	Concrete slab of former buildings	MEDIUM	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
Davies 2006	Access road to former road bridge	HIGH	Clear of undergrowth, stabilise to prevent deterioration as required and retain as walking track.	Medium					
Davies 2006	Hilltop butterfly valves	MEDIUM	Retain while serviceable, upgrade if required.	Medium					

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
Davies 2006	Tramway formation and alignment around station	VERY HIGH	Retain and maintain where required to prevent deterioration.	High					
Austral 2009	Movable heritage items	HIGH	Retain in situ	Medium					
Post 2102	Toilet	Low	Maintain in clean working order	High					
Precinct 4 - Lower Station Area									
CHL 661	Lower weir and headworks	VERY HIGH	Retain *in situ* in operational condition, repair as required.	High					
CHL 662	Trashrack and intake	MEDIUM	Retain and maintain *in situ*.	Medium					
CHL 663	Woodstave pipeline alignment	HIGH	Maintain original formation and cuttings in generally cleared form to allow for public access as opportunities arise.						
CHL 664	Leslie Creek Bridge	HIGH	Maintain in serviceable condition.	Medium					
CHL 665	Winding House & Winch	MEDIUM	Retain in mothballed condition, secure building, undertake repairs to keep weatherproof and clean interior on programmed basis.	Medium					
CHL 666	Valve House & Valves	MEDIUM	Retain building, undertake routine maintenance and keep secure. Retain valves *in situ*.	Medium					
CHL 667	Surge Tower	MEDIUM	Retain *in situ*, stabilise as required.	Medium					
CHL 668	Penstock c1930s	MEDIUM	Retain evidence *in situ*.	Medium					
CHL 669	Haulageway	HIGH	Maintain clearing around penstock and haulageway including hilltop valves and winch house	High					
CHL 670	Haulageway buffer	MEDIUM	Retain and conserve as opportunities arise	Medium					
CHL 671	Power Station building	VERY HIGH	Retain and undertake routine maintenance to keep the building weatherproof and secure	High					
CHL 672	Francis Turbine	HIGH	Reassemble, document condition and maintain in secure mothballed state	High					
CHL 673	Control panel	VERY HIGH	Document condition and maintain in mothballed form.						
CHL 773	'Tin town' construction site	HIGH	Avoid site disturbance. Retain and document evidence as opportunities arise.	Medium					
THR 4.6	Timber bridge near winch house	MEDIUM	Retain *in situ* if extant. Stabilise abutments if required.	Medium					
Davies 2006	Transformers	VERY HIGH	Document condition and maintain in mothballed form.	High					
THR 4.9	Road Network along early Tramway Alignments and 'Zig-Zag' Track.	N/A	Maintain in current form.	Medium					
THR 4.10	Copper Mines of Tasmania pipeline and	N/A	Manage in accordance with CMT agreement.	Low					

Primary Source	Name	Rank	Action	Priority	2016	2017	2018	2019	2020
	pump house								
Post 2009	Lower Station Mini-Hydro development	N/A	Maintain building and asset in good working condition. Consider opportunities for guided tours.	Low					
Post 2009	Replacement woodstave pipeline c2010	N/A	Maintain as required.	Low					
Post 2009	FRP Penstock 2010	N/A	Maintain as required.	Low					
Post 2009	Access road	N/A	Maintain as required. Consider opportunities for guided tours.	Low					
Austral 2009	Movable heritage items	HIGH	Retain in situ	Medium					
Precinct 5 - Broader Site									
CHL 676	Fish Hatchery	MEDIUM	Avoid site disturbance. Clear vegetation and document evidence as opportunities arise.	High					
CHL 677	Former tramway route	HIGH	Avoid site disturbance. Retain and document evidence as opportunities arise.	High					
CHL 678	Main access road	MEDIUM	Maintain and upgrade as required but retaining alignment.	Medium					
CHL 679	Transmission Towers	MEDIUM	Retain *in situ*.	Medium					
CHL 680	Access roads and tracks	MEDIUM	Generally maintain tracks and roads to a minimum standard, do not create additional roads unless necessary and approved.	Medium					
THR 5.1	Yolande waterfall construction site	N/A	Avoid site disturbance. Investigate if opportunities permit.	Low					
THR 5.2	Early c20th timber and exploration tracks (incl. Leslie Creek timber camp	N/A	Avoid site disturbance. Investigate if opportunities permit.	Low					
THR 5.4	1912-14 Maltese Worker's Camps 'Valetta' & 'Gozo'.	N/A	Avoid site disturbance. Investigate if opportunities permit.	Low					
THR 5.11	Signage and exterior lighting.	N/A	Maintain or upgrade as required	Low					

CHL – Hydro Tasmania Cultural Heritage List

THR – Tasmanian Heritage Register

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