

HISTORIC HERITAGE SURVEY & ASSESSMENT
in the area of the Scotia and Endurance Tin
Mines, Gladstone, Northeast Tasmania.

REPORT FOR VAN DIEMAN MINES PTY LTD,
CANBERRA, ACT



BY

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(with M. Maitri)

September 2005

Cover Picture: *Scotia Tin Mine and manager James Galloway, July 1902*
(*photograph held in the Mineral Resources Tasmania photographic collection*)

DISCLAIMER

The consultant has taken all reasonable measures to identify all available information on the cultural heritage within the study areas and other relevant background information within the scope of the project requirements, and to provide sound advice with respect to cultural heritage management in the light of the proposed development. However there may be sources of information which were not identified, and other development or management issues may arise which were not foreshadowed during this study. The consultant therefore disclaims liability in the event that additional heritage or relevant background information in relation to the project is identified, or where new development or management issues arise.

SUMMARY

The Project

This report documents an assessment of the historical (non-Aboriginal) cultural heritage and potential impacts in relation to proposed renewed alluvial tin mining in two areas near Gladstone, northeast Tasmania. The mining is being proposed by Van Dieman Mines Pty Ltd who currently hold Mining Leases over the two areas of interest. The two areas being considered are 1) the area of the former Scotia – Lochaber tin mines c.3 km north of Gladstone; and 2) the area of the former Endurance tin mine on the south side of Mt Cameron and c.8 km northwest of the South Mt Cameron township. Both are areas of Crown land.

The present study was commissioned by Van Dieman Mines Pty Ltd (VDM). The purpose of the study was to provide a preliminary environmental impact assessment (EIA) in relation to historic heritage for the two areas based on field survey. The liaison person for VDM with respect to the study was David Duncan (McPherson Duncan & Associates) acting on behalf of VDM, and Neil Kinnane was the VDM contact person. The historic heritage assessment was undertaken as a consultancy to VDM by cultural heritage consultant Anne McConnell in August 2005. Archaeologist Maddy Maitri (Maitri Archaeology) was engaged to help undertake the field survey component.

Identified Historic Heritage

Both areas contain previously identified historic heritage and heritage identified by the present study. All identified historic heritage is mining heritage, and most are related to historic alluvial tin mining.

The Scotia area includes part of the Mt Cameron Water Race which was a major, long-lived government managed race; the associated Water Race Reserve & Scotia Cottage; the Scotia Water Race; Bells Shaft which is an early shaft in Tertiary deep lead deposits and possibly associated with George Rennison Bell; and the Scotia, Lochaber, Newhaven and Mallinsons tin mines which were all active mines in the late 1800s/early 1900s (with only the Lochaber Mine being subsequently mined); an early mining access track (termed by this study the North Scotia Track); and the Dorset Dredge Power Line. A small number of historic mining related features were also identified.

The sites in the Scotia area range in cultural heritage significance from local to state level. The only site with acknowledged state level significance is the Mt Cameron Water Race. This is also the only listed site in the area and is listed on the Tasmanian Heritage Register and in the Dorset Planning Scheme 1996. A distinctive attribute of the mining heritage of the area is that it all belongs to the main early phase of alluvial tin mining in northeast Tasmania (& Tasmania) and has not been re-mined or otherwise redeveloped or modified subsequently. As a result, most of the sites in this area are relatively intact and have a high level of integrity, and the landscape as a whole, with its typical Great Northern Plains woodland, has the same values.

The Endurance area is a very different situation. Most of the study area is in the western part of the Endurance Mine which was subject to early small scale mining which was overprinted by later mining which continued up to the 1980s. There is understood to be very early unworked mining camps and small scale workings, some of which were Chinese, on the lower slopes of Mt Cameron immediately adjacent to the north boundary of the present mining lease area. The area, primarily the extensive tailings, was then subject to rehabilitation which has been reasonably successful. Consequently, the west part of the Endurance Mine appears to have no intact features other than the main workings (now filled with water) and one small area with the in situ remains of a treatment plant (including part of a tail race and sluice, a track and a hut).

The marshy plains to the west of the Endurance Mine appear not to have been affected by historical mining and only four sites were identified in this area – the South Endurance Track/Road (the historic cart track to port of Boobyalla via the Old Port Road), the West Endurance Water Race 1, 2 & 3, and a power pole of the Moorina- Endurance Power Line.

None of these sites are heritage listed and none are considered to have state level heritage significance. The Endurance Mine and the South Endurance Road are considered to have regional level significance, but the Endurance Mine has primarily historical value, while the South Endurance Road has historical value and has high integrity and is relatively intact. The Moorina- Endurance Power Line has not been assessed as only one feature relating to it was located. As the Moorina Power Station has state level significance, the Moorina- Endurance Power Line is likely to have at least regional level significance for its historical associations. The other sites are considered to be of local significance only. The area is not considered to have historic cultural landscape values.

Impact Mitigation Advice Scotia Area

Specific Site/Feature Protection

1. Impacts to the **Mt Cameron Water Race** and associated features should be avoided where possible given the extremely high (state level) significance of this site, and the impacts of any essential works should be minimised.

Mining development is understood to be normally exempt from the provisions of the *Historic Cultural Heritage Act 1995* (under Part 12(100)) however since the Mt Cameron Water Race is listed on the Tasmanian Heritage Register, VDM should seek clarification in relation to this matter. VDM should also contact the Dorset Council to check if there are any conditions that apply to the Mt Cameron Water Race since it is listed in Schedule 3 of the *Dorset Planning Scheme 1996*.

2. The **Bells Shaft** area should be avoided if possible, and it should be surveyed, documented and assessed prior to works if mining or associated infrastructure is planned for the area as this is a very early and potentially highly significant site area (note – a c.100m area around the shaft should be surveyed to ensure that all associated features can be identified and included in the assessment).
3. Given its associations with the Mt Cameron Water Race and the Scotia Mine, both of which are considered to be of relatively high significance, impacts to the **Scotia Water Race** should be avoided where possible and the impacts of any essential works should be minimised.
4. Works (ie, mining or development & maintenance of associated infrastructure) in the Scotia area should, where possible, avoid those areas of high known or potential historic heritage sensitivity shown in Figure 6. Any works in these areas are will require further historic heritage assessment and/or heritage recording, and the larger artefact scatter areas are considered to require test excavation (prior to any works) to ensure adequate salvage of the mining heritage.
5. The **Scotia Mine** workings have been included in the area of high sensitivity as it is considered to be the most significant open mine in the area and of regional significance (including for fabric based reasons). This is to indicate that the proposed mining should seek to minimise impacts to this site as far as possible. However it is recognised that achieving a minimal impact in this area will be difficult as it is understood that VDM are considering mining the north face, using the actual mine workings for tailings, and locating a range of infrastructure on the east edge of the mine.

It is not the intent to constrain the proposed mining, but to ensure the range of feasible options for minimising adverse heritage impacts to the Scotia Mine are considered. Options for minimising the heritage impacts in this area that should be considered include relocating infrastructure to the north of the Scotia Mine or east of the Scotia Race in the mine area; using the existing tracks in the area as much as possible for mine roads; containing the works as much as possible (and if possible containing the mine tailings and associated work within the historic mine working in the north end).

If the above measures are not achievable, then it will need to be accepted that the proposed mining and the conservation of the heritage values of the Scotia Mine are not mutually compatible and that the heritage values of the Scotia mine will be significantly impacted. In this case there should be salvage recording of heritage in areas to be impacted, but no requirement to minimise the impacts in this area. Since the heritage values will not be retained, this would needlessly constrain the proposed mining operation.

General Heritage Protection

6. Given the assessed significance of the area generally as a high integrity late 1800s-early 1900s alluvial tin mining landscape, disturbance of the area should, without unduly constraining the proposed mining, be confined to as small an area as possible, kept out of the areas of potential sensitivity indicated in Figure 6 to the extent possible, and kept to a minimum.
7. No features (structures or objects) related to historical mining should be disturbed unless they are in works areas (ie, mining or associated infrastructure areas).
8. Once the locations for the mining and infrastructure (eg, treatment plant, workshops, offices, roads, water supply, and including re-use of historical features) are finalised these locations should be surveyed/re-surveyed to ensure all heritage features in the areas are located, and these features should be fully recorded (and the information provided to MRT) as these mining heritage features are unlikely to survive.
9. If works are to be located outside the present study area, then a heritage survey should be carried out to ensure no other historic significant heritage, in particular mining heritage, in these other areas is impacted and that all historic heritage in the areas can be recorded prior to disturbance.
10. Should the proposed mining not go ahead in this area, the mining lease expire, and interest in this area diminish, then Mineral Resources Tasmania should consider treating this area as a heritage conservation area to protect its largely intact, high integrity late 1800s-early 1900s alluvial tin mining landscape which if conserved would be a good representative example of such a landscape.

Impact Mitigation Advice Endurance Area

Specific Site/Feature Protection

1. The **South Endurance Road** should not be impacted west of the Endurance Mine tailings (ie, where the original formation is extant) given its assessed significance.
2. If it is to be impacted by the mining, the identified power pole of the **Moorina-Endurance Power Line** (EA 40) should be salvaged as it is possibly a rare surviving example.
3. The in situ treatment area and associated features (**EA 23**) on the south edge of Blue Lake within the West Endurance area should not be impacted by the works as this is the only identified in situ heritage in the area and is a relatively high integrity complex.
4. The six cell jig (**EA 10**) and the sluice box (**EA 11**) should be relocated to another part of the West Endurance if they are likely to be impacted by the proposed mining or associated infrastructure.
5. Although not in the present study area, the area north of the present study area is considered sensitive for historic mining heritage, including very early Chinese mining camps, and should be avoided by the proposed mining and associated infrastructure if possible.

General Heritage Protection

6. No features (structures or objects) related to historical mining should be disturbed unless they are in works areas (ie, mining or associated infrastructure areas).
7. Once the locations for the infrastructure (eg, treatment plant, workshops, offices, roads, water supply, and including re-use of historical features) are finalised these locations should be surveyed/re-surveyed to ensure all heritage features in the areas are located, and these features should be fully recorded (and the information provided to MRT) as these mining heritage features are unlikely to survive.
8. If works are to be located outside the present study area, then a heritage survey should be carried out to ensure no other historic significant heritage, in particular mining heritage, in these other areas is impacted and that all historic heritage in the areas can be recorded prior to disturbance.

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- Revel Munro, Tin Mine Centre, Derby,
- Graeme McIntyre of Encom Technology Pty Ltd for providing the air photo base maps for the heritage survey plans,
- staff of the Mineral Resources Tasmania Library, Rosny; and
- staff Tasmaniana Collection of the State Library,

I would also like to thank David Duncan (Mineral Exploration Consultants, Kingston, Tasmania) and Neil Kinnane (Van Dieman Mines Pty Ltd) for background information and for administrative assistance to the project.

Maddy Maitri provided invaluable archaeological support in the field, and I am grateful to her for undertaking the field work in less than easy circumstances (and in Anne's car).

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Abbreviations

asl	above sea level
DIER	Department of Infrastructure, Energy & Resources
DTPHA	Department of Tourism, Parks, Heritage & the Arts
EIA	Environmental Impact Assessment
ha	hectare
HT	Heritage Tasmania
km	kilometre
MRT	Mineral Resources Tasmania, DIER
RNE	Register of the National Estate
THC	Tasmanian Heritage Council
THPI	Tasmanian Historical Places Inventory
THR	Tasmanian Heritage Register
VDM	Van Dieman Mines Pty Ltd

1 INTRODUCTION

1.1 Project Background

This report documents an assessment of the historical (non-Aboriginal) cultural heritage and potential impacts in relation to proposed renewed alluvial tin mining in two areas near Gladstone, northeast Tasmania. The mining is being proposed by Van Dieman Mines Pty Ltd who currently holds Mining Leases over the two areas of interest. The two areas being considered are 1) the area of the former Scotia – Lochaber tin mines c.3 km north of Gladstone; and 2) the area of the former Endurance tin mine on the south side of Mt Cameron and c.8 km northwest of the South Mt Cameron township (refer Figure 1). Both are areas of Crown land.

The proposed development in both cases is to open cut mine the as yet unworked leads beyond the former alluvial mines. In both cases it is proposed to mine some 1.5 km of lead, and in the case of the Scotia area possibly further. The proposed mining will require dams, treatment plant, workshops, offices, roads, water supply and removal, other infrastructure, and areas for tailings dumps, all of which may impact on mining heritage associated with the former mines (and possibly other historic heritage). The Mining Lease areas are shown in Figures 2 & 4, and the proposed location of infrastructure (as at July 2005) is shown in Figures 3 & 5.

Consequently, Van Dieman Mines Pty Ltd (VDM) commissioned the present study to provide a preliminary environmental impact assessment (EIA) in relation to historic heritage for the two areas. The liaison person for VDM with respect to the study was David Duncan, McPherson Duncan & Associates, acting on behalf of VDM. Neil Kinnane was the VDM contact person. The historic heritage assessment was undertaken as a consultancy to VDM by cultural heritage consultant Anne McConnell in August 2005. Archaeologist Maddy Maitri (Maitri Archaeology) was engaged to help undertake the field survey component.

This report documents the findings of the present study. The advice provided in this report is solely the evaluation of the consultant and should not be taken to constitute endorsement by any of the agencies and organisations consulted.

1.2 Purpose, Scope & Approach

There was no specific brief for the project, however the scope and methods of the study were established by the consultant proposal (McConnell, 15/7//2005)¹ based on the requirements of the client and Mineral Resources Tasmania (MRT).

The nature of the study has also been informed by the nature of the proposed development and by State and Federal government legislation and policy for historical cultural heritage and the requirements of the relevant local government planning scheme in respect of historic heritage.

Study Area

The assessment has two study areas referred to as the Scotia and Endurance areas. These relate to the two proposed mining areas.

The actual study areas are those areas within the mining lease areas (refer Figures 2 & 4) that will be potentially impacted by the proposed mining, in particular those locations where mining and infrastructure may be focussed (as per the correspondence of 5th Jul 2005). These areas are shown in Figures 3 & 5.

¹ *The project has been carried out as per this proposal.*



Figure 1 Northeast Tasmania showing the location of the Scotia and Endurance study areas.
 (taken from the *Holiday Atlas of Tasmania* (1986), Tasmap, DPIWE)

Purpose

The general purpose of the study was to locate (through field survey), document, assess the significance of any historical heritage in the two study areas, and to provide advice in relation to managing the historic heritage in the two areas and to mitigating potential impacts to identified historic heritage values.

Such an assessment is required under the *Mineral Resources Development Act 1995* which requires that the mining heritage of mining leases which are under development be recorded. MRT also assesses the proposed mining in relation to its impacts on cultural and natural values, hence requires significance assessments and heritage impact assessment.

Since the proposed mining in both areas is in the preliminary assessment phase, the survey and assessment undertaken has been a preliminary assessment (a 'first pass reconnaissance survey' Duncan 5/7/05, p2)).

The client (Duncan 5/7/2005) asked that the project undertake a survey of areas to be disturbed and provide a report on the survey that would interpret the significance of any historic heritage located and 'make recommendations as to how these features can best be managed within the proposed new developments. The client's directions in relation to the survey were as follows –

Scotia area - to 'focus on the sites of potential maximum disturbance at the proposed open cut, the two plant sites and the old Scotia open cut (to be used as a tailings dam)' and also include the 'proposed new access road which runs near the disused Mt Cameron Water Race' and 'Newhaven Creek which will be dammed for water supply'; and

Endurance area – to 'focus on the area of the proposed open cut across the grassy plains near the western edge of Blue Lakes as well as on the treatment plant sites'.

Scope

As noted above, the assessment has been a preliminary assessment. The reporting also reflects the fact that this is a preliminary survey & assessment. The project has also provided detailed site documentation (refer Appendices) since mining heritage documentation is a requirement where new development is proposed.

Given that there has been essentially no prior historic heritage field survey carried out in the two areas, the assessment required field survey be undertaken to identify the historic heritage. Because VDM is still assessing the location for the mining and associated infrastructure (Neil Kinnane, pers comm) it was not possible to target the exact areas to be impacted by the proposed mining and, given the size of the mining lease areas and nature of the historic mining, it was not considered useful or cost effective to comprehensively survey the full mine areas. The areas targeted for survey and assessment have been the areas indicated as being probable mining and infrastructure locations as at July 2005 (refer Figures 3 & 5).

The heritage scope considered has been limited to historical (ie, non-Aboriginal) cultural heritage. No particular cut off date has been used in considering the historic heritage values of the study area.² While the study has considered all types of historic heritage and cultural heritage values, the social values have not been assessed.

Approach

The approach used to carry out this preliminary assessment is documented below. The Endurance and Scotia areas have both been treated (surveyed and assessed) similarly.

² Although no cut-off date is used, activities carried out post-WWII are generally unlikely to have historic heritage significance. This is especially the case when considering heritage technology, as WWII promoted a wide range of technological developments, and in a general sense the technologies being used today flow from the technological changes around this time.

The study has been carried out in line with standard accepted guidelines for cultural heritage assessment and management in Australia, in particular the *Burra Charter* (Australia ICOMOS 1999). Major limitations are noted in Section 1.3, below.

The study (including the report) has taken approximately 14 days work, including 4 days (8 person days) of field survey and travel.

Legislative and Policy Context Review

This information has been essentially derived from relevant legislative and policy documents. The review has taken into account the different types of land status of the study areas.

History Review

The mining history of the area, in particular that of the historic mines within the study area, has been researched to understand the history of the study area and to assist in interpreting identified sites. The historical review has involved –

- review of accessible secondary histories of the area;
- review of select archival sources for information on identified historic heritage, mainly mining records held by Mineral Resources Tasmania; and
- review of historic maps and plans for the study area, including the series of mining lease charts held by MRT.

Summary histories of the Scotia and Endurance mines were also provided by VDM via David Duncan, and Greg Dickens provided some background historical information and assistance in accessing the primary historical resources in the MRT library.

All sources used in the review are referenced in this report (refer Section 5).

Cultural Heritage Review

A review of relevant heritage studies has been undertaken to provide contextual information on mining heritage for the assessment of identified heritage and for assessing appropriate protection and impact mitigation measures. This review therefore focussed on the various heritage registers and other listings, current policy and practice for the management of mining heritage in Tasmania and other relevant Tasmanian overview studies and heritage studies of similar heritage types.

All sources used in the review are referenced in this report (refer Section 5).

On-ground Survey

A ground (on-foot) survey of the two study areas was undertaken on 5-7 August 2005. The field survey was carried out by Anne McConnell and Maddy Maitri. The field survey represents approximately 25 hours of on-foot survey and inspection.

The general area surveyed on foot is indicated in Figures 3 and 5 (by study area boundary) and the actual areas surveyed are those for which heritage survey mapping is available (refer Appendix 2). The areas targeted for survey and assessment were those areas indicated as being probable mining and possible infrastructure locations, but some reconnaissance level inspection of adjacent areas was also undertaken for orientation and to inspect areas indicated in the history background review as having had historic mining activity.

Historical information and air photos were used prior to the survey to identify possible sites in the area and to gain an understanding of the location of the known sites. A brief description of all located sites was made in the field. Subsequently the sites have been recorded on standard forms.³ Locations were recorded using a hand held GPS. In most cases identified historic heritage features were photographed.

³ Given that this study is only a preliminary assessment, sites were not comprehensively recorded.

Assessment of Cultural Significance

The significance of each identified site and of the Endurance and Scotia areas as whole has been assessed as both levels are important for providing heritage management advice. The assessment of significance has used the standard criteria for cultural significance assessment (ie, as per the Australia ICOMOS (1999) *Burra Charter*) and major sites have also been assessed against the *Historic Cultural Heritage Act 1995* criteria for entry onto the Tasmanian Heritage Register where not previously assessed. Social significance has not been assessed in this study.

Analysis of Management Issues

The project has evaluated the potential issues for management and provides advice for heritage impact mitigation, including the need for further heritage survey and assessment. This is a qualitative analysis. This level of assessment is based on the current knowledge of the nature and significance of the sites and their condition, the nature of the proposed works in the site area, relevant policy, and current protection for, and management of, other comparable heritage examples.

Reporting

This report comprises the full study report. The report includes the detailed documentation for identified sites and a detailed scale location map (refer Appendices 1 & 2).

The report has been provided to the client. The client will need to provide a copy of the report to Mineral Resources Tasmania and possibly the Tasmanian Heritage Office. It is also recommended that VDM put the report on public record (ie, including by providing a copy to the State Library of Tasmania) to assist future research in similar areas if there are no commercial in confidence constraints to doing so.

1.3 Study Constraints

There are some factors which have constrained the ability of this study to provide comprehensive, highly accurate and reliable advice in relation to the potential impacts of the proposed tin mining in the Scotia and Endurance areas. In summary these are –

- The main constraint is the preliminary nature of this assessment and, as a consequence, the lack of comprehensive identification of mining heritage in the two areas. The main consequence of this is that not all heritage features have been fully identified and documented and some features and sites may not have been identified. To some extent this constraint has been acknowledged in the recommendations for further targeted survey and assessment in later mining development stages.
- The lack of existing heritage information for the study area and for alluvial tin mining heritage in Tasmania more generally, primarily due to the lack of previous systematic or comprehensive survey and assessment for the local area, is also a major constraint. This lack of existing information creates some difficulty in identifying the range of heritage in the study area (in particular areas of archaeological sensitivity and intangible values) and creates significant difficulties for assessing the significance of heritage features.
- The lack of detailed historic information for the two study areas is also a constraint in relation to assessing the cultural significance of the two areas and in identifying potential sites. This is mainly a problem for the earlier mining heritage where there is simply a lack of the relevant historical data.
- The lack of assessment of social significance also limits the ability of the study to provide a comprehensive assessment of cultural significance. Such an assessment would necessitate public consultation which is beyond the scope of this preliminary assessment. Given the history of the area (refer Section 2.2), it is considered unlikely that either of the study areas will have major social value.

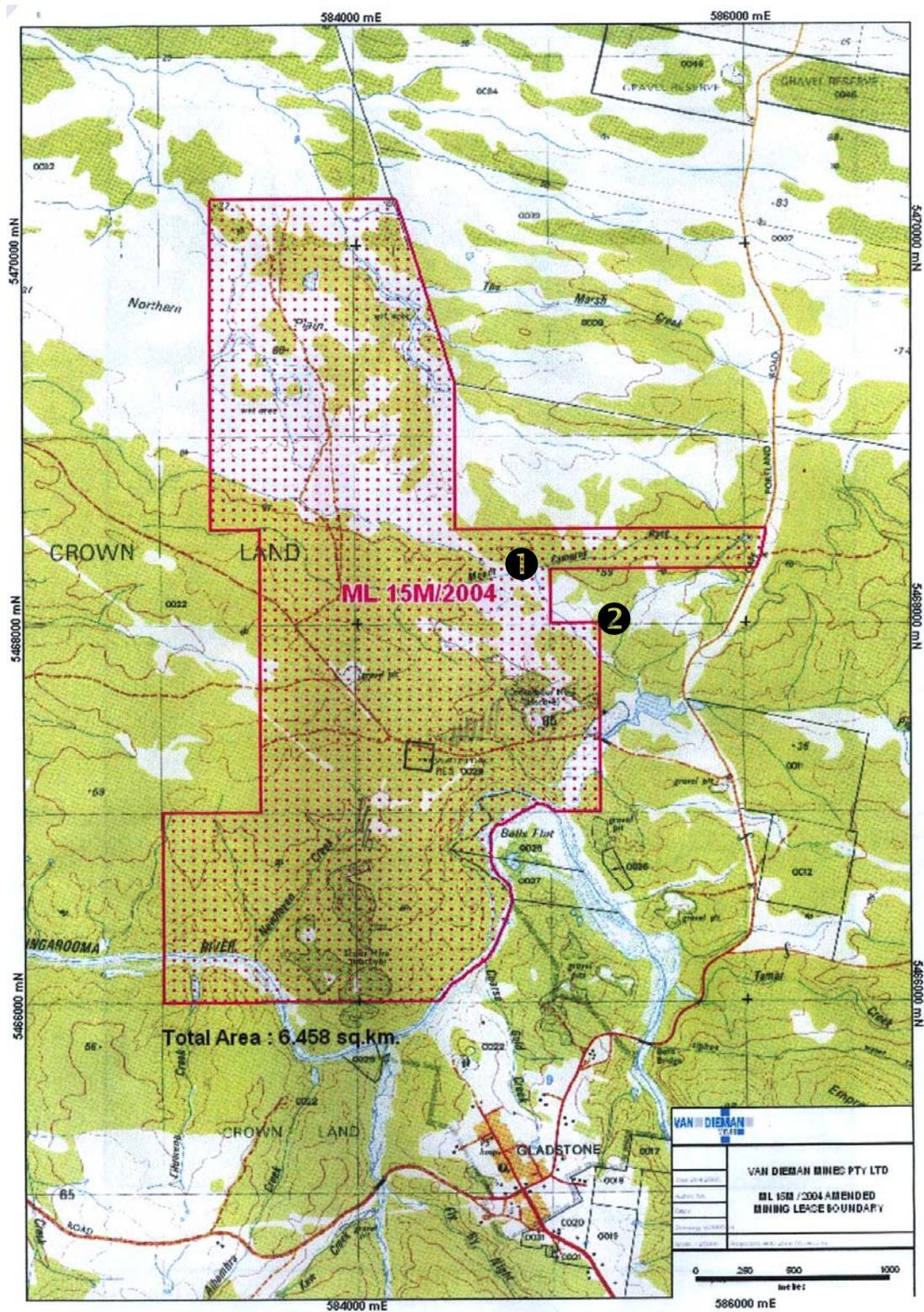


Figure 2 Scotia area showing the VDM Mining Lease area and previously identified historic heritage sites in and adjacent to the mining lease (1 – Mt Cameron Water Race; 2 – Marsh Ck South Alluvial Diggings) (taken from the project Brief (Duncan 5/7/2005)).

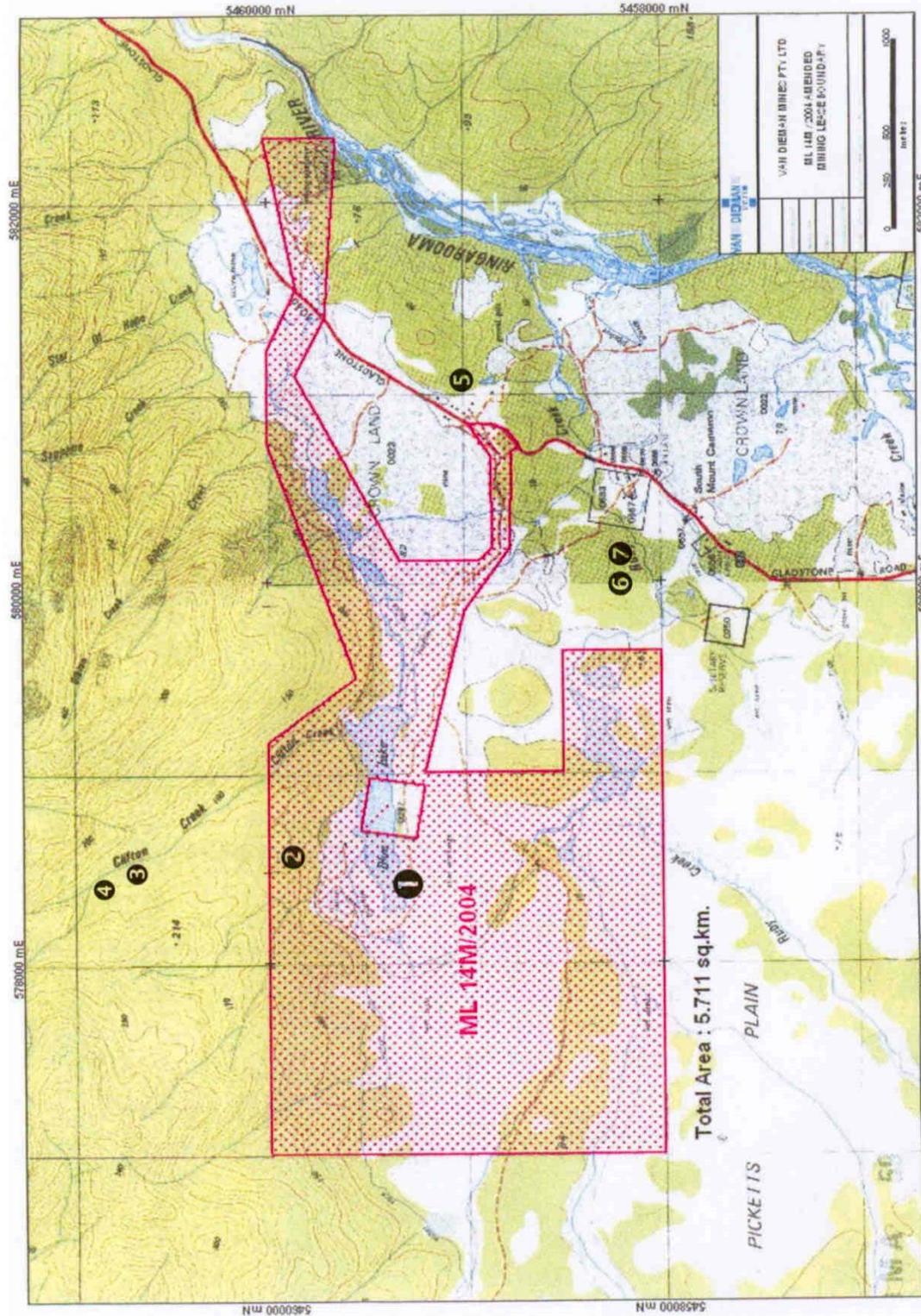


Figure 4 Endurance area showing the VDM Mining Lease area and previously identified historic heritage sites in the vicinity of the mining lease (1 – Endurance Mine; 2 – Blue Lake Camp; 3 – Clifton Camp 2; 4 – Clifton Camp 2; 5 – Long Gee's Camp; 6 – Ruby Creek Camp 1; 7 – Ruby Creek Camp 2) (taken from the project Brief (Duncan 5/7/2005)).

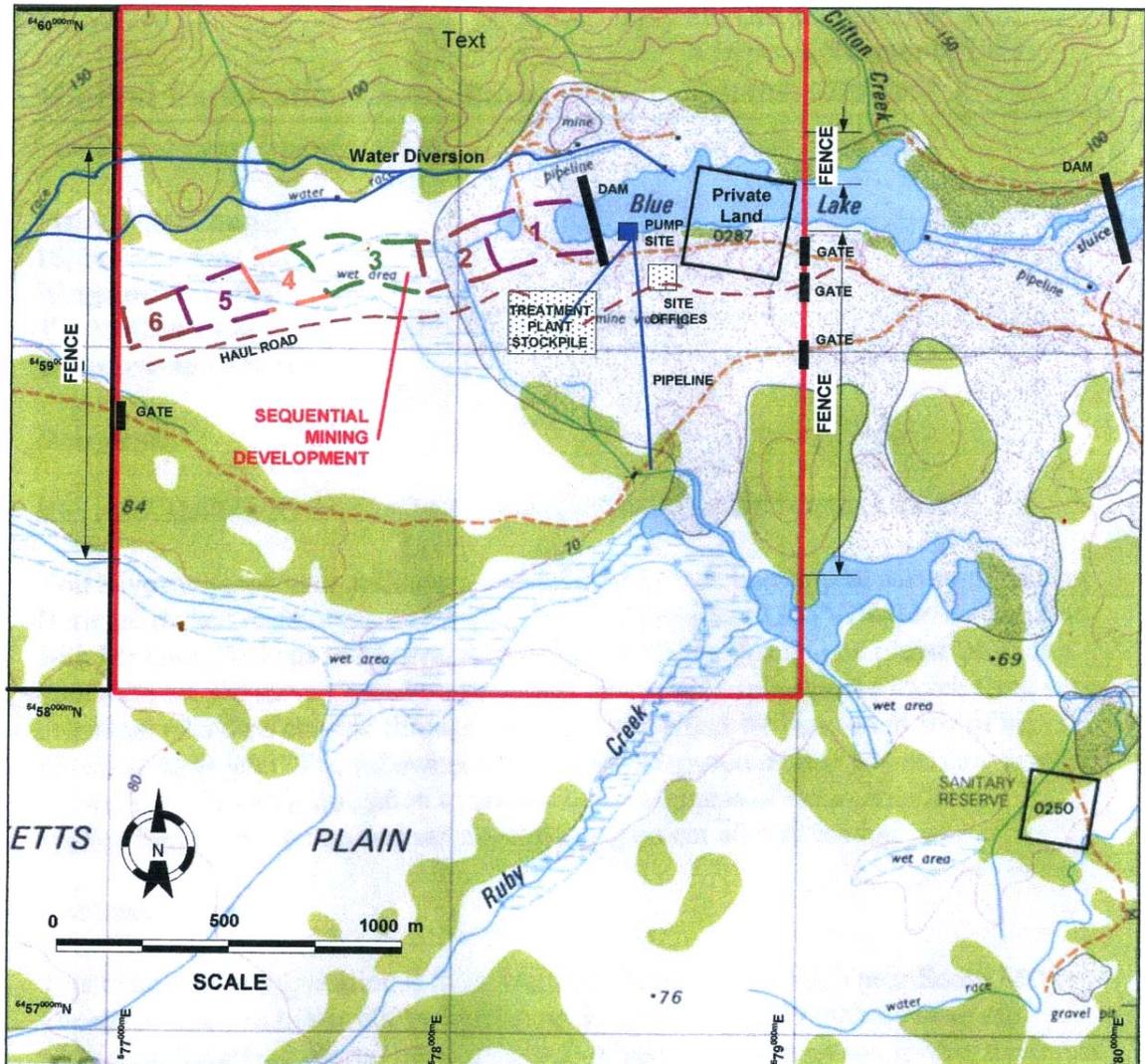


Figure 5 Endurance area showing the preliminary proposal for the location of the mining (sequential mining development) and associated infrastructure. (taken from the project Brief (Duncan 5/7/2005)).

2 BACKGROUND

2.1 Environmental Setting

General Overview

The study areas lie to the north and south of the granitic Mt Cameron massif, which rises to 551m. On the north side of Mt Cameron are the Great Northern Plains, a sandy depositional plain which slopes from about 80m asl at the south end north to the coast. South of Mt Cameron the area is essentially large flood plains of the Ringarooma River and other major rivers with intervening low-medium hills and beyond to the south are ranges. The Ringarooma River, one of the major rivers of northeast Tasmania, flows from the south around the east side of the Mt Cameron massif and then northeast to the north coast.

The northeast of Tasmania has been extensively mined, resulting in significant landscape and other environmental change in the region, including significant modification of the course and flow of the Ringarooma River. It has been calculated that by 1981 (ie, over a c.100 year period) some 2,500 ha of the region had been disturbed by tin mining, although by 1997 much of this area has been at least partly recolonised (Cook 1997, 1). There are a small number of small towns and villages which were originally developed as mining centres and which were originally much more populous.

The tin deposits are found primarily as alluvial 'placer' deposits within the Tertiary sediments which are to a large extent derived from the weathering of the margins of the granitic Mt Cameron massif. It is these margins which contained the tin mineralisation, and the weathering products have been shed around all sides of the Mt Cameron massif. The Great Northern Plains were noted as having high mineral potential, and Twelvetrees (1916, 2) commented that in areas of the gravels "the mineral is found from the grass roots downwards to 50, or even 100, feet from the surface".

Scotia Area

The study area is located on part of the Great Northern Plains. The area is primarily an undulating area of low ridges and valleys with sandy soils, abundant water courses and open eucalypt woodland with a grassy, saggy or heathy understorey. Eucalypt forest with a shrubby understorey and/or bracken occurs in the wetter gullies and on moister south facing slopes and there are occasional depressions in the plains which are open and mossy or have dense tea tree scrub. The Scotia area is drained by a small number of short, medium gradient creeks, such as Newhaven Creek. These flow into the Ringarooma River which bounds the study area on its east and south side.

The bedrock geology of the area is one of Devonian to Siluro-Ordovician Mathinna Beds which crops out along the Ringarooma River and which in this area is mapped as steeply bedded contact metamorphosed sediments comprising psammite, spotted pelite and schist. This bedrock has a veneer of Tertiary sediments which are shallow at the south end near the Ringarooma River, but thicken to the north. The Tertiary deposits are the source of the tin which occurs at various levels in leads within the Tertiary deposit. The Ringarooma valley floor and creeks in the area contain Quaternary alluvium. At the north end of the Scotia area NW-SE trending Pleistocene dunes occur. These control drainage, give a strong linear grain and manifest as subparallel low ridges with intervening depressions. To the north, more recent lunettes sit on these dunes (McConnell & Stanton 1997).

The VDM Mining lease is over 600 ha. The area is Crown land (deferred State forest) and at present is subject to leasing and grazing by Rushy Lagoon Station, which also draws water for its dairying industry from the Mt Cameron Water Race (Duncan, pers comm). The area has

been disturbed in the past by alluvial tin mining and exploration (late 1870s/early 1880s to present) (refer Section 2.2).

Endurance Area

The Endurance area is located against the base of the south slopes of Mt Cameron on the northern edge of a large area of flood plain (c.5 km by 5 km) of the Ringarooma River which flows some 4 km to the east. The flood plain is contiguous with the valley of the Little Boobyalla River to the west. The lower south facing slopes of Mt Cameron carry eucalypt forest with an open heathy to shrubby understorey, with denser forest in the creek lines. The undisturbed areas of the plains contain low hills with similar eucalypt forest as the lower slopes of Mt Cameron, low rises of open eucalypt forest with a saggy or heathy understorey, and large flat poorly drained areas of buttongrass, sedges and other swamp/marsh vegetation. Drainage in the area is southeast to the Ringarooma River.

The plains are essentially undifferentiated Tertiary sediments (gravel, sand, clay) with pockets of Quaternary alluvium. As noted above, Mt Cameron is a granitic massif and contributes colluvial and alluvial deposits to the plains. As with the Scotia area, the Tertiary deposits are the source of the tin which occurs at various levels in leads within the deposits.

The VDM Mining lease over this area is on Crown land is just under 600 ha. About one third of the area has been disturbed in the past by alluvial tin mining and exploration (c.1875 to present). There is some recreational use of the lake and tailings area (for trail bike riding) by the local community, especially at weekends (Duncan, pers comm). Extensive rehabilitation works, mainly topographic softening and revegetation has occurred across most of the mining landscape south of the lake over the last 5-10 years (Cook 1997, SEMF 1997, McPhail 2001, Munro 2000, 2001, 2002 & 2003).

2.2 Historical Overview

Contextual Background History

The first tin find in northeast Tasmania is credited to George Rennison Bell who found alluvial tin on the Boobyalla River in early 1874 (Dickens 1990), although at about the same time, alluvial tin was also found in the St Helens and Weldborough areas (Gaughwin 1991). Bell's find heralded the dawn of tin mining in the region, including in the Gladstone and South Mt Cameron districts (Dickens 1990). The first recorded tin leases were at Mt Cameron in late 1874 and in the Gladstone area in early 1875. These were taken out by James (and son Charles) Ogilvie (Dickens 1990), who was also amongst the earliest lease holders in the Scotia mine area (MRT Mining Lease charts).

These discoveries of tin in northeast Tasmania came not long after the discovery of tin at Mt Bischoff in 1871 which was at the time the most significant mineral find in Tasmania and prompted a 'rush' to the west coast to prospect for tin and other minerals. As such it is considered to be the beginning of the Tasmanian mining industry (Scripps (1990).

While tin mining expanded beyond Mt Bischoff on the west coast, the main tin mines were lode mines and the alluvial mines were comparatively restricted. On the other hand alluvial mining was the predominant form of tin mining in northeast Tasmania, the main alluvial mining region in Tasmania, although there were a small number of mines and alluvial fields further south. In northeast Tasmania the alluvial tin mining covered a vast area. The most important mining area in the region was the Ringarooma Valley, although the Gladstone field was known as a small but particularly rich field (Nye 1923). According to Nye (1923), by 1923 over half the tin production in Tasmania had come from the alluvial mining in the northeast.

The main period of tin mining in northeast Tasmania was through the 1870s to the late 1890s/early 1900s, although there were downturns in mining and mine closures at various times during this period including around 1878 and 1893-3 when tin fell to low prices. Miners lived mainly in small mining settlements (eg, Gladstone, South Mt Cameron and Moorina) which were established by c.1880. By 1890, Moorina was the largest township in the region (Miller & Miller 1979). At South Mt Cameron Wilson (1988, 58) notes that 'homes were not confined to the road sides, but were scattered from there to the Ringarooma River and some further west'. Chinese miners were in the northeast tin fields from 1876 (Miller & Miller 1979), but tended to live in small camps near workings or on the outskirts of the townships, although there were exceptions such as Garibaldi, which was a township in its own right. There were Chinese camps at South Mt Cameron and at Gladstone (Wilson 1988). The mining also resulted in the establishment of timber mills and small farms to provide wood, fuel and food to the mines and mining communities (Wilson 1988). Roads, tracks and railways also accompanied the establishment of the mines and associated settlements.

After the early 1900s a range of factors – including falling tin prices, the increasing costs of retrieving lower grades of tin, overseas competition (especially from the Malay states) and the onset of World War I – all contributed to the closure of all but a few major mines in region (Gaughwin 1991). Some of the mines however were worked at a much reduced scale on tribute for a while longer and a small number of mines have been worked sporadically by small operations at various periods. Tin production in Tasmania over this early tin mining period was greater than for any other mineral, with a total production by 1923 of c. £14,250,000 billion (Nye 1923).

Gaughwin (1991, 49) describes the generalised pattern of mining historically as follows: The earliest mines were alluvial and worked by the leaseholders themselves. While there were some individual operators the tendency was for a syndicate to be formed in which at least some members did the actual mining. These miners were attracted to the alluvial deposits of the creeks which required little capital equipment to work the tin. By 1878 much of the shallow tin was worked out and hydraulic sluicing was introduced. This however needed considerable quantities of water and water pressure. To achieve this extensive water races were required and overall the larger scale mining approach required greater capital investment which resulted in many syndicates falling by the wayside and larger entrepreneurial companies with the ability to invest large amounts of money moving in. The cost of sluicing and elevating the deposits also meant that poor ground was abandoned and only the richer ground was worked (Alexander 1947).

Although the mining companies built most of the water races, the government stepped in in the 1880s to take over the partly completed Mt Cameron water race which was completed to provide water from the Great Musselroe River to the South Mt Cameron Gladstone fields (Dickens 1990). This allowed many small mines, such as the Scotia and Newhaven to continue. This government input however was unusual and in general the miners and mining companies had to develop the required infrastructure themselves – including roads and electricity. The Moorina Power Station built in 1908 in northeast Tasmania, now the oldest continuously operating hydro-electric power station in the southern hemisphere, was one such power scheme. This power scheme provided electricity to the Endurance Mine over the second half of its life (Gaughwin 1991).

The mines in the two study areas are typical examples of the workings and evolution of alluvial mines in the region from the late 1870s/early 1880s to the early 1900s in the case of the Scotia mine, and until the mid-late 1900s in the case of the Endurance Mine. The Scotia Mine and others in the Scotia area can be considered small-medium scale mines, while the Endurance can be considered as one of the larger alluvial mines of the region.

Scotia Mine Area ⁴

The Scotia deposit (lead) was one of the first located in northeast Tasmania and is considered part of the Gladstone Tin Field which produced tin from the very earliest days of tin mining in Tasmania with uninterrupted production up until at least the mid-1910s (Twelvetrees 1916).

The Scotia Mine was established by the Scotia Tin Mining Company which was formed in 1881 to develop the Scotia lead.⁵ Little information is available on the activities of the Scotia Tin Mining Company, however by 1891 the Scotia Company and T.W. Brown had opened six working faces (3-5m) in the present southern end of the Scotia Workings close to the Ringarooma River.

During the 1890s production gradually declined. In 1901 exploration located deeper ground at the northern end of the workings and under the management of James Galloway the Scotia Mine became a leading northeast Tasmanian tin producer. Mining continued until 1905, but production then declined and the mine was closed in 1908, and there has been no renewal of mining at the Scotia Mine since 1908.

With mining it became apparent that the Scotia deposit was in the form of a narrow high-grade gutter developed at the base of the lead. Since the closure of the Scotia Mine in 1908 there has been a series of drilling programs carried out in the area of the Scotia Lead. These include three lines of holes (28 holes) north of the Scotia Mine by C.G. Ryan of the Pioneer Tin Mining Company soon after the Scotia Mine closed; 855 holes by the Tasmanian Department of Mines between 1935 and 1944; drilling by Rio Tinto in 1958; check drilling by Storeys Creek Tin Mining Company in 1965; drilling and augering across the lead by BMI Mining between 1970 and 1973; check drilling by Amdex Mining in 1976; further drilling by Amdex in the early 1980s as part of a joint venture with Australian Anglo American Prospecting Pty Ltd; and drilling by VDM since 2001. To facilitate the government assessment, the area was declared a Special Reserve in 1938 and made exempt from mining (this status was cancelled in 1965).

Other mines in the area have exploited the Scotia Lead or at least tributaries of the main lead. These include the Newhaven Mine, the Lochaber Mine and Mallinson's Workings. The Newhaven Mine (named on Nye's (1932) map) is adjacent to the north end of the Scotia Mine. It is not mentioned by Twelvetrees (1916) and it is assumed that it had also closed by 1916 (&/or may have been considered part of the Scotia Mine). To the northeast of the Scotia Mine and adjacent to the Water Race Reserve was an area of workings referred to by Nye (1932) as Mallinson's Workings. It is also unclear when this mine was operational, but according to Twelvetrees (1916) it was being worked in 1910s by Mr A. Mallinson. The Lochaber Mine was the second largest after the Scotia Mine and also operated about the same time as the Scotia Mine. A 'little work' was still being done there in 1916 (Twelvetrees 1916) and renewed mining in the early 1930s was reported by Nye (1932). Twelvetrees (1916) described the Lochaber workings as having 'produced fair tin in their time'. To the northwest of the Scotia and Newhaven Mines and on the western side of the Scotia Lead is an early shaft (of 56' depth), presumably sunk to test and exploit the deposits of the area, which is known as Bell's Shaft.

Endurance Mine Area ⁶

Tin was discovered in the South Mt Cameron district in 1875, and mining in the area of the Endurance appears to have started soon after. Initially miners (including Chinese miners) exploited the shallow alluvial deposits associated with the many small, deeply incised and steeply rising streams along the southern flanks of Mt Cameron. These deposits occurred

⁴ *This historical background information is taken from Kinnane (2003a) unless otherwise acknowledged.*

⁵ *Wilson (1988, 165) refers to the Scotia Mine as an 'earlier mine'.*

⁶ *This historical background information is taken from Kinnane (2003b) unless otherwise acknowledged.*

perched well above the Endurance deep lead. During this period the Clifton Tin Mining Company and the Endurance Tin Mining Syndicate were the major producers. The Clifton Company worked high-grade ground along Clifton Creek and the Endurance Syndicate worked shallow ground to the northwest of the Clifton workings.

The Endurance Tin Mining Company formed in 1922 and acquired the assets of the Endurance Syndicate and probably also those of the Clifton Tin Mining Company (probably nearly completely mined). In 1923 the Endurance Mine is listed as one of the main operating tin mines in Tasmania (Nye 1923). Initially hydraulic monitors supplied by steam pumped water were used, but a lack of adequate water supply required a return water system be used. In 1928 diesel driven plant was introduced because of an inadequate supply of wood to fire the boilers. Declining tin prices however forced the closure of the mine soon after, but small scale tribute mining continued.

In the early 1930s the Endurance Company restructured and acquired the Tasmanian assets of the Pioneer Tin Mining Company. As these assets included the Moorina hydro-electric power station, this enabled the company to electrify its operations at the Endurance Mine. In 1934, C. Ryan, former manager of the Pioneer Mine was appointed General Manager of the Endurance operations, and in 1935 he commenced the exploitation of the remaining shallow ground and mining of the deeper sections of the main lead. This new work involved pumping water from the Ringarooma River, construction of a tail race from the eastern end of the mine to the Ringarooma River, and the introduction of larger gravel pumps (and replacement of the pontoon steam driven plant). By 1945 all the economic shallow ground at the eastern end of the leads had been exhausted and the mining moved to west central section of the of the lead and mining of this area continued to 1956, after which the mining moved back to the central section and proceeded east (Wilson 1988).

From 1945 to the closure of the mine in the 1980s, kaolin was also mined for use by APPM (in Burnie) for paper making. Between 1945 and 1947 the clay was mined by contractors and after that by the Endurance Company. Prior to 1945 there had been some attempts to mine the clay for pottery, but these were not commercially viable (Wilson 1988).

In 1952 the Endurance Mine was regarded as 'one of the principal producers of tin in the area' with an annual output of c.50 tons (Keid 1952), but by 1954 the profitability of mining the deeper ground had become a problem. Mining however continued. Other problems between 1945 and 1960 were the difficulty of disposing of the tailings and from time to time the presence of abundant pyritic material. In 1960 the Company started mining the eastern end of the mine, but relocated back to the western sections in the same year.

In 1969 the ownership flowed to the Murray Maguire Group, and then via various interests until 1970 when BMI Mining acquired the interests of the Endurance Mining Corporation. BMI discontinued mining in the western lead in favour of mining the shallower eastern end. The mine was taken over by the Tiako-Amdex Mining Groups in 1978 and shallow mining and exploration continued, mainly at the West Endurance (R. Munro, pers comm), until the mine closed in 1982 and the equipment was sold off (Wilson 1988). No mining has occurred since.

Extensive rehabilitation has occurred at the Endurance Mine, including in the western area. Small scale rehabilitation trials were undertaken on the tailings deposits in the early 1980s (Cook 1997) and large scale rehabilitation of the tailings was undertaken prior to 1997 (SEMF et al 1997) with additional rehabilitation of new or problem areas undertaken in the last c.5 years (Munro 2000, 2001, 2002, 2003).

2.3 Identified Historic Heritage

Previous Work

Three previous cultural heritage studies are known from the general area. These are Vivian (1985), Gaughwin (1991) and McConnell & Stanton (1997). Most known historic sites in the general area have been identified and documented by one of these three studies. The sites identified in these three studies have been listed on the Tasmanian Historic Places Inventory (THPI). It should be noted that the short history of the Mt Cameron Water Race by Greg Dickens (1990) provides considerable information on the history of the site, but did not include any field recording.

Vivian (1985) focussed exclusively on the history and heritage of mining by Chinese in Tasmania. Because Chinese miners were generally excluded from lode mining there were few Chinese employed in mining in western Tasmania and consequently the focus of Vivian is on north east Tasmania. She identified and inspected a large number of sites in the region ranging from towns such as Garibaldi to workings, camps, and individual features such as joss houses, shops, huts and pig ovens.

Gaughwin (1991) carried out a regional inventory project for northeast Tasmania which focussed, although not exclusively, on areas of State forest. The project identified historic sites mainly through a literature review and oral information sources. This resulted in over 550 historic sites being identified on a range of land tenures in the region, although few of the sites were inspected and recorded in the field. Gaughwin (1991) also provides a summary thematic history for the region.

McConnell & Stanton (1997) undertook an Aboriginal and historical heritage assessment (EIA) for a proposed dam on The Marsh Creek to the north of the Scotia area. This included a survey along a proposed pipeline route which crossed the Mt Cameron Water Race in the Scotia area. The study identified a small number of historic heritage sites and features, including in the Scotia study area.

Gaughwin (1991) provides important contextual regional heritage information for northeast Tasmania. Of the 550+ historic sites she identified in northeast Tasmania, 269 are mining sites, and 104 of these are tin mining sites, mainly alluvial workings, mines, water races and campsites. This gives some impression of the scale of tin mining in the region and the amount of mining evidence that has persisted in the landscape. Gaughwin (1991, 64) notes that until recently when mine rehabilitation became a requirement "miners moved only machinery that was valuable and walked away from the site. The ground disturbances they caused were left untouched from the last day of mining. Today the features of these former mines are often clearly discernable and their extent can easily be traced. The machines which they used and many other portable artefacts do not often remain, except under unique circumstances". Gaughwin (1991, 53) also makes reference to the "numerous other, smaller races [that] crisscross the entire landscape of the North East". A number of the tin mining sites and water races identified by Gaughwin (1991) occur in the vicinity of the study areas.

It is more difficult to get an impression of the amount of tin mining heritage and its nature and condition statewide as the necessary research has not been done.⁷ Most of the currently identified mining sites in Tasmania are listed in Tasmanian Historic Places Inventory (THPI), however it is not possible to sort by tin mining. A review of THPI however shows that there are at least some 690 mining sites identified to date in Tasmania, of which 415 (60%) occur in northeast Tasmania. It is likely that more than 50% of these are tin mining sites. These numbers are likely to be an underestimate given the limited amount of research into mining sites generally in the northeast and in Tasmania more generally, but they do provide an idea of

⁷ *Comparable inventories however have been done for the northwest and southeast regions (Scripps 1990 & Parham 1992).*

the extent and scale of tin mining in Tasmania and of the concentration of this mining in the northeast region.

Identified Historic Heritage in the Vicinity of the Two Study Areas

The only sites that Gaughwin (1991) has identified in the two study areas are the Endurance Mine (THPI 8415:102) in the Endurance study area and the Mt Cameron Water Race (THPI 8515:50) in the Scotia study area. Her preliminary assessment of cultural significance for these two sites is as being of local and regional significance respectively.

Also in the Endurance area are six Chinese mining camps identified by Vivian (1985). Two (THPI 8415:27 & 28) are located well up Clifton Creek and are likely to be early sites, two (THPI 8415:23 & 24) are located on Ruby Creek just west of South Mt Cameron, one (THPI 8415:25) is located east of the main road just north of South Mt Cameron, and one (THPI 8415:26) is located just inside the VDM lease area on the northern boundary.

A number of features on the Mt Cameron Water Race were documented by McConnell & Stanton (1997) who identified and recorded a small number of other mining sites in and adjacent to the Scotia study area. These include the Marsh Creek South Alluvial Tin Mine (THPI 8516:10), the Scotia Siphon Take-off (THPI 8516:11)⁸ and the MCH 13 water race which from, its location, appears likely to be a water race or tail race associated with the Lochaber Mine. The project's preliminary assessment of the cultural significance of the identified sites is was: Mt Cameron Water Race (& Scotia Siphon Takeoff) – high regional significance; Marsh Creek South Tin Mine – medium local; and the MCH 13 water race – not assessed.

The location of the historic heritage places listed above and which are in or adjacent to the study areas are shown in Figures 2 & 4.

2.4 Historic Heritage Listings

In the northeast corner of Tasmania, there are only a small number of historic heritage places other than buildings or outside towns and townships that are listed on any register or other protective lists. Most of these places are tin mining sites. Those tin mining related places in the general area that are listed on a protective register or list are as follows⁹ –

<i>National Heritage List</i>	<i>no places</i>
<i>Commonwealth Heritage List</i>	<i>not applicable</i>
<i>Register of the National Estate</i> (<i>no protective powers</i>)	<ul style="list-style-type: none"> ▪ <u>Moorina Hydro-electric Power Scheme</u> (Moorina Power Station and Frome Dam complex), ▪ the Mt Cameron Water Race, and ▪ the Old Chum Dam area
<i>Tasmanian Heritage Register</i>	<ul style="list-style-type: none"> ▪ <u>Moorina Hydro-electric Power Scheme</u>, ▪ the Mt Cameron Water Race
<i>Dorset Planning Scheme 1996</i> <i>Schedule 3 (Environment Protection</i> <i>Areas/Sites of Cultural Significance)</i>	<ul style="list-style-type: none"> ▪ <u>Moorina Hydro-electric Power Scheme</u>, ▪ the Mt Cameron Water Race ▪ the Old Chum Dam area, ▪ Garibaldi township, and ▪ a range of places (eg, cemeteries and buildings) in various mining towns, including Gladstone.

⁸ This is in fact a part of the Mt Cameron Water Race (THPI 8515:50) and is treated as such in this report.

⁹ Places in bold occur in, or partly within one of the two study areas, and those underlined places are outside the study areas but are historically associated.

Within the study areas only one cultural heritage place, the **Mt Cameron Water Race**, is listed on any register or other protective list. This site (in its entirety) is listed by the National Trust, is on the Register of the National Estate and on the Tasmanian Heritage Register (THR), and is listed in Schedule 3 of the *Dorset Planning Scheme 1996* as an 'Environment Protection Area' (No.24). The THR listing is for a 20m zone (ie, 10m from the centre line on both sides) for the full length of the race (53 km and comprising earth channels, siphons, storage dams and other associated features and equipment). A copy of the THR data sheet for the Mt Cameron Water Race, including a summary of significance, is provided with the Site Record in Appendix 1

The **Moorina Hydro-electric Power Scheme** which is outside the study areas, but which is listed on the Register of the National Estate, the Tasmanian Heritage Register and in Schedule 3 of the *Dorset Planning Scheme 1996*, is related historically to the Endurance Mine (as the Endurance Mine took over the power scheme from the Pioneer Mine in the 1930s and used the electricity from the scheme for the mining until the late 1940s (Alexander 1947, Dickens 1990)).

The implications of the listings are discussed in Section 2.5, below. It should be noted that to date there has been no comprehensive or recent heritage assessment process that has led to places being listed on the above registers. As a consequence the listed sites are only a sub-set of places that might be listed, but their inclusion on the lists at present indicates that they are some of the most highly significant heritage places in the region.

(Note – The historic heritage places listed on the Tasmanian Historic Places Inventory (THPI) are not considered here because THPI is primarily a heritage database and has no protective powers. Places on THPI are discussed in Section 5.3, above).

2.5 Legislative & Policy Framework Implications

National Level Legislation

As no places in the study area are listed on the Commonwealth or National Heritage Lists, there are no legislative requirements for heritage protection at the Federal government level.¹⁰

State Level Legislation

The only state level historic heritage protective provisions that apply to the two study areas are those in the *Historic Cultural Heritage Act 1995*. Through the *Historic Cultural Heritage Act 1995* places listed on the THR are provided with protection. Once a place is assessed as having state level significance and listed on the THR no works are generally permitted that will have a negative impact on the assessed state level significance, and all works to the place will require 'works approval' from the Tasmanian Heritage Council. Mining exploration activities are exempt from the provisions of the *Historic Cultural Heritage Act 1995* under Part 12 (100) of the Act and it is also understood (G. Corney, pers comm) that all mining activities are exempted. VDM should seek clarification in relation to this since the Mt Cameron Water Race is listed on the THR and will be potentially impacted by VDM's proposed mining.

¹⁰ *There are no obligations for the protection of sites listed on the RNE since the Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (& 2003 (Heritage) Amendments) was enacted and the Australian Heritage Commission Act 1975 repealed. Protection for historic heritage at the Federal government level is now provided through listing on the National and Commonwealth Heritage Lists under the new legislation.*

Local Government Legislation

Under the *Land Use Planning and Approval Act 1993* local government has a responsibility to conserve significant historic heritage. This is achieved through the provisions of a statutory 'planning scheme' for each municipality and, in some cases, other area specific statutory plans. In this case the *Dorset Planning Scheme 1996* applies. Under this planning scheme places listed in Schedule 3 of the Dorset Planning Scheme require protection. Any proposed works that will affect listed sites normally require Council approval. For the present study the Mt Cameron Water Race is the only site that may require consideration under the *Dorset Planning Scheme 1996*.

Policy

There are no mandatory policies that apply, but there is a nationally accepted set of guidelines for cultural heritage practice, the Australia ICOMOS (1999) *Burra Charter*, and Mineral Resources Tasmania (MRT) has its own policy on mining heritage.

MRT Heritage Policy: This policy is used to guide decisions by MRT about mining heritage and its treatment in case of mine closure, the reworking or reopening of old mines/deposits, and in relation to moveable mining machinery/equipment.

In general it advocates that mining heritage of significance be conserved, in particular that mining machinery/equipment be left on site where possible and, where this is not possible, that appropriate action be taken to fully document the mining heritage before it is destroyed by new works. The policy also states that the preservation of mining heritage should not unduly interfere with new mining projects.

The Burra Charter: These guidelines are generally used in Tasmania as they are endorsed by most government departments and local government entities, including Mineral Resources Tasmania through its Heritage Policy. They provide generally accepted policy for managing historic heritage.

Key *Burra Charter* principles include -

- 'significant cultural heritage should be conserved' (article 2.1),
- 'the aim of conservation is to retain cultural significance' (article 2.2),
- 'significant associations and meanings of a place (including spiritual values) should be respected (articles 24.1 & 24.2)

Clearly in observing the principles of the *Burra Charter* it is critical to understand the cultural significance of a place (or feature). The *Burra Charter* (Australia ICOMOS 1999) defines the cultural significance of a place as the 'aesthetic, historic, scientific, social or spiritual value for past present or future generations', with cultural significance seen as being 'embodied in the place itself, its fabric, setting, use, associations, meanings, related places and related objects' (Australia ICOMOS 1999, 2).

3 RESULTS – HISTORIC HERITAGE VALUES

3.1 Scotia Area

Mining Lease Area Overview

A range of sites and features have been identified in and adjacent to the Scotia area. These include alluvial workings, one shaft, water races, tracks and a range of associated features. All relate to historic mining, and all probably relate to tin mining.

The one shaft is known as Bells Shaft. It was not relocated. Bell's Shaft is one of the earliest sites in the area (late 1870s/early 1880s), is possibly associated with George Rennison Bell, and is located approximately on the Scotia Lead. The Bells Shaft Exploration Pits site was located nearby. The other Mines are deep hydraulic/alluvial workings. They include the Scotia Mine which is the main workings in the area; the adjacent and much smaller Newhaven Mine; the nearby Lochaber Mine, which is relatively large; the area of workings to the south, referred to as Mallinson's Workings;¹¹ and the Marsh Creek South Tin Mine. This latter is a shallow workings and may be related to gold prospecting rather than tin mining.

There are two main water races in the area – the Mt Cameron Water Race and the Scotia Race. The Scotia Race which is a branch of the Mt Cameron Race and is understood to branch to the Doone Mine in the vicinity of the Water Race Reserve. Smaller offshoot and other water races occur throughout most of the mining lease area, but are most concentrated near the working faces of the mines and beside the main races. A section of race has also been located east of the Lochaber Mine (& is probably related to the Lochaber Mine). Evidence of a track, likely to be a connection from the Water Race Reserve to the Mt Cameron Water Race or to the mines further to the west, was noted running through the area, and there is also evidence of the power line to the Dorset Dredge to the south.

All the above sites are in, or partly within, the VDM mining lease area except for the Marsh Creek South Tin Mine (which is just outside the mining lease area north of the Lochaber Mine) and the water race to the east of the Lochaber Mine, both of which were recorded by McConnell & Stanton (1997).

The heritage in the proposed works area is described in more detail below and in the site data sheets (with site photos) in Appendix 1. A site location map for the full area is provided in Appendix 2. All identified sites in the study area are listed in Table 1.

It should be noted that there is some 50-60% of the Scotia mining lease area that has not been inspected and which may contain additional historic heritage.¹² However, no additional major heritage sites other than the Doone Water Race or possible sites along the Ringarooma River are anticipated, and no major sites are anticipated.

Proposed Works Area

The overall impression from the field survey and inspection and the historic heritage identified to date in this area is that the area represents a relatively intact early historic (late 1800s) mining landscape. The early mining features are well preserved in a landscape that has had little subsequent modification.

The only newer features that were identified were more recent mining at the Lochaber Mine, the relatively recent off takes from the Mt Cameron Water Race for rural agricultural water supply, the present road to the Dorset Dredge which clearly cuts across the historical features,

¹¹ A Mallinson also ran the Doone Mine.

¹² Given the proposed works areas the survey did not survey and map the Lochaber Mine and Mallinson's Working other than to locate the western extremities.

and a relatively new access road from near the Lochaber Mine NW to the Mt Cameron Water Race and some associated excavations (mineral exploration?). There are a small number of other minor, informal tracks that post-date the mining, but these do not appear to have caused other than minor damage to the historic heritage in the area.

Scotia Mine: The Scotia Mine is the main mine and the open cut is around 30 ha in area. The open cut area is a single area comprising earlier (?), shallower workings on the south and east side with remnant tail races to the west into Newhaven Creek and south onto the Ringarooma River flood plain; and deeper workings at the north/northeast end which appear to have followed the main lead north, and which terminate in faces that are c.5-20m high. There are more tail races to the west in this section. The floor of the open cut is relatively flat with areas of sediment that were not mined, tailings mounds of various types, including cobble mounds, and in places the workings bottom out on bedrock (particularly in the southwest corner). There were no artefacts observed in the open cut other than some sections of discarded pipe. Around the edge of the open cut on the eastern side are a series of shallow races. These presumably brought water from the main Scotia Race to the working face. There are only a couple of places where there are larger races constructed to the edge of the open cut (eg, SA 19). There are also a small number of what appear to be shallow exploratory shafts near the edge of the mine near the northeast and one at the southwest end (including SA 18 & 20).

Artefactual material appears to be limited to a sparse scatter of steel pipe sections around the eastern edge of the mine and five or six scatters of domestic artefacts. The domestic artefacts (glass, ceramic, and a miner's pick) are all consistent with late 1800s-early 1900s mining activity and at least one piece is of Chinese origin. The artefact scatters (SA 7-12) are confined to the crest of the spur on which the Scotia Mine is located, essentially between the eastern face of the mine and the N-S track. The dense scatter beside the track (SA 8) possibly marks the site of a former miner's hut. It is disturbed by the track, but there may be undisturbed associated archaeological deposits.

Newhaven Mine & Creek: The Newhaven Mine comes to within c.10m of the Scotia Mine at its north end. As shown on the maps the workings are bi-lobate, presumably accessing and mining the Scotia Lead and alluvial deposits derived from the lead. No mining was observed on the west side of Newhaven Creek. The SE lobe has a long tail race running W to Newhaven Creek. The northeast lobe is the larger worked area and runs up the Newhaven Valley. The workings are similar to those of the Scotia Mine but smaller, and there is less evidence of water races to the working faces or of artefacts in or around the mine. The very limited ground surface visibility on the east side of the mine however made it difficult to locate such features. The nature and revegetation of the Newhaven Mine suggests the mine was worked similarly to the Scotia Mine and around the same period.

There was no other mining heritage noted associated with Newhaven Creek, however the creek has been silted up as a result of the tailings that have been fed into it, and at the southern end there are traces of activity – a possible track on the west bank leading up toward the Newhaven Mine and north end of the Scotia Mine, and a small race on the east side. The confluence of the two creeks on the flood plain also appears to have been modified, but there is no clear evidence for this or features which could be recorded.

Mallinson's Working & the Lochaber Mine: As noted, only the western extremities of these two sites were inspected. On this side both mines are very similar to the Scotia and Newhaven Mines. Further to the east there has been later working of the Lochaber Mine and it is not clear if the Lochaber Mine has encroached onto Mallinson's Workings.¹³ There was a high c.1.5m earth bank noted immediately to the southwest of Mallinson's Workings and this may be the wall of the dam shown in this approximate location on Nye's (1932) map of the area.¹⁴

¹³ *These two mines are recognised as separate mines based on the separate leases held over the two areas historically and based on Nye's (1932) report which documents them as separate workings (and provides the names used here).*

¹⁴ *The other 2 dams in the area shown on Nye's (1932) map were not relocated, even though the mapped locations were partly surveyed.*

A number of small races were noted running to the west working face of both mines, and it is likely that they were supplied by the Scotia Race, although this connection was not traced in the field.

Scotia Race: The Scotia Race can be traced from its offtake from the Mt Cameron Water Race where there appears to be two generations of offtake (to match two generations of the Mt Cameron Water Race?). The race, which is a 'medium' size race, follows approximately around the 50m contour to the Water Race Reserve at which point it splits into two main races feeding the Scotia Mine – one which appears to approximate that shown on Nye's (1932) map (but for which the termination is uncertain) and which may loop back to supply the Newhaven Mine, remain independent or rejoin the eastern race; and one which continues around on the 50m contour to the southeastern part of the Scotia Mine, splitting into a number of races c.150-200m before the working face. North of the Water Race Reserve the Scotia Race has a smaller parallel race on the north-west side. The Scotia Race has been truncated in the Reserve by the present road to the Dorset Dredge and it is difficult to trace the exact linkages here.

Water Race Reserve Area: As well as the Scotia Race, the reserve was also the site of 'Scotia Cottage', one of the Mt Cameron Water Race Caretakers Cottages (built 1888 and removed in 1924). The area is heavily vegetated and no clear evidence of the Cottage was observed. A number of features were located south of the present road and west of the Scotia Race and this may be the general area of the former cottage. The features include two 44-gallon drums, an early track, a mound and part of a vehicle chassis. The track is a shallow depression (ie, an unformed road) that can be traced along the south side of the current Dorset Dredge road and then at the west end of the Reserve it turns NW and is crossed by the present road, but continues on the north side, skirting the south and west sides of the Scotia Race. Its location and the absence of other more major tracks suggest it is the original main access road/track in the area.

Bells Shaft Area: Bell's Shaft was not located during the field, but a survey transect through the general area located a cluster of four small pits on the crest of a low nearby rise.¹⁵ Two of the pits appear to be shallow pits (costeans) but the other two are larger (c.2-3'x6') and deeper with low spoil mounds around the edge and are similar to the small exploratory shafts found in the area of the Scotia Mine. About 150m south of the pits and immediately north of the relatively modern sand/gravel quarry a low mound of quartz gravel was noted with a piece of rusted metal and a c.late 1800s style brick (SA 15). This suggests that there has been historic heritage which has been destroyed by the gravel quarry. Another c.100m south of the mound is an artefact (SA 16) which is a section of 44-gallon drum rivetted to a section of steel (race) water pipe and the other end of the drum section has been welded together into a flat seam.

Mt Cameron Water Race: In the lease area the Mt Cameron Water Race extends from the Cape Portland Road and runs approximately west the width of the mining lease area. Most of the race west of the start of the Scotia Siphon was inspected in this study and the eastern part was inspected previously by the author (McConnell & Stanton 1997).

From the Cape Portland Road to the start of the Scotia Siphon the race is a distinct and relatively large earthen channel which runs north to the lease area then west around the south side of the ridge overlooking the Lochaber Mine. Two features associated with the race have been located east of the Scotia Siphon intake - a small (c.10m diameter) reservoir north of the Race with a c.7m feeder race from the Race that is likely to be a relatively recent stock dam (MCR 1); and a c.30m long by 15-20m wide pit about 20m south of the Race (MCR 2) that has been interpreted as a borrow pit for the Race.

The Scotia Siphon intake (MCR 3) is a major feature with evidence of the original and later intakes preserved (as a concrete bulkhead and a stone lined earthen bulkhead). From this point the Mt Cameron Water Race has two sub-parallel channels which persist to the Scotia Race

¹⁵ It is understood that VDM personnel have relocated Bells Shaft in this general area in a similar topographic situation (N. Kinnane, pers comm).

offtake at the other end of the Siphon. Because both period siphons were buried it is not possible to follow the two siphon races continuously. Over a third of the Siphon distance (at the west end), the northern, older channel can be traced by a line of excavated steel pipe sections (which are understood to have been replaced by wood stave pipe in the later, southern channel). The field evidence suggests that the two siphon lines are between 10m and 130m apart and that the older channel is between 2' wide by 2' deep and c.4' by c.4' deep, while the later channel is larger (c.5' wide by 5' deep but with sloping sides to a basal width of c.3'6") (McConnell & Stanton 1997). There are also a small number of relatively recent northern offtakes from the siphon, presumably to provide water to the local pastoral properties (eg, MCR 6 & 7).

West of the Scotia Race offtake (at the Scotia Siphon out-take) the Mt Cameron Water Race appears to have one channel only. This is very distinct, relatively large (c.4' wide by 4' deep with the spoil on the northern bank) and in good condition. No associated features were noted west of the Scotia Race offtake.

Other: A short, fallen eucalypt power pole with a metal cross bar and small white ceramic insulators (SA 6) was located by the edge of the present track at the northeast end of the Scotia Mine. This is interpreted as part of the power line to the Dorset dredge which is thought to have followed the N-S track from the Ringarooma River and then swung NW north of the Newhaven Mine. The line of the NW trending power line is shown on the 1:25,000 map (G. Dickens, pers comm).

Assessment of Cultural Significance

Apart from the Mt Cameron Water Race, which is regarded as having state level significance (and is listed on the Tasmanian Heritage Register), the sites identified in the Scotia area have regional or local level significance. The Mt Cameron Water Race is considered important for demonstrating the evolution of tin mining in north-eastern Tasmania, for demonstrating a high degree of technical achievement (being the longest water race constructed in Tasmania), and for its high level of intactness. As part of the Mt Cameron Water Race, The Scotia Cottage Water Race Reserve is also likely to have state or regional level significance. This significance is largely for its historical associations as there is minimal physical evidence at the site.

Bell's Shaft is likely to be the most significant heritage place in the area at the regional level as an unusual site type in an alluvial field, as an early phase mine that has high integrity for mine of its period, and for its associations with the Bell family, given that G.R. Bell was the first person to find tin in northeast Tasmania and had other historical mining connections.

The Scotia Mine is considered to also have regional level significance primarily because it is a good example of a typical alluvial tin mine of the main phase of early mining (c.1880-1910) and which used the three main methods of working alluvial ground (ie, small scale shallow manual workings, sluicing and use of hydraulic elevators) in that period, and is intact and has high integrity (particularly given the preservation and integrity of the Scotia Race). It also has local significance for its association with James Galloway. The Scotia Race is considered to have at least the same level of significance as the Scotia Mine by association and because it shares a similar level of intactness and integrity.

The Dorset Dredge Power Line is also considered to have regional significance as it is part of the Dorset Dredge complex (the Dorset Dredge being assessed as having regional significance by Gaughwin (1991)). As it is not intact, it is not considered to have fabric related significance.

The Newhaven and Lochaber Mines and Mallinson's Workings, while earlier mines with historical significance, are smaller mines and/or lack the high level of integrity of the Scotia Mine, hence are considered to have mainly local significance. The North Scotia Road/Track has not been assessed as it is not well enough researched, but the degree of disturbance caused by the construction of the present Dorset Dredge Road suggests its significance will be mainly historical.

The area as a whole is distinctive for being a relatively undisturbed and relatively early alluvial tin mining area in northeast Tasmania (and in Tasmania) that represents and can hence demonstrate well the first main phase of tin mining (late 1870s – 1910s). The landscape of most of the study area (excluding the Lochaber Mine is) is therefore considered to have significance as an early mining landscape which can demonstrate the pattern of Tasmania's mining history, demonstrate the characteristics of mines and related features of the period, and demonstrate uncommon and endangered aspects of the heritage of the historical tin mining industry.

It is difficult to assess just how important the area is for these broader values. This is primarily because few alluvial tin mining areas of the State have been fully surveyed and assessed to date. The author's personal knowledge of the tin mining heritage of Tasmania together with the information provided by relevant regional reports (eg, Scripps 1990, Gaughwin 1991, Vivian 1985) and other alluvial tin mining heritage studies (eg, Searle 1997, Jackman 1998, Parham 2004) suggest that the degree of intactness and integrity of the early mining evidence in the Scotia area is relatively rare, hence the area is likely to be significant for the above reasons at a regional level, and possibly a state level..

3.2 Endurance Area

Mining Lease Area Overview

Six sites have been identified in the Endurance area from the previous studies, existing listings, historical background research, map and air photo interpretation and field survey. These are listed in Table 1. Not all the mining lease area has been inspected (including the forested slopes of Mt Cameron, south of the South Endurance Road and east of the easternmost proposed dam), hence additional historic heritage may be anticipated in these areas although no major heritage sites are expected to occur.

The sites in the Endurance Area comprise the Endurance Mine which occupies over 50% of the study area, an associated water race, two other water races that flow west and are not connected to the Endurance Mine, an apparently unassociated earlier Chinese camp, and a major track.

Sites that are in the proposed works area are described in more detail below and in the site data sheets (with site photos) in Appendix 1. A heritage site and feature location map for the full area is provided in Appendix 2.

Proposed Works Area

Most of the area of proposed works is part of the Endurance Mine and is a highly disturbed alluvially mined landscape with tailings piles, inundated open workings, shallow workings, water races, tail races, and a scatter of artefacts, mainly sections of iron pipe. This area is clearly defined by the disturbed landscape and there is little evidence of mining away from this area other than one main water race and the South Endurance Road.

In the study area, the main mine area comprises the large open cut workings that are now infilled with water and form the chain of lakes termed the Blue Lakes. On the north and west sides there are no banks, but on the southern shore the banks gradually increase in height to over 5-7m above the lake. East of the eastern mining lease boundary to the proposed eastern dam, the mining appears to have refilled earlier major workings and the tailings are larger, more distinct, rowed features suggestive of greater mechanisation. No artefactual material was noted in this area (the upper banks however were not surveyed).

To the south of the lake is a broad fan of tailings from the open workings. Much of this area has been modified by recent rehabilitation (levelling and revegetation) and it is difficult to interpret a number of the features in the tailings area. There appears to be a series of tail races

which run N-S and which have treatment areas at the north end (next to the lake) which contain coarse tailings (quartz cobble) dumps and scattered artefacts, predominantly iron pipes and timber from the sluicing operations and only a few domestic artefacts. The artefacts are mainly disturbed (not in primary location) and heavily corroded. They appear to date mainly to the early-mid 1900s, and at least 1 artefact is possibly evidence of Chinese mining. Only one area (just to the east of the private property block and on the lake edge) had clearly in situ remains (EA 23). A pine tree was noted within the mining lease area but south of the South Endurance Road. It was not inspected and it is not clear if this is a wilding or if it marks the site of an historic residence

It is difficult to understand the age of the various features in this general area, but the western end (in the VDM lease area) appears to be earlier (late 1800s/early 1900s) than the workings to the east of the private property block which are likely to be mid-late 1900s with a very small area of 1970s mining at the extreme western end.

At the north-west end of the Endurance Mine there is another lake. This is understood to have been mined in the mid-late 1900s and there is shallowly, more recently mined land to the east of the lake. On the west side on the edge of the plains there is an area of shallow workings or a former small dam site, and between this and the lake edge there is a scatter of rusted metal pipe sections and a water race/tail race system in an area of mature eucalypt forest. The vegetation and artefacts suggest these features relate to late 1800s mining. The main tracks in the area have disturbed these earlier features and are likely to be much later – probably relating to the c.1970s mining.

The water race system is difficult to interpret given recent disturbance to sections of it. The creek that feeds in at this location from the slopes of Mt Cameron feeds (?) a race that runs west and terminates at a former working face on the present lake edge, but is not necessarily related as the deep workings that form the lake are understood to be relatively recent (mid-late 1900s) workings. The race feeds east from the creek to the shallow workings, although the water is currently diverted to the 1970s workings by a more recent large channel. In the shallow workings area there is another race that feeds in from the west and which is shown on the 1:25,000 map as running around the base of Mt Cameron from a creek c.700m to the west. This race (West Endurance Water Race 1) was followed for about 500m and it is a medium size race in good condition. Its location and the nature of vegetation growing on it suggest it dates to the late 1800s/early 1900s. The other water race in the north part of the mining lease area (West Endurance Water Race 2) appears not to be related to the Endurance Mine as it runs west into the Little Boobyalla River. This race was not inspected.

The only other historic heritage that was identified and inspected is the track which runs through the southern part of the mining lease area and westward along a low rise in the landscape to connect to the Old Port Road. This track, termed here the South Endurance Track, was only inspected to the first bridge, as although it is within the lease area, it lies mainly outside the area of proposed work. The undisturbed section beyond the tailings appears to be an unmodified dirt track and is considered likely to date to the late 1800s on the basis of its route, its linkage to the Old Port Road and the method of construction of the first bridge (parallel log pole construction with early (hand made) large nails).

There is a third water race on the west side of the Endurance Mine (West Endurance Water Race 3), and this runs along the south edge of the plain just north of the South Endurance Road and feeds into the headwaters of the Little Boobyalla River. The race is mapped as a creek but clearly shows as a water race on the aerial photograph of the area. This race was not inspected. Blue Lake Camp, a previously recorded Chinese mining camp, which is documented as being some 200-300m up the slopes of Mt Cameron west of Clifton Creek was also not inspected as it was considered to be well outside the area of proposed works.

Assessment of Cultural Significance

The main site in the Endurance area is the Endurance Mine (western part). The Endurance Mine is considered by the present study to have high regional significance. This significance

is primarily for its historical values and associations – the mine was one of the longest lived mines of northeast Tasmania and was consequently subject to a wide range of styles of alluvial tin mining, and it has significant associations with the Pioneer Mine and the Frome–Moorina hydro-electric power generation system (of high State level significance). It is also considered to have regional significance for its associations with individuals such as James and Charles Ogilvie who were important figures in the mining history of the region.

The disturbance of the site by subsequent periods of mining (including recent mining) which reworked and destroyed much of the earlier mine workings,¹⁶ the auctioning and removal of mining machinery and other equipment in c.1982, and the extensive rehabilitation post c.1982 collectively are considered to result in the Endurance Mine having low significance in relation to fabric and landscape values (as well as its scientific and educational values).

The only other site considered to have regional level significance in the study area is the South Endurance Road. This road, where it is extant (ie, west of the Endurance Mine tailings) is considered by the present study to be of high regional significance as a relatively rare example of a late 1880s/early 1900s road which has generally good preservation and a high level of integrity of the preserved sections. It is considered to be comparable (although perhaps historically less important) to the Three Notch Road, another major north east Tasmanian mining access and cart track which also led to the port of Boobyalla (Gaughwin 1991).

The other recorded site in the area, the West Endurance Race 1 is considered to be of medium-high local significance. Although there were many hundreds of kilometres of water race in the region and they are not significant per se, this race is largely intact and has high integrity (except at its Western end) and is likely to date to the first main phase of tin mining (ie, c.1880s-1910) in the area. The other main races in the area are also likely to be of medium-high local significance if well preserved.

The early Chinese tin mining sites have not been assessed as they were not inspected. If relatively well preserved, they will have cultural significance as early historical workings and for their Chinese associations at the local or regional level.

Because of ongoing mining up until recent times and the consequent overprinting of much of the historic mining evidence, as well as the rehabilitation which has significantly modified the landscape of the Endurance Mine, the area as a whole is not considered to have cultural significance as an historical mining landscape.

¹⁶ *At one level this can be seen as an ongoing use and a part of the natural evolution of a mine site.*

Table 1 List of Identified Historic Heritage in and Adjacent to the Two Study Areas.

ITEM NO.	HERITAGE SITE	DESCRIPTION	HERITAGE SIGNIFICANCE
SCOTIA AREA			
THR Place No.6952 THPI 8515:50 (includes THPI 8516:11 - the Scotia Siphon)	MT CAMERON WATER RACE	This is a very long and relatively large water race which supplied water from the Great Musselroe River to the alluvial mining fields of the region from 1881 until 1984, and more recently supplies water for agricultural/ pastoral purposes. The total length of the enlarged Mt Cameron Water Race is 178 km. The race comprises open earth channel, wooden fluming, siphons (steel & later concrete pipes), by-washes, offtakes/branch races, offtake features (eg, stone walling) and associated artefacts (eg, disused pipes). The Scotia Siphon (No.6 siphon) intake occurs in the study area. There are a range of features along the race, mainly on the N side & within c.20m. <i>Location:</i> In mining lease area - GR ⁵ 833/ ⁵⁴ 686 - ⁵ 858/ ⁵⁴ 680 & the Scotia Siphon intake is at GR ⁵ 852/ ⁵⁴ 684.	<ul style="list-style-type: none"> ▪ THR – state level significance – for historical and scientific reasons, as a rare intact race, & for the high degree of technical achievement.
THPI 8516:10	MARSH CREEK SOUTH TIN MINE	A c.80m x 20m area of small scale, apparently historic alluvial workings which consist of a series of 7 pits, spoil heaps and 3 costeans which run in a c.E-W line. The workings are well preserved. Possibly an early gold prospecting location known as 'Pope's Prospect'. <i>Location:</i> GR ⁵ 853/ ⁵⁴ 682	<ul style="list-style-type: none"> ▪ <i>not assessed</i>
	SCOTIA RACE	This race fed the Scotia, Newhaven and Doone Mines and is a branch of the Mt Cameron Water Race. The Scotia Race comprises a main race of medium size, and has sections of a smaller parallel race, numerous branches/offtakes and a small number of bywashes. The race is mainly intact and in good condition. <i>Location:</i> GR ⁵ 842/ ⁵⁴ 682 to c. ⁵ 841/ ⁵⁴ 664	<ul style="list-style-type: none"> ▪ This study – high local & probable regional significance.
	SCOTIA COTTAGE WATER RACE RESERVE	One of 4 five acre reserves vested in the Mt Cameron Water Race to house the Race 'channel keepers' who were housed in cottages on the Reserves. This Reserve was built next to the Scotia Race and the cottage was known as Scotia Cottage. The cottage was built in 1888 and removed in 1924. No evidence was located. <i>Location:</i> Bounded by c. GR ⁵ 8425/ ⁵⁴ 6737 - ⁵ 8440/ ⁵⁴ 6736 - ⁵ 8438/ ⁵⁴ 6720 - ⁵ 8423/ ⁵⁴ 6722.	<ul style="list-style-type: none"> ▪ This study – probable state level significance as part of the Mt Cameron Water Race.
	SCOTIA MINE	A medium size alluvial tin mine of the late 1800s/early 1900s that works a relatively rich lead. Not later reworked, but subject to a series of drilling programs. The mine is intact and has a high degree of integrity. Comprises shallow and deep workings, tailraces, water races and artefact scatters. <i>Location:</i> Area encompassed within c.GR ⁵ 835/ ⁵⁴ 663 - ⁵ 841/ ⁵⁴ 668 - ⁵ 843/ ⁵⁴ 663 - ⁵ 840/ ⁵⁴ 658.	<ul style="list-style-type: none"> ▪ This study – high regional significance.
	NEWHAVEN MINE	A small alluvial tin mine of the same period as the Scotia Mine and possibly worked as an adjunct. It is immediately north of the Scotia Mine and is in Newhaven Creek. <i>Location:</i> Area encompassed within in c.GR ⁵ 8385/ ⁵⁴ 6680 - ⁵ 8390/ ⁵⁴ 6710 - ⁵ 8410/ ⁵⁴ 6700 - ⁵ 8410/ ⁵⁴ 6675	<ul style="list-style-type: none"> ▪ This study –local significance.
	LOCHABER MINE	A medium size alluvial tin mine of the late 1800s/early 1900s which was worked through to the 1910s, with a second period of operation from 1932 - ?. Only the western extremity of the Mine was inspected. <i>Location:</i> West extremity is at c. GR ⁵ 846/ ⁵⁴ 6782.	<ul style="list-style-type: none"> ▪ This study – not fully inspected but of probable local significance.
	MALLINSON'S WORKINGS	A small alluvial tin mine. Limited historical information available, but probably worked only in the early 1900s. Only the western extremity of the Mine was inspected. <i>Location:</i> West extremity is at c. GR ⁵ 8455/ ⁵⁴ 6745 (with dam(?) wall at c. GR ⁵ 845/ ⁵⁴ 674).	<ul style="list-style-type: none"> ▪ This study – not fully inspected but of probable local significance.
	NORTH SCOTIA TRACK	Pre-mid 1900s(?) minor, unmade track. Interpreted as a historic access track to the mines of the area. A significant proportion has been destroyed by the construction of the present road to the Dorset Dredge. <i>Location:</i> Traced from GR ⁵ 8475/ ⁵⁴ 6735 to c.GR ⁵ 8403/ ⁵⁴ 6760.	<ul style="list-style-type: none"> ▪ This study – probable regional significance.

ITEM NO.	HERITAGE SITE	DESCRIPTION	HERITAGE SIGNIFICANCE
	DORSET DREDGE POWER LINE	Power line from Gladstone via the Scotia area to the Dorset Dredge. Presumably erected and in use from 1964 to 1971. Little visible evidence in the study area. The Track E of the Scotia Mine may relate to the power line. <i>Location:</i> Mapped (on 1:25,000 map) from c. GR ⁵ 838/ ⁵⁴ 673 to GR c. ⁵ 817/ ⁵⁴ 690; with a power pole at GR ⁵ 8419/ ⁵⁴ 6668.	<ul style="list-style-type: none"> ▪ This study – high regional significance.
	BELLS SHAFT	A 56' deep shaft excavated into the Tertiary deposits to mine tin (& possibly also extracted gold) in the late 1800s. Limited historical information but thought to be a very early tin mining site and is possibly associated with GR Bell. <i>Location:</i> Approximately GR ⁵ 839/ ⁵⁴ 679 (based on Nye 1932 mapped location).	<ul style="list-style-type: none"> ▪ This study – probable high regional significance.
	BELLS SHAFT EXPLORATION PITS	A set of 2 costeans and two exploration pits located in a c.40m diameter area; possibly associated with the mining of Bells Shaft. <i>Location:</i> In area of GR ⁵ 8393/ ⁵⁴ 6796.	<ul style="list-style-type: none"> ▪ <i>not assessed</i>
	SA 15	A mound of granitic gravel with a couple of artefacts (brick and metal fragments); probably late 1800s/early 1900s, but not in situ. No historical information. <i>Location:</i> GR ⁵ 8397/ ⁵⁴ 6778	<ul style="list-style-type: none"> ▪ <i>not assessed (probably not of significance)</i>
	SA 16	An artefact - a section of 44-gallon drum rivetted to a section of steel water pipe and welded together into a flat seam at one end. May not be in primary position. No historical information. <i>Location:</i> GR ⁵ 8404/ ⁵⁴ 6770	<ul style="list-style-type: none"> ▪ <i>not assessed (probably not of significance)</i>
ENDURANCE AREA			
THPI 8415:102	ENDURANCE TIN MINE	The Endurance Mine operated from 1875 to the early 1980s - initially as small scale manual alluvial workings but by the late 1800s was a hydraulic operation Workers lived in South Mt Cameron. Approximately 1km x 4km of alluvial workings at the foot of the south facing slopes of Mt Cameron. <i>Location:</i> Area generally bounded by GR ⁵ 810/ ⁵⁴ 600, ⁵ 790/ ⁵⁴ 592, ⁵ 778/ ⁵⁴ 594, & ⁵ 784/ ⁵⁴ 597 (the THPI grid ref is inaccurate)	<ul style="list-style-type: none"> ▪ Gaughwin (1991) - local. ▪ This study – high regional significance.
THPI 8415:26	BLUE LAKE CAMP	Chinese mining camp with a hut remains, a water race and artefacts. Not inspected. <i>Location:</i> GR ⁵ 786/ ⁵⁴ 599	<ul style="list-style-type: none"> ▪ <i>not inspected - not assessed</i>
-	WEST ENDURANCE WATER RACE 1	This race runs east around the base of the southern slopes of Mt Cameron to the NW corner of the Endurance Mine taking water from the creeks running off Mt Cameron. There is no historical information but its location and degree of revegetation suggest it operated from late 1800s to the early 1900s. <i>Location:</i> GR ⁵ 774/ ⁵⁴ 594 - ⁵ 782/ ⁵⁴ 595.	<ul style="list-style-type: none"> ▪ This study – probable local significance.
-	WEST ENDURANCE WATER RACE 2	This water race appears to run west, taking off from the same creek as the West Endurance WR 1, and running around the southern toe-slope of the Mt Cameron massif to the headwaters of the Little Boobyalla River. There is no historical information. <i>Location:</i> GR c. ⁵ 774/ ⁵⁴ 596 - ⁵ 763/ ⁵⁴ 591	<ul style="list-style-type: none"> ▪ This study – probable local significance.
-	WEST ENDURANCE WATER RACE 3	This race is shown as a creek on the 1:25,000 topographic map but is clearly a water race on the 1:5,000 air photo. It runs along the south edge of the plain north of the South Endurance Road and feeds into a head water creek of the Little Boobyalla River. There is no historical information. <i>Location:</i> GR ⁵ 773/ ⁵⁴ 587 – c. ⁵ 765/ ⁵⁴ 590	<ul style="list-style-type: none"> ▪ This study – probable local significance.
-	SOUTH ENDURANCE ROAD	A dirt track that runs from the SW corner of the Endurance Mine west to meet the Old Port Road. Appears intact and in good-moderate condition. The bridge near the mine & mining lease charts suggests it is late 1800s/early 1900s. <i>Location:</i> GR ⁵ 794/ ⁵⁴ 592 - ⁵ 755/ ⁵⁴ 594	<ul style="list-style-type: none"> ▪ This study – probably high regional significance.

4 HERITAGE IMPACT MITIGATION ADVICE

4.1 Potential Impacts & Impact Mitigation – Discussion

General Comment

As this is a preliminary survey and assessment and because all the areas which will be impacted in the two study areas have not been fully surveyed (as these are not yet known) the advice provided in this report is by necessity preliminary.

The advice is aimed at providing comment to help determine an appropriate location for plant and other infrastructure and to provide first level heritage mitigation advice in relation to the proposed mining in the Scotia and Endurance areas.

The advice is based on the obligations and policy for heritage that apply, primarily the MRT *Heritage Policy*, the Australia ICOMOS *Burra Charter* and the *Historic Cultural Heritage Act 1995*.

Given that under the MRT Heritage Policy heritage conservation is not to 'unduly interfere with the re-opening of old mines, and will not impede the developer', this present assessment has –

1. made a clear distinction between fabric based (ie, tangible) values which will be affected by physical disturbance and non-fabric based (ie, intangible) values which generally will be affected to a much lesser extent by physical disturbance; and
2. only heritage sites/features of previously identified or assessed¹⁷ state level or medium-high, or higher, regional level significance are considered as potentially warranting significant impact mitigation.

The heritage information supporting the following assessment and advice is contained mainly in Section 3 and the Appendices (Heritage Site Data) of this report.

Scotia Area

The Scotia area contains a network of historic heritage sites and features, many of which are considered to be of regional significance and one of which (the Mt Cameron Water Race) is of state significance and listed on the Tasmanian Heritage Register. The high level of intactness of these sites and the landscape generally due to the lack of later (post-c.1910s/20s) mining or other significant development means the sites in this area have high integrity as early historic alluvial tin mining sites and most of the area can be considered a high integrity historic (late 1800s/early 1900s) alluvial tin mining landscape (refer Section 3.1).¹⁸ Ideally, if there was no mining interest in the area, consideration should be given to reserving the area from development to preserve a representative example of this type of historic mining landscape.¹⁹

Although it will be difficult to significantly reduce the impact on the cultural landscape values if mining goes ahead, no recommendation is made to protect the cultural landscape values of the Scotia area in relation to the present proposal. This is in part because it is not possible to make a highly reliable comparative assessment of the cultural landscape values of area at this

¹⁷ *It should be noted that all significance assessments by this study should be regarded as preliminary as, except in a few cases, the places assessed have not been fully researched.*

¹⁸ *The lack of disturbance from VDM and other post-mining mineral exploration activities in the Scotia area is noticeable and the companies that have worked in this area are to be congratulated for their environmentally sensitive operations in this area.*

¹⁹ *The area also lends itself to this because it contains a range of types of alluvial mining site of high integrity, it is a comparatively small area; is unlikely to have other high impact development pressure other than in relation to mining; and given that it is dry, relatively open country located close to Gladstone and accessible by road it lends itself to promotion for visitation/tourism (and is a relatively safe environment).*

stage as insufficient research of alluvial mining areas elsewhere in Tasmania has been carried out, and in part because the MRT Heritage Policy is not to unduly constrain renewed mining.

Actions which can mitigate the impact on the historic heritage values of the area, in particular the individual sites of significance, include containing the footprint of the works (mining and infrastructure) and locating works outside sensitive areas. A map showing the key areas of known or probable (potential) high sensitivity for historic heritage reasons is provided to help guide the planning for the proposed mining in the area (refer Figure 6). Works should be kept to a minimum in sensitive area and kept out of sensitive areas where possible. Special impact mitigation actions (eg, excavation) are indicated where desirable if works do proceed in these areas.

Because the field survey of the study area has not been comprehensive, not all features have been fully recorded and other unrecorded features may occur in the area. Consequently, and as per the MRT Heritage Policy, when the various infrastructure locations are finalised a comprehensive survey should be undertaken of these areas to ensure all mining heritage that will be potentially impacted can be located and documented. This applies to the full study area.

Known heritage sites included in the sensitivity zoning in Figure 6 are the Mt Cameron Water Race which is of state level significance, the Bells Shaft area which is also considered to be potentially of state level significance, the Scotia Mine which is considered to be of high regional significance and the Scotia Water Race which is considered to have similar level significance by virtue of its relationship to the Scotia Mine and Mt Cameron Water Race and its high integrity. Mallinson's Workings and the Newhaven Mine are also included as they are high integrity sites of the same period although they are smaller, less complex examples than the Scotia Mine. The crest of the Scotia spur is also included in the Scotia mine area as the artefacts in this area suggest this area was utilised historically (possibly as a camping/living area) and there is potential for other artefactual material to occur in the area, including as sub-surface deposits. The Water Race Reserve & Scotia Cottage are not included as this site appears to have limited fabric based heritage/potential heritage, and the Lochaber Mine is not included as it has had later mining and is not considered to have as high heritage significance as the other mines in the area.

The Scotia Mine area is problematic. It is the most important open alluvial mine in the area and considered to be an important early alluvial mine (for a combination of historical and fabric preservation reasons), yet the mine covers a large and the proposed mining is likely to have a significant impact on it.

Given the MRT heritage policy and the need for a practical approach to mining heritage conservation, then the most logical option to pursue in this case is containment and sensitive location of mining and infrastructure at the site. This would allow mining to go ahead yet still provide a degree of impact mitigation, especially if the mining and associated works could be focussed in one or two areas. It is recognised however that this might not be achievable without creating undue constraints on VDM's operations. If this proves to be the case, then unless MRT believes the heritage values of the Scotia Mine outweigh the benefits of renewed mining in the site area, all heritage protection constraints (other than salvage survey, recording and excavation) should be lifted for the Scotia Mine site, as the constraints will create difficulties for VDM while providing minimal heritage impact mitigation.

It should also be noted that this assessment does not apply outside the Scotia study area as there has been no assessment of these areas. If mine related works are proposed outside the study area, then a heritage survey and assessment should be carried out.

Endurance Area

Unlike the Scotia area, the proposed new mining in the area will have little impact on the historic mining heritage of the area as the mining will be mainly westward into previously undisturbed marshland. The aspects of the proposed mining that will have an impact are the

associated infrastructure that will be established at the mine (eg, treatment plant, workshops, offices, roads, water supply). Since the Endurance Mine is not considered to have high fabric based significance (refer Section 4.2), then the location of infrastructure at the mine site is not generally considered to have a major negative impact on the heritage significance of the Endurance Mine or other identified sites, particularly where located on the tailings.

The only area of the Endurance Mine within the study area that has fabric based significance, and which therefore should be avoided, is the area of in-situ workings (EA 23). This is the only area of the Endurance Mine (within the study area) that was identified as having unequivocally in situ remains and, although not early, has remains of a number of features that collectively can demonstrate a small 20th century treatment/slucing operation. This area is on the edge of Blue Lake on the eastern lease boundary and is well away from the proposed mining and associated infrastructure locations, hence should be easily avoided.

Other than at EA 23, the Endurance Mine (in the study area) has little equipment or machinery. Given the MRT Heritage Policy, all equipment, including iron pipe sections, should be left in situ if not in a development/works area as these all are part of the evidence of the earlier mining and help interpret the history of the mine. The only piece of equipment identified that is considered to warrant preservation should the mine or mining infrastructure development potentially impact on it is the six cell jig at the northwest corner of the southern tailings (EA 10). As the jig is understood to have been moved to its present location from elsewhere on the site post-mining, then there is no imperative to leave it in situ if the mining or mining infrastructure is located in the general area. If moved it should be relocated to another part of the West Endurance. In these circumstances, the sluice box (EA 11) should also be moved to the same alternative location as it is a relatively complete example.

With respect to the other sites identified, these are mainly outside the area likely to be disturbed by the proposed mining. Given its historical significance, intactness and integrity, the mining should plan to leave the South Endurance Road undisturbed where the original formation exists (ie, west of the SE edge of the southern tailings of the West Endurance). Given the historical significance of the Moorina – Endurance Power Line, the one identified power pole (EA 40) of this site should be salvaged if it will be potentially impacted. Because the site has such poor preservation (no wire and only a few (?) poles) and because the pole is in poor condition, it is not considered to warrant in situ preservation.

It is understood that VDM were considering reusing the West Endurance Water Race 1 and 2. This will impact on the cultural significance of these sites (eg, loss of the historic nature and probable route modification), but these sites are not considered to be of high enough significance to warrant their protection or other special treatment.

Because the field survey of the study area has not been comprehensive, not all features have been fully recorded and other unrecorded features may occur in the area. Consequently, and as per the MRT Heritage Policy, when the various infrastructure locations are finalised a comprehensive survey should be undertaken of these areas and all heritage identified features fully documented. This applies to the full study area, including the West Endurance Water Races 1-3. The marshy area that will be the main focus of the mining is not considered to require further survey except in the area of identified sites as it has not been previously developed and is unlikely to have been the focus of historic activity given the wet environment.

This assessment does not apply outside the study area as there has been no assessment of these areas. If mine related works are proposed outside the study area, then a heritage survey and assessment should be carried out. This is particularly important north of the current lease boundary where there was early period Chinese and other mining and where Chinese mine workings and camps have been recorded. This area is likely to be sensitive from a mining heritage perspective and works/impacts in this area should be avoided.

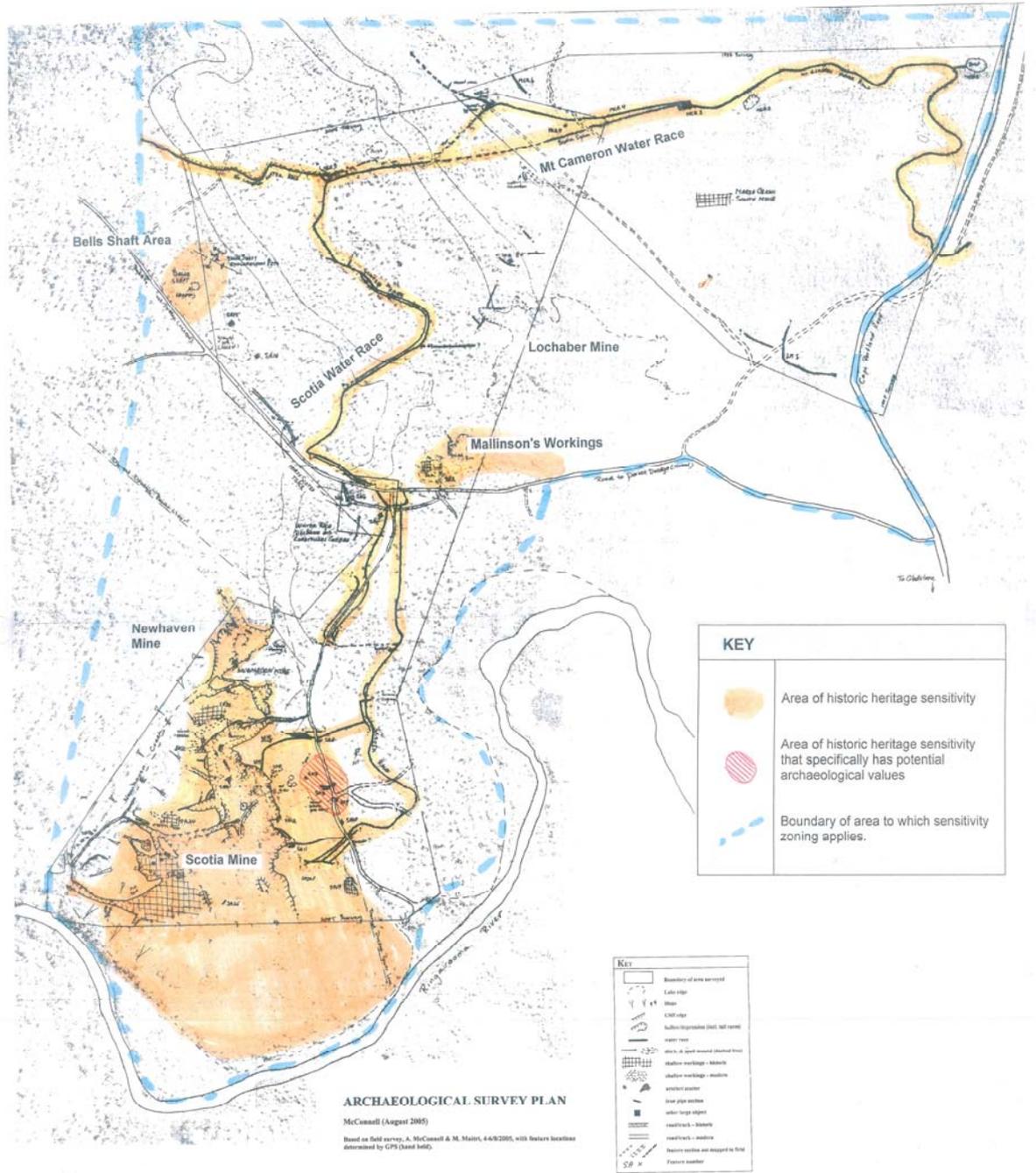


Figure 6 Scotia area showing areas of known and potential historic heritage sensitivity in the mining lease area and identified heritage in the Scotia area (for a detailed map of historic heritage in the Scotia area refer Appendix 2).

Historic Heritage Survey & Assessment – Scotia & Endurance Mines Areas, Gladstone, NE Tasmania.
 - for Van Dieman Mines Pty Ltd. McConnell (Sept 2005)

4.2 Advice

The following advice is provided in relation to the Scotia and Endurance areas and the conservation of historic heritage in the light of the proposed renewal of tin mining by Van Dieman Mines Pty Ltd. The advice has been formulated on the basis of the historic heritage survey and assessment findings and has also taken into account the relevant legislation, statutory planning, policy and guidelines.

Scotia Area

Specific Site/Feature Protection

1. Impacts to the **Mt Cameron Water Race** and associated features should be avoided where possible given the extremely high (state level) significance of this site, and the impacts of any essential works should be minimised.

Mining development is understood to be normally exempt from the provisions of the *Historic Cultural Heritage Act 1995* (under Part 12(100)) however since the Mt Cameron Water Race is listed on the Tasmanian Heritage Register, VDM should seek clarification in relation to this matter. VDM should also contact the Dorset Council to check if there are any conditions that apply to the Mt Cameron Water Race since it is listed in Schedule 3 of the *Dorset Planning Scheme 1996*.

2. The **Bells Shaft** area should be avoided if possible, and it should be surveyed, documented and assessed prior to works if mining or associated infrastructure is planned for the area as this is a very early and potentially highly significant site area (note – a c.100m area around the shaft should be surveyed to ensure that all associated features can be identified and included in the assessment).
3. Given its associations with the Mt Cameron Water Race and the Scotia Mine, both of which are considered to be of relatively high significance, impacts to the **Scotia Water Race** should be avoided where possible and the impacts of any essential works should be minimised.
4. Works (ie, mining or development & maintenance of associated infrastructure) in the Scotia area should, where possible, avoid those areas of high known or potential historic heritage sensitivity shown in Figure 6. Any works in these areas will require further historic heritage assessment and/or heritage recording, and the larger artefact scatter areas are considered to require test excavation (prior to any works) to ensure adequate salvage of the mining heritage.
5. The **Scotia Mine** workings have been included in the area of high sensitivity as it is considered to be the most significant open mine in the area and of regional significance (including for fabric based reasons). This is to indicate that the proposed mining should seek to minimise impacts to this site as far as possible. However it is recognised that achieving a minimal impact in this area will be difficult as it is understood that VDM are considering mining the north face, using the actual mine workings for tailings, and locating a range of infrastructure on the east edge of the mine.

It is not the intent to constrain the proposed mining, but to ensure the range of feasible options for minimising adverse heritage impacts to the Scotia Mine are considered. Options for minimising the heritage impacts in this area that should be considered include relocating infrastructure to the north of the Scotia Mine or east of the Scotia Race in the mine area; using the existing tracks in the area as much as possible for mine roads; containing the works as much as possible (and if possible containing the mine tailings and associated work within the historic mine working in the north end).

If the above measures are not achievable, then it will need to be accepted that the proposed mining and the conservation of the heritage values of the Scotia Mine are not mutually compatible and that the heritage values of the Scotia mine will be significantly impacted. In this case there should be salvage recording of heritage in areas to be

impacted, but no requirement to minimise the impacts in this area. Since the heritage values will not be retained, this would needlessly constrain the proposed mining operation.

General Heritage Protection

6. Given the assessed significance of the area generally as a high integrity late 1800s-early 1900s alluvial tin mining landscape, disturbance of the area should, without unduly constraining the proposed mining, be confined to as small an area as possible, kept out of the areas of potential sensitivity indicated in Figure 6 to the extent possible, and kept to a minimum.
7. No features (structures or objects) related to historical mining should be disturbed unless they are in works areas (ie, mining or associated infrastructure areas).
8. Once the locations for the mining and infrastructure (eg, treatment plant, workshops, offices, roads, water supply, and including re-use of historical features) are finalised these locations should be surveyed/re-surveyed to ensure all heritage features in the areas are located, and these features should be fully recorded (and the information provided to MRT) as these mining heritage features are unlikely to survive.
9. If works are to be located outside the present study area, then a heritage survey should be carried out to ensure no other historic significant heritage, in particular mining heritage, in these other areas is impacted and that all historic heritage in the areas can be recorded prior to disturbance.
10. Should the proposed mining not go ahead in this area, the mining lease expire, and interest in this area diminish, then Mineral Resources Tasmania should consider treating this area as a heritage conservation area to protect its largely intact, high integrity late 1800s-early 1900s alluvial tin mining landscape which if conserved would be a good representative example of such a landscape.

Endurance Area

Specific Site/Feature Protection

1. The **South Endurance Road** should not be impacted west of the Endurance Mine tailings (ie, where the original formation is extant) given its assessed significance.
2. If it is to be impacted by the mining, the identified power pole of the **Moorina-Endurance Power Line** (EA 40) should be salvaged as it is possibly a rare surviving example.
3. The in situ treatment area and associated features (**EA 23**) on the south edge of Blue Lake within the West Endurance area should not be impacted by the works as this is the only identified in situ heritage in the area and is a relatively high integrity complex.
4. The six cell jig (**EA 10**) and the sluice box (**EA 11**) should be relocated to another part of the West Endurance if they are likely to be impacted by the proposed mining or associated infrastructure.
5. Although not in the present study area, the area north of the present study area is considered sensitive for historic mining heritage, including very early Chinese mining camps, and should be avoided by the proposed mining and associated infrastructure if possible.

General Heritage Protection

6. No features (structures or objects) related to historical mining should be disturbed unless they are in works areas (ie, mining or associated infrastructure areas).
7. Once the locations for the infrastructure (eg, treatment plant, workshops, offices, roads, water supply, and including re-use of historical features) are finalised these locations should be surveyed/re-surveyed to ensure all heritage features in the areas are located, and these features should be fully recorded (and the information provided to MRT) as these mining heritage features are unlikely to survive.
8. If works are to be located outside the present study area, then a heritage survey should be carried out to ensure no other historic significant heritage, in particular mining heritage, in these other areas is impacted and that all historic heritage in the areas can be recorded prior to disturbance.

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Appendices

Appendix 1

HERITAGE SITE DOCUMENTATION

SITE NAME: 'Endurance Mine'

Heritage Listings/Status -

- THPI 8415:102

Site Type/Function:

Type of site: **Tin Mine**

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Forester (1:100,000 mapsheet) (8415)

Pioneer & Lanka (1:25,000 mapsheets)

Location – NW of the South Mt Cameron township and at the S foot of Mt Cameron

Bounded by c.810/600 – c.810/590 – c.790/592 – 778/594 – 784/597

Owner – Crown Land – plus one single private property block (0287).

Historical Information: *(based on Kinnane 2003b – which is in part based on Wilson 1988)*

The Endurance mine has produced alluvial tin (c. late 1870s – 1980s) and white clay (kaolin) used for paper making (mid 1900s).

Shallow tin deposits were discovered in the South Mt Cameron district in 1875, and were mined initially by individuals (including Chinese miners), syndicates and small companies, including in the area of the Endurance Mine (Wilson 1988). Initially miners exploited the shallow alluvial deposits associated with the many small, deeply incised and steeply rising streams along the southern flanks of the Mt Cameron massif. These deposits occurred perched well above the Endurance deep lead. During this period the Clifton Tin Mining Company and the Endurance Tin Mining Syndicate were the major producers. The Clifton Company worked high-grade ground along Clifton Creek and the Endurance Syndicate worked shallow ground to the northwest of the Clifton workings. The larger operations used steam driven gravel pumps, and given the limited water supplies, a return water system was used (Wilson 1988).

MRT Lease maps show that James and Charles Ogilvie (who had the first mining leases in the Gladstone district) had leases along the upper part of Clifton Creek at this period with leases to the south in the present area of the Endurance mine being held by A.S.R. Osborne and John Simpson (the block leased by Simpson was purchased by him between 1886 and 1892 and appears to be the private property block that still exists in the West Endurance area). There are two water races on the upper part of Clifton Creek (Outside the study area) by 1885, and by 1890 the leases held by the Ogilvie's are under lease to Ah Wong. Between 1892 and 1902 there are 2 adjacent leases immediately east of Simpson's block leased to Chin Mong Tong. Between 1902 and 1911 these 2 leases have been transferred to C.A. McDonald who also had a number of other new leases in the area. The only other leases are one held by Yot Wah (who also held leases in the East Endurance area) at the NW end of the present Endurance Mine (in the area of EA 42) and that was held by Hap Lee for part of the period to the west of Simpson's block. In this period the first water races in the West Endurance area are shown – running from the creek that flows into the NW end of the West Endurance and down Clifton Creek SE then E to the East Endurance, at that time under lease to the South Mt Cameron Tin Mining Company. Between 1911 and 1926 the race is shown as belonging to J.C. MacMichael who has leases over most of the West and Central Endurance area. From 1902-1911, a track is shown running from the E side of Simpson's block SW and is labelled 'Road form Boobyalla' and by 1926-29 the road is termed the 'Cart Road'.

The Endurance Tin Mining Company N.L. formed in 1922 and acquired the assets of the Endurance Syndicate and probably also those of the Clifton Tin Mining Company (probably nearly completely mined). In 1923 the Endurance Mine is listed as one of the main operating tin mines in Tasmania (Nye 1923). The Endurance Company began operating in the same way as the Clifton – using gravel and water pumps mounted on barges and which necessitated the periodic flooding of the mine to move the processing plant to new sites. Keid (1952, 137) describes the system as steam driven, barge mounted gravel and water pumps, which were 'augmented by the installation of a diesel engine' in 1928. Sluiced deposits were elevated over 100' in places (Alexander 1947, 287). The diesel driven plant was introduced because of an inadequate supply of wood to fire the boilers. Declining tin prices however forced the closure of the mine soon after, but small scale tribute mining continued.

In the early 1930s the Endurance Company restructured and 1933 acquired the Tasmanian assets of the Pioneer Tin Mining Company. As these assets included the Moorina hydro-electric power station, this enabled the company to electrify its operations at the Endurance Mine, also in 1933. In 1934, C. Ryan, former manager of the Pioneer Mine was appointed General Manager of the Endurance operations, and in 1935 he commenced the exploitation of the remaining shallow ground and mining of the deeper sections of the main lead. According to Keid (1952), at this time water for sluicing was obtained from the Ringarooma River and pumped to the mine workings (from 1935 by an electrical pump). A tail race was also constructed from the eastern end of the mine to the Ringarooma River, and larger gravel pumps were introduced (and replacement of the pontoon steam driven plant). According to Alexander (1947) during dry periods shallow ground was

SITE NAME: 'Endurance Mine'

worked as this required less power compared to the deep ground, but by 1947 the shallow ground was almost exhausted, and arrangements were made with the HEC for the supply of electricity during dry periods to ensure continuous working of the deeper ground.

In the 1940s (and presumably for much of the Mine's life) the workshops and offices were situated on the main road (to Gladstone) approximately half way between the pumping station and the workings (Alexander 1947). In the 1940s there were also 4 staff houses, 2 workmen's cottages and several single men's huts at the mine and 3 staff houses and a caretakers cottage at the [Moorina?] power station (Alexander 1947). Wilson (1988, 58) also notes that the cluster of houses and 'now demolished workshops' to the north of South Mt Cameron township proper were built for the Endurance Tin Mining Company.

By 1945 the mining moved to west central section of the lead and mining proceeded in a westerly direction until c.1956 when it ceased in this area (at the edge of the 'mudflats' and due to dipping ground) (Wilson 1988). Mining then moved back to the Central area and proceeded eastwards until 1968, with a large channel then dug to drain the waterfilled workings (Wilson 1988).

In 1952 the Endurance Mine was regarded as 'one of the principal producers of tin in the area' with an annual output of c.50 tons (Keid 1952). Keid describes the Endurance Mine in 1952 as holding approximately 750 acres of mineral lease – '156 sluice heads, 125 acres as tailings areas, 96 acres as machinery and pumping station areas and 238 as dam sites'. By 1954 however the profitability of mining the deeper ground had become a problem but mining continued. Other problems between 1945 and 1960 were the difficulty of disposing of the tailings and from time to time the presence of abundant pyritic material. In 1960 the Company started mining the eastern end of the mine, but relocated back to the western sections in the same year.

In 1969 the ownership flowed to the Murray Maguire Group, and then via various interests until 1970 when Blue Metal Industries (BMI) Mining acquired the interests of the Endurance Mining Corporation. BMI discontinued mining in the western lead in favour of mining the shallower eastern end. According to Wilson (1988) at this period the work was undertaken by several 'small two man shows', which used earth moving scrapers, in old and new mining areas. Miller & Miller (1979) comment that BMI Mining were working in 2 main areas and the excavated deposit was trucked to a single processing area that used only used 1 nozzle and 1 race, rather than continuing with the earlier on site sluicing at multiple sites. The mine was taken over by the Tiako-Amdex Mining Groups in 1978 and shallow mining and exploration continued until the mine closed in 1982 (Wilson 1988). When the mine closed the equipment was auctioned off and the area was slowly stripped of building materials and equipment left on site (R. Munro, pers comm).

From 1945 to the closure of the mine in the 1980s, kaolin was also mined for use by APPM in Burnie for paper making. Between 1945 and 1947 the clay was mined by contractors and after that by the Endurance Company. Prior to 1945 there had been some attempts to mine the clay for pottery, but these were not commercially viable (Wilson 1988).

No mining has occurred since the early 1980s. Rehabilitation trials on the tailings deposits were undertaken in the early 1980s (Wilson 1988, Cook 1997). Large scale rehabilitation has been undertaken in the area in the last 5-10 years with most of the tailings in the western part of the Endurance Mine having been rehabilitated prior to 1997 (SEMF et al 1997), and with remediation of continuing problem areas having occurred more recently (Munro 2000, 2001, 2002, 2003).

Site Description & Setting

Most of the area of proposed works is part of the Endurance Mine and is a highly disturbed alluvially mined landscape with tailings piles, inundated open workings, shallow workings, water races, tail races, and a scatter of artefacts, mainly sections of iron pipe relating to water and gravel pumping and sediment treatment. This area is clearly defined by the disturbed landscape and there is little evidence of mining away from the mined and mine tailings area. That part of the Endurance Mine described below is the west part of the Endurance Mine, generally referred to as the 'West Endurance' (R. Munro, pers comm).

The main mined area is the large open cut workings that are now infilled with water (and form the chain of lakes termed the Blue Lakes). This area of deep alluvial mining is understood to date to the mid-1900s (c.1945-1956 (Wilson 1988) and possibly small scale operations during 1960-1970), although artefactual material (eg, ceramics) indicates that some mining occurred in the area in the late 1800s-early 1900s. On the southern shore the banks gradually increase in height eastwards from low banks (<0.5m) to over 5-7m above the lake. On the north and west sides there are no banks, and no tailings deposits from the main workings. The tailings from the main workings have been deposited on the south side of the workings.

These tailings form a broad fan. Most of this area has been modified by the recent rehabilitation (furrowing, levelling and seeding and replanting) and it is difficult to interpret a number of the features in the tailings area. There appears to be a series of tail races which run N-S and at the north end of which (next to the lake) are the sluicing/treatment areas (refer features EA 2-4). These have coarse tailings (quartz cobble) dumps (mounds) and scattered artefacts, predominantly metal pipes and collapsed trestle timbers from the pumping & sluicing operations and occasional scatters of domestic artefacts. In places on the lake edge and associated with the treatment areas are old main working faces and races. The only other possibly mining related landscape features are a shallow bulldozer scoop (EA 5) and four long shallow furrows (EA6-9) with low spoil mounds on their eastern sides (& which have fence posts along the mounds). These may be related to rehabilitation, but the

SITE NAME: **'Endurance Mine'**

weathered nature of, and lichen on, the timber posts suggest an older age. There are a number of features which are clearly rehabilitation features in the area (eg, set of linear furrows with trees planted in the furrows).

The artefactual material is mostly disturbed (eroded, dumped or relocated) and/or heavily corroded. Only one area (EA 23 - just to the east of the private property block and on the lake edge) had clearly in situ remains (possibly the c.1980-82 'Little Jig Plant' (R. Munro, pers comm) although some of the remains suggest an earlier age). The nature of the material is such that it covers a range of ages from early 1900s (solar purple bottle glass and 1 piece of Chinese domestic ceramic) to c.1970s (eg plastic pipe). A pine tree was noted within the mining lease area at the extreme southern edge (south of the South Endurance Road) of this southern tailings area. It was not inspected and it is not clear if this is a wilding or evidence of an earlier residence

According to R. Munro (pers comm), the small lake on the west side of the track at the extreme west end of the mine is known as 'Woods Hole' and was mined in the 1970s, and there was a hut and treatment plant nearby. This is likely to correspond to features EA 12, 13 & 14. The metal sluice box (EA 11) and treatment plant (EA 10) are understood to relate to late 1970s mining to the north and to have been moved to their present location c.1982 for the equipment auction that was held in 1982 following the closure of the mine.

At the north-west end of the study area is another lake, which is larger than Woods Hole and much smaller than the 'Blue Lake'. This is understood (R. Munro, pers comm) to be 'Clifton 1980' and the last area of the Endurance Mine to have been mined (in c.1980). The revegetation around the lake however suggests an earlier period of mining, and the 'Clifton 1980' workings may be the obviously recent shallow bulldozer excavations to the west of the lake (EA 35). There appear to be older shallow workings around this smaller lake, including workings to the NE (EA 34), to the SE beside the lake (EA 37) and on the immediately west side between the lake and the unmined marsh to the west (EA 29). This western area of shallow workings is revegetated with relatively mature eucalypt forest and contains a scatter of rusted metal pipe sections (EA 29a&b, EA 32) and a water race/tail race system (EA 39). The vegetation (similar to that in the Scotia workings) and artefacts suggest that this is area was most probably mined in the late 1800s/early 1900s. The main tracks in the area have disturbed these earlier features and are likely to be much later – probably relating to the c.1970s mining. On the east side there are a small number of features that are also likely to relate to the c.1970s mining in the area – a concrete pipe support (EA 41) and a large recent, deep trench (EA 36). According to R. Munro (pers comm) the trench was a drainage diversion for the c.1970s (1968-1970s) mining and there is also a pump station hut concrete foundation slab at the east end of the trench near the lake, and pipes may have also been laid on the floor of the trench.

East of the main working (now the westernmost Blue Lake) to the proposed eastern dam, the tailings are sitting in a depression and appear to have refilled earlier major workings. These tailings are larger more distinct sub-parallel features suggestive of greater mechanisation, and there is a major trench running approximately through the centre. No artefactual material was noted in this area (the upper banks however were not surveyed). This area is understood to be the area of the last phase of mining in the main workings (ie, c.1956/7 – 1968) (Wilson 1988).

Individual features are listed and briefly described on the attached pages and survey map.

Cultural Significance:

Gaughwin (1991) – Local significance

This Study – High regional significance – primarily historical and associational.

The Endurance Mine is considered to have high regional significance, and possibly state level significance as one of the longest lived mines of NE Tasmania, also one of the larger alluvial mines of the region, and which has been subject to a wide range of styles of alluvial tin mining, many of which are still evident in the landscape today although the surface topography has been modified by revegetation since the early 1980s. The mine is also significant for its associations with the Pioneer Mine and the Frome–Moorina hydro-electric power generation system (this power scheme has high state level cultural heritage significance and powered the Endurance Mine from c.1934 to the 1970s). The mine also has importance for its Chinese mining associations and other individual such as James and Charles Ogilvie. The disturbance to the site by subsequent periods of mining (including recent mining) which reworked earlier mine workings, the auctioning of mining equipment in c.1982, the subsequent removal of remaining artefacts, and the rehabilitation works collectively mean the site is highly disturbed and has poor integrity as an historic mine.

The Endurance mine potentially has historical cultural significance for the following THR criteria (but not necessarily at the State level) –

- (a) importance in demonstrating the evolution or pattern of Tasmania's history (in relation to alluvial tin mining); and
- (f)
- (g) it has special associations with the Pioneer Mine and associated operations and employees, and for the Chinese community whose forebears worked at the mine/in the mine area.

Other Comment:

Note this record only considers the western part of the full Endurance Mine, but the assessment of significance is likely to apply to the full mine.

SITE NAME: **'Endurance Mine'****Report References :****Archival**

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Historical Sources

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- R. Munro – August 2005, pers comm.

Heritage Studies

- Gaughwin, D. 1991 *The North East Tasmania Historic Sites Inventory Project*. Forestry Commission, Tasmania.
- McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See attached – photos and main survey map.

Data by: Anne McConnell & Maddy Maitri	Date of record: 24/8/2005 (AMcC)	Date of Field Inspection: 5-6/8/2005
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SITE NAME: **'Endurance Mine'****Feature List & Description**

Feature No.	Feature Type/Name	Description	Photo
EA 1	iron pipe cluster	Large hollow with remnant iron pipe sections – a – 2 sections of iron pipe (rivetted) weathering out of tailings, highly corroded; b – 3 sections of iron pipe, 1 is flanged both ends, highly corroded; c – 3 pipe sections – welded iron with bands, highly corroded; d – 3 pipe sections, 2 iron with welded bands, flanged & c.18" and 1 rivetted iron, highly corroded. Possibly associated with EA 26 - former main face and artefacts.	✓
EA 2	tail race?	Channel/gully – flat floored with relatively straight sides, c.8.5m wide by 2m deep Probably associated with F24 and possibly associated with EA 22 &/or EA 23 – treatment/slucing areas.	✓
EA 3	tail race?	Channel/gully – flat floored with relatively straight sides, c.15m wide by c.1m deep. Associated with EA19 which is a deeper wide and more irregular hollow at the north end (with which EA3 is contiguous) which is likely to be a treatment/slucing area.	✓
EA 4	tail race?	Channel/gully – flat floored with relatively straight sides, c.25m wide. The sides appear to have been smoothed – possibly by the rehabilitation that has occurred in the area. Possibly associated with EA 16, 17 & 18 – the treatment/slucing area.	✓
EA 5	excavation	Shallow excavation c.2m x 4m deepening at the SE end and with low mound of spoil around SE end. Probable c.1970s to recent bulldozer scoop. Immediately to the E of EA6.	
EA 6	fence line	Long linear fence – timber posts are spaced at intervals along a low mound which runs the length of fence and has a shallow ditch beside it on the W side. Timber posts are c.4' high, square and are weathered with lichen growing on them; only a small number survive. Function and date not known – weathering of posts suggests it is a mining phase feature.	✓
EA 7	fence line	As for EA 7	
EA 8	fence line	As for EA 7	
EA 9	fence line	As for EA 7	
EA 10	treatment plant (a six cell jig)	Iron framework and chassis with raised iron bins (12? or 6?) with circular openings with rubber gaskets; c. 10.5m long x 3.5m wide; all mechanisms and most parts removed, highly-moderately corroded. According to R. Munro (pers comm) the plant was used in the c.1970s working on the north west side of the mine (EA 35?) and was relocated to its present position in c.1982 for a post-mine closure equipment auction. Identified as a 'six cell jig by G. Dickens (pers comm).	✓
EA 11	metal sluice box	Rectangular iron frame with a horizontal perforated iron sheet across the interior of the box at mid height; c.3m x 7.5m and c.0.5-0.6m high; corroded and in poor condition. May have been associated with the 1970s Woods Hole workings (and hence associated with EA 12-14) or may have been relocated to its present position in c.1982 for the post-mine closure equipment auction with EA 10 (as per R. Munro, pers comm).	✓
EA 12	1970s treatment plant site/hut	Small concrete block (in ground, rectangular, made with local granitic grit) c.5m NE of present road in the area of artefact scatter (broken glass, metal fragments, metal pipe, plastic and rubber hose sections, iron wire rope, 1 gumboot, metal pipe, a 44 gallon drum, particle board, asbestos sheet?) over a c.6m x 10m area between the road and swampy lake edge. Understood (from R. Munro, pers comm) to have been a hut (or treatment plant) associated with the 1970s Woods Hole workings (and hence associated with EA 14 and possibly EA 11 & 13).	✓

SITE NAME: **'Endurance Mine'****Feature List & Description - continued**

Feature No.	Feature Type/Name	Description	Photo
EA 13	hut site?	Piece of corrugated iron sheet and iron ridge capping on edge of lake and associated with three iron bolts protruding vertically from the ground and several lengths of sawn timber; materials are scattered over a c.4m x 10m area. Possibly hut/shed associated with the 1970s Woods Hole workings (and hence associated with EA 12 & 14 and possibly EA 11).	✓
EA 14	workings (<i>Woods Hole ?</i>)	Not inspected, but from the road appears to have no tailings or artefacts in the area. Understood (from R. Munro, pers comm) to have been the 1970s 'Woods Hole' workings (and hence associated with EA 12 and possibly EA 11 & 13).	
EA 15	iron pipe	1 section of iron pipe protruding from the sediment on the lake edge.	✓
EA 16	treatment area ?	A high narrow mullock heap overlooks a gully on the E side. On the E side of the gully is an artefact scatter (iron pipe sections (including rivetted spiral pipe), and collapsed and splintered timbers (probable pipe/slucice trestles), broken concrete slab (with local granitic grit), wire rope *& other wood fragments); possibly mid-late 1900s. Probably associated with EA 4.	✓
EA 17	concrete block	Concrete block c.2m x 1m by 0.5m high; made with local granite grit; possibly not in situ.	✓
EA 18	iron pipe	2 iron pipe sections lying together on edge of lake. The pipes are rivetted, flanged with small repair plates; 20" diameter; and highly corroded. Tin billy nearby but probably not related.	✓
EA 19	treatment area	Large, deep linear hollow that connects to EA 3 (tailrace?) and to the lake (former main workings). Comprises – a – 1 section large diameter (>20") iron pipe, rivetted, flanged, highly corroded; and 1 section iron pipe, highly corroded; both on W side of hollow; b – 4 quartz cobble dumps (coarse tailings) which occur as benches low on the E side of the hollow; c – 1 section large diameter (>20") iron pipe, rivetted, no flanges, highly corroded, on W side of hollow; d – 2 sections of large diameter iron pipe (rivetted, no flanges, highly corroded) and collapsed timber framing (pipe trestles?) in gully north of road; e – quartz cobbles and 1 section of iron pipe partly in ground in area of EA 20.	✓
EA 20	modern rubbish dump/camp	Area on lake edge with a scatter of metal fragments, broken china (modern) and a bicycle wheel and with some sawn planks in trees (possible frame for tarpaulin?). Associated with mining artefacts (refer EA19e).	✓
EA 21	iron artefacts (pipes & plate)	Scatter comprising 2 sections of iron pipe; highly corroded; 1 section of very large diameter (c.28") flanged rivetted iron pipe which has been repaired with small steel plates bolted on; and a steel plate which has a large section cut out of it (post-use metal scavenging?).	✓
EA 22	treatment area & race	1 section large diameter iron T-section pipe; a length narrow diameter pvc pipe; 1 section of rivetted iron pipe; a long mound (c.15m x c.3m x 1.5m high) of washed gravel (coarse tailings?); and to the east of the artefacts there is a deep (c.1-2m) narrow (c.0.5m) race that runs from the edge of EA 23. Possibly worked in c.1980-1982 and known as the 'Little Jig Plant' (R. Munro, pers comm)	✓
EA 23	treatment area and camp	A small scale treatment area with a number of features, most of which are in-situ. These include – a – one end of a sluice – an open box of iron and timber construction open at the S end; b – a double row of upright poles, and a long narrow diameter iron pipe beside it suggesting the uprights were trestle supports for the pipe (for the sluice?); and there is an iron sluice box of the same design as EA 11 on the ground in about the middle of the row of uprights; c – 1 section of iron pipe (not in situ);	✓

SITE NAME: **'Endurance Mine'****Feature List & Description - continued**

Feature No.	Feature Type/Name	Description	Photo
EA 23 continued		<p>d – probable hut site with timber pole bed logs still in place and a scatter of artefacts (window glass, corrugated iron sheet, boots, a wood heater (outside foundations and on side), roofing nails, tin cans and a modern (aluminium can);</p> <p>e – 1 section of iron pipe (not in situ);</p> <p>f – a shallow race running to the former main working face – probably related to mining of the face and not to the treatment area;</p> <p>g - a probable dirt track coming in from the east side to the lower part of the area.</p> <p>The area also contains buried splintered timbers which may relate to earlier mining and the SE quarter of the area has abundant quartz cobbles (coarse tailings).</p> <p>Possibly worked in c.1980-1982 and known as the 'Little Jig Plant' (R. Munro, pers comm), but hut foundations and artefacts suggest a mid 1900s age.</p> <p>Unusual in that this is the only area of the West Endurance that has in situ treatment area features; also the features represent a range of activities at a treatment plant. Area considered to have high integrity.</p>	
EA 24	treatment area	A large hollow that connects to tail race (?) EA 2. The hollow contains a low mound of quartz cobbles (coarse tailings) and 2 sections of iron pipe – 1 section is large diameter rivetted pipe (at the S end of the cobble heap) and the other is a smaller diameter thick welded iron pipe section with a triple flange at one end which is on the upper slope of the hollow.	
EA 25	artefacts (pump site?)	Three artefacts on top of slope above F26 and slightly to the north of EA 1. The artefacts include a section of very narrow diameter iron pipe; the casing (outer housing) of a water pump (of c.1" thick iron); and c.12m E a metal cross arm of a power pole with 2 small white ceramic insulators and a fragment of thick iron – possibly the corner of a box or tank.	✓
EA 26	workings & treatment area	<p>a – large area of unflooded main workings that narrows to a deep narrow channel (possibly a tail race – buried on the S side of the road by later tailings?);</p> <p>b – around the top end of the narrow channel on the E edge (mainly down the bank) are a range of artefacts including a number of collapsed splintered timber posts (possibly pipe trestles) and iron pipe sections; and</p> <p>c – small-medium diameter rivetted iron pipe (with large rivets) and repairs, and with flanges at each end (these flanges are broader and with less bolt holes than on most of the pipes in the area – different period?) (this feature is on the S side of the road and is possibly related to EA 1 rather than EA 26).</p> <p>EA 26 may be part of EA 1.</p>	✓
EA 27	artefact scatter (domestic)	A sparse scatter of fragmented glass and ceramics that is c.3m from the edge of the former workings (EA 26) near the junction with a tail race (?) that runs NE to EA 30. Includes solar purple glass, thick, dark green glass, and domestic ware (probably early 1900s and including 1 fragment of green glazed ceramic of probable Chinese origin).	
EA 28	iron pipe	1 section of iron pipe on the edge of the tail race that runs NE to EA 30.	
EA 29	shallow workings/dam (?) & artefacts	<p>An area of uneven excavated ground with an earth bank on the west side on the NW edge of the Endurance Mine. The excavated area is partly revegetated with tea tree scrub and appears relatively recent. There is also –</p> <p>a – an earth bank c.1m high on the SW side (that may relate to EA 39 or West Endurance Water Race 1 – possibly a dam wall?);</p> <p>b – a section of medium diameter iron pipe that is vertical (possibly moved by the more recent dirt track to the lake outlet); and</p> <p>c – a scatter of relatively recent artefacts - an overturned iron object (square steel plate (table?) with iron pipe legs), metal screen, kerosene tin, standard water pipe and some sawn timber fragments.</p> <p>Two water races flow into the area – EA 39 which takes water from the creek to the NE and flows out onto the marshy land at the north end of the earth bank;</p>	✓

SITE NAME: **'Endurance Mine'****Feature List & Description - continued**

Feature No.	Feature Type/Name	Description	Photo
EA 29 continued		and West Endurance Water Race 1 which flows into the NW edge of the workings from the NW. It is not clear how these races relate to the excavated area but both are likely to be of late 1880s/early 1900s age. The area is interpreted as shallow workings that post date the races, and the earth bank is interpreted as a dam wall that is associated with the races, or mound earth from the workings.	✓
EA 30	races & pipes	Area of converging shallow races with some pipes still in the race and some beside it in the SW corner. Pipes include – 3 large diameter iron pipes (2 rivetted with flanges and 1 a spiral band); and 3 small-medium diameter iron pipes lying in the race (1 spiral banded with flange & in situ (?), 1 welded (cast) and 1 spiral band with no flange). May be some domestic artefacts near the pipes.	✓
EA 31	water channel	A straight sided channel (no banks) c.1.5m that acts as an outlet from the NW lake (Clifton 1980 workings) into the west end of the Blue Lake. The channel runs west then south.	✓
EA 32	iron pipes & timber	A pile of iron pipe sections and scattered single sections in a heavily forested area (possibly never worked or logged) between the dirt track and the lake (Clifton 1980 workings). The pipes in the heap are very large diameter and rivetted and there are also some small timber poles. There are at least 2 more sections of iron pipe between the heap and the water race (EA 39) to the north.	✓
EA 33	channel/race	A short straight vertical sided channel (c.2-3m wide and 3-4m deep) that takes water from the nearby creek to the north via a short section of earlier race (EA39). Currently takes all the water from the creek. Appears to be a diversion channel for the creek, possibly to supply water to the Clifton 1980 operation (EA 43).	✓
EA 34	water race	Small race that runs from the main creek from Mt Cameron east curving around to the face of Clifton 1980 workings (EA 43). The degree of revegetation of the channel and the banks suggest this is a much earlier (late 1880s/early 1900s) race that is truncated by the Clifton 1980 workings. Probably part of the c.1902-1911 water ace that fed the East Endurance (MRT lease map). Unclear how it relates to the water race that runs west (EA 39) and is very similar in size and the degree of revegetation.	
EA 35	workings	Large area of shallow workings of a very different nature to the other shallow workings in the area – these are large scale, minimally revegetated and appear to have been worked by earth moving machinery (and possibly rehabilitated post-mining). Likely to relate to the late 1970s early 1980s.	
EA 36	channel (& pumping station)	Large deep channel that cuts in towards the Clifton 1980 workings from the edge of Blue Lake – straight sided, with the sides sloping in slightly & c.5-6m high) and with a flat base c.2m wide – appears to have been excavated mechanically. According to R. Munro (pers comm) this is a later period water diversion channel, and pipes may have been laid in the base at one time. R. Munro also commented that outside the eastern end of the channel there is a concrete foundation of a pumping station that operated from 1968 to the 1970s (and was powered by electricity from the Moorina Power Station). It is not clear if the diversion channel is associated and/or of the same age.	
EA 37	shallow workings	At the east end of the large diversion channel and extending north is a forested area of hummocky ground. The nature of the ground and degree of revegetation suggest this is an area of earlier shallow workings (possibly early 1900s?).	
EA 38	jetties	Two small timber jetties. Given the small size these jetties are likely to be post-mining recreational jetties.	
EA 39	water race	Small race that runs from the main creek from Mt Cameron west to the swamps to the west (beyond EA 29). The degree of revegetation of the channel and the banks suggest this is an early (late 1880s/early 1900s) race. There are some sections of iron pipe adjacent to the race but it is not clear if they are associated	✓

SITE NAME: **'Endurance Mine'****Feature List & Description - continued**

Feature No.	Feature Type/Name	Description	Photo
EA 40	power pole (part of the Moorina – Endurance Power Line)	or not. It is unclear how it relates to the water race that runs east (EA 34) and is very similar in size and the degree of revegetation. Collapsed power pole with a metal cross arm with a small brown ceramic insulator on each end and metal rod protruding from the top with another brown ceramic insulator. Understood to be part of the power line from the Moorina Power Station to the Endurance Mine (installed c.1934) (R. Munro, pers comm). R. Munro also noted that actual power line which was of solid copper wire was sold and taken soon after the mine closed.	✓
EA 41	pipe support	Low concrete support for a pipe (0.5m x c.1m x c0.5m high). Located beside the track – possibly not in situ.	✓
EA 42	shallow workings (early 1900s)	An area of shallow workings that are largely revegetated. Located between the present track and low bank (excavated) to the north of the track. On MRT mining lease chart for 1902-1911 the area is under lease to Yot Wah, and it is probable the workings date to this period.	
EA 43	1980s workings (Clifton 1980)	Currently a lake with vertical banks. Understood to be the last main (deep) working at the Endurance Mine and to have been mined between 1980 and 1982 when the mine closed (R. Munro, pers comm). There is little evidence for this later mining on the W and N sides, but there was a major diversion channel (EA 36) and pump station on the E side that are likely to have been part of this period of mining (R. Munro, pers comm). There is a fan of tailings on the S side that separates the Clifton 1980 lake from the Blue Lake. These tailings are also assumed to relate to the Clifton 1980 workings.	✓
EA 44	linear features	A linear feature that can be seen in the air photos but is not evident on the ground – runs in a line NE from Woods Hole (EA 14) then turns and runs SE into the outlet from the Clifton 1980 workings. Possibly a former channel or pipeline.	

Data by: Anne McConnell & Maddy Maitri	Date of record: 24/8/2005 (AMcC)	Date of Field Inspection: 5-6/8/2005
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SITE NAME: 'West Endurance Water Race 1'

Heritage Listings/Status -

no existing listings

Site Type/Function:

Type of site: Water Race (mining)

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Forester (1:100,000 mapsheet) (8415)

Pioneer (1:25,000 mapsheet)

Location – Runs along the base of the south toe-slope of Mt Cameron from near the middle east to the NW corner of the Endurance Mine.
GR ⁵774/⁵4594 - ⁵782/⁵4595.

Owner – Crown Land.

Historical Information:

There is no historical information for the race. The degree of revegetation, its line and descriptions of the working of the Endurance Mine suggest it is an early feature - probably operating from the c. late 1870s to the early 1900s – which ceased being used by 1935 (Keid 1952, Kinnane 2003b).

[Munro (pers comm) understands it to be diversion race, but it appears to be designed to pick up water from a creek to the west and it flows east, hence appears to be more likely to have been designed to supply water to small scale early workings.]

Site Description & Setting

The air photo shows the race starting at the break in slope of Mt Cameron and the adjoining plains to the south at one of the numerous creeks which run off Mt Cameron. The race then runs eastwards to the NW corner of the Endurance Mine. It termination is unclear as there has been post-race construction workings in the area. The race curves south around the base of the spurs and curves to the north where it crosses the flats which are wetland with wet heathy vegetation.

The West Endurance Water Race 1 was followed for about 500m west from its eastern end. It is a medium size race – c.6' wide and 3'-4' deep with the spoil forming a c.2'-3' high bank on the south side. The race is in good condition.

Its location and the nature of vegetation growing on it (mature eucalypts (c.100 years) and shrubs) suggest it dates to the late 1800s/early 1900s.

[The other water race in the north part of the mining lease area (West Endurance Water Race 2) appears not to be related to the Endurance Mine as it runs west into the Little Boobyalla River. This race was not inspected.]

Cultural Significance:

This Study - Likely to have local significance for its high degree of preservation and role in local historical tin mining.

Other Comment:

Report References :

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See attached

Data by: Anne McConnell & Maddy Maitri

Date of record: 24/8/2005 (AMcC)

Date of Field Inspection: 5-6/8/2005

SITE NAME: 'South Endurance Road'

Heritage Listings/Status -
no existing listings

Site Type/Function:
Type of site: Road (mining related?)
Present use: abandoned

Site Location & Owner Information:

Mapsheets : Forester (1:100,000 mapsheet) (8415)
Pioneer (1:25,000 mapsheet)

Location – Runs E-W across Picketts Plains from the Endurance Mine (formerly South Mt Cameron?) to meet the Old Port Road near the Little Boobyalla River; GR c. ⁵794/⁵⁴592 - ⁵755/⁵⁴594.

Owner – Crown Land.

Historical Information:

The only historical information for the road is from the MRT mining lease charts. The road first appears on the 1902-11 chart and is labelled 'Road from Boobyalla' and is shown as running to the central Endurance area (just east of the private property block). On the 1926-29 chart the full extent east of the road is shown in the area, including an extension (?) to South Mt Cameron, and it is labelled the 'Cart Road'.

Site Description & Setting

This road (dirt track) runs through the southern part of the mining lease area and westward along a low rise in the landscape to connect to the Old Port Road. This track, termed here the South Endurance Track, was only inspected to the first bridge, as although within the lease area, it lies mainly outside the area of proposed work.

The undisturbed section beyond the tailings appears to be an unmodified dirt track of c.6' width. The surface is natural local granitic gravel and there is no imported surfacing material in the section inspected. The bridge inspected is of parallel log pole construction with early (hand made) large nails. The large number of nails, mainly along the top of the poles suggests the poles may have had a layer of transverse plank decking, although there is no clear evidence of this now. Some logs are missing (ie, bridge is not usable).

The road appears to date to the early 1900s as it is first shown on the 1902-1911 MRT mining lease chart. The style of construction of the first bridge, its route and its linkage to the Old Port Road are all compatible with this early 1900s date.

Cultural Significance:

This Study - of high regional significance as a relatively rare example of an early 1900s road which has generally good preservation and integrity of the preserved sections.

Other Comment:

Report References :

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See attached

Data by: Anne McConnell & Maddy Maitri | **Date of record:** 24/8/2005 (AMcC) | **Date of Field Inspection:** 5-6/8/2005

SITE NAME: 'Mt Cameron Water Race' (for field area this study only – ie, part of the Northern Deviation/Branch)

Heritage Listings/Status -

- **THR (Place No.6952; Ref No.R6303)** (listed area is a 20m wide corridor (ie, 10m both sides of the race centre line) for the full length of the race).
- **THPI 8515:50 (& THPI 8516:11)**

Site Type/Function:

Type of site: **Water Race (mining)**

Present use: abandoned for mining but partly in use for rural water supply

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – Overall the race runs from the Great Musselroe River to a dam near the Dorset Dredge site. Within the study area it runs from GR⁵833/⁵⁴686 - ⁵858/⁵⁴680

Owner – Mainly Crown Land (Deferred State Forest).

Historical Information:

Overview

The Mt Cameron Water Race was constructed to supply water to the tin mines of the Gladstone district, initially the southern area, but from c.1891 it also supplied the north part of the district (which includes the study area).

From Dickens (1990 & 1992): The Mt Cameron Water Race was partially constructed during 1881-82 by the Mt Cameron Hydraulic Tin Mining Company. They constructed c.20km from the Great Musselroe River intake to the Edina Sugarloaf. Much of this early section of race was wooden fluming (mostly replaced in 1895-6). The race was purchased from the Company by the Tasmanian Government in 1887 at a cost of £4,750. This included 12.5 miles of main race and 9 miles of branches, including the Amber Creek branch. The purchase was enabled by an 1887 Act of Parliament.

The Government, advised by a Mt Cameron Water Race Board and a Manager (initially James Brown, then Michael Griffin) extended the race a further 33 km over the next 3 years. Between 1888 -1890 the Northern Extension (the section to north of Gladstone, north of the Ringarooma River) was constructed. The race was officially opened by Sam Hawkes MHA on 21 August 1890 at the Scotia Siphon site.

From 1881 to 1984 the race provided a permanent water supply to numerous tin mines in the Gladstone area. During this time an extensive network of branches was built to develop new tin deposits on both sides of the Ringarooma River. The largest branch race was the 20km long Western Deviation, which was constructed across the Ringarooma River to service tin workings west of Gladstone. There were four maintenance staff ('Channel Keepers') employed and cottages were built for each of these at strategic locations. One was located south of the Scotia Siphon.

Between c.1895 and 1902 a major program of repair and replacement took place, mainly on the initial sections of the race. From 1902 to 1906 little new work occurred, but between 1906 and 1915 all the fluming was replaced with earth channelling and the siphons were all replaced (with iron or wood stave pipe). In 1916 Twelvetrees (1916, 54) commented that the race was "an example of a well-managed Government-owned undertaking, and has splendidly accomplished its task these many years of fostering and assisting the industry and in keeping this remote community together".

Various extensions were made to c.1920, but by this time mining was declining in the district and the race was facing an uncertain future. After various investigations it was determined in 1921 to construct a major race (the Western Deviation) to the Gladstone area south of the Ringarooma River. The dismantling of the Scotia Siphon for this effectively closed down the whole Northern Extension in 1922. The Western Deviation was completed in 1923. Further extensions were constructed over the next c.7 years. The Western Deviation operated for mining until 1934, after which it mainly supplied domestic water to Gladstone.

A depletion of reserves in the Gladstone area lead to renewed interest to the area north of Gladstone and in the late 1920s a decision was made to re-open the Northern Extension. The Edina Siphon was renewed in 1927 using 18" Hume Pipe Co. concrete pipes – this was the first use of concrete pipes on the race system. The capability of the Edina and Cybele Dams was increased in 1934, and the Scotia Siphon was replaced in 1935 to ensure a high level supply to the Lochaber Mine. The upgrade of the Scotia Siphon resulted in the reopening of the No.1 Government Dam and the Scotia and Doone Races, and in 1938 a new low-level race from the Scotia Siphon intake to the No.1 Government Dam was completed. Various other repairs and replacements occurred along other parts of the Mt Cameron Water Race, including the Amber branch which was

SITE NAME: 'Mt Cameron Water Race' (for field area this study only – ie, part of the Northern Deviation/Branch)

reopened in the mid-1930s, with the Amber Siphon being of similar construction to the new Scotia Siphon.

Since World War II, the gradual decline in mining eventually closed all branch races. The Western Deviation was officially abandoned in 1949. In 1956 the Amber Creek and Scotia Siphons were dismantled for re-use by the Elizabeth Tin Syndicate. The Channel keeper's cottages had all been vacated or removed by 1958. By c.1956 the only surviving part of the Mt Cameron Water Race was the main race from the Great Musselroe intake to the No.1 Government Dam, and the race was supplying only 3 mines (Star Hill, Elizabeth Tin Syndicate Mine and the Musselroe Mine) and supply domestic water to Gladstone.

From the mid 1950s to present however there has been renewal of parts of the system and new race built. In 1955 the water supply to Gladstone was renewed with supply across Bells Bridge and in the 1960s there were various new mines open including the Dorset Dredge which commenced operations in 1964. However by 1984 the last tin mine in the area closed and the race was only needed to supply water to Gladstone township. In 1986 however Mr Bert Farquhar of *Rushy Lagoon* purchased the disused race to provide a permanent water supply for the property, and over the next 3 years he extended the race system on his property and increased the capacity of the Old Chum Dam. To maintain the viability of the race the Mt Cameron Water Race Board was reconstituted in 1978. Today the length of the enlarged Mt Cameron Water Race is 178 km.

IN 1932, Nye (1932) commented that "it is worthy of note that from 1891 to 1931, excepting from 1923-25, the production of tin ore by water from the Mt Cameron race has been 2,722 tons or approximately 2% of the total production for the State or 2.76% of the production for the same period".

In Scotia/Lochaber Area

- It is c.11.5 miles from the start of the Northern Extension to the start of the Scotia (No.6) Siphon which is 3,105 ft long and was originally constructed (1888-1890) of 3' diameter by 19'7" long ¼ inch iron pipes.
- In 1910-11 the iron pipes of the Scotia were replaced by 30" wood stave pipes. The siphon was dismantled in 1922 to provide pipes for the Ringarooma Siphon for the Western Deviation, which closed down the Mt Cameron Water Race in this area.
- The Scotia Race was constructed by 1888, and extended in 1910 [after the mine closed?], with the branch race to the Doone Mine being constructed in 1915.
- By 1926 there was a branch of the Mt Cameron Water Race which passed through the Lochaber Mine (Scott 1926b).
- In 1935 the Scotia Siphon was replaced with 15" diameter, 16 gauge galvanised iron pipe for 2,940' (to ensure a high level supply to the Lochaber Mine), and in 1938 a new low-level race from the Scotia Siphon intake to the No.1 Government Dam was completed.
- The Doone Race was abandoned in 1941 when the mine closed was re-opened and scrubbed clean in 1953 when the mine reopened but the mine and race both closed in 1955.
- In 1956 the Amber Creek and Scotia Siphons were dismantled for re-use by the Elizabeth Tin Syndicate.
- The Scotia Channel Keepers Cottage was the first of the Channel Keepers cottages to be built - in July 1888. It was located alongside the Scotia Race (a branch of the Mt Cameron Water Race) and known as 'Scotia Cottage'. The cottages were all built on a 5 acre reserve vested with the Mt Cameron Water Race Board, and to the same plan – 4 main rooms, corrugated iron clad walls and roof, 2 chimneys and internal pine lining. Scotia Cottage was sold and transported to the Monarch Mine in 1924.

Site Description & Setting

General

Commencing at the intake on the Great Musselroe River the main channel meanders 53 km to the 'No.1 Government Reservoir' near Aberfoyle Hill, northwest of Gladstone. There were many kms of branch race along its length. The extent of the race is shown on the attached map.

There has been no survey and documentation of the full length of the Race, but it is expected to be in variable condition given that sections have been left untouched for several decades, sections have been dismantled and sections have been renewed at various times, including in the last 20 years. Dickens (1990) notes that Western Deviation is poorly preserved – siphons and pipes dismantled and the earthen channel largely ploughed over.

In Scotia/Lochaber Area

In the lease area the Mt Cameron Water Race extends from the Cape Portland Road and runs approximately west to well beyond the west boundary of the lease area. Most of the race west of the start of the Scotia Siphon was inspected in this study and the eastern part was inspected by McConnell & Stanton (1997).

From the Cape Portland Road to the start of the Scotia Siphon the race is a distinct and relatively large earthen channel which runs north to the lease area then west around the south side of the ridge overlooking the Lochaber Mine. Two features associated with the race have been located east of the Scotia Siphon intake - a small (c.10m diameter) reservoir north of the

SITE NAME: 'Mt Cameron Water Race' (for field area this study only – ie, part of the Northern Deviation/Branch)

Race with a c.7m feeder race from the Race that is likely to be a relatively recent stock dam (MCR 1); and a c.30m long by 15-20m wide pit (MCR 2) about 20m south of the Race that has been interpreted as a borrow pit for the Race.

The Scotia Siphon intake (MCR 3) is a major feature with evidence of the original and later intakes preserved (as a concrete bulkhead and a stone lined earthen bulkhead). From this point the Mt Cameron Water Race has two sub-parallel channels which persist to the Scotia Race offtake at the other end of the Siphon. Because both period siphons were buried it is not possible to follow the two siphon races contiguously. Over a third of the Siphon distance (west end), the northern, older channel can be traced by a line of excavated steel pipe sections (which are understood to have been replaced by wood stave pipe in the later, southern channel). The field evidence suggests that the two siphon lines are between 10m and 130m apart and that the older southern channel is between 2' wide by 2' deep and c.4' by c.4' deep, while the later northern channel (MCR 4) is larger (c.5' wide by 5' deep but with sloping sides to a basal width of c.3'6") (McConnell & Stanton 1997). There are also a small number of relatively recent northern offtakes (MCR 6 &7) from the siphon, presumably to provide water to the local pastoral properties.

West of the Scotia Race offtake (at the Scotia Siphon out-take) (MCR 8) the Mt Cameron Water Race appears to have one channel which is very distinct, relatively large (c.4' wide by 4' deep with the spoil on the northern bank) and in good condition. No associated features were noted west of the Scotia Race offtake.

Cultural Significance:

THR –

- it is important in demonstrating the evolution and pattern of the tin mining industry in north-eastern Tasmania having operated continuously for over 100 years from 1882;
- It is believed to be the only 19th C mining race to survive intact in Tasmania and as such is significant for its rarity;
- It demonstrated a high degree of technical achievement being the longest water race constructed in Tasmania (and has the potential to yield information that will contribute to an understanding of Tasmania's history, particularly with regard to tin mining technology).

Other Comment:

The location of the race in the study area west of the Scotia Siphon intake is relatively accurately mapped by GPS. The route of the southern siphon channel however needs to be more carefully mapped.

Report References :

Archival

- . Nye, P.B. – 13/12/1923 – 'The Mineral Resources and Mining Industry of Tasmania'; UR 1923/21-33.
- . Nye, P.B. – 4/4/1926 – 'The Mineral Resources and the Mining Industry of the North Eastern Districts in Relation to the Possible Provisions of Hydro-Electric Power'; UR 1926/9-27.
- . Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.
- . Scott, J.B. – 1/9/1926 (b) – 'Alluvial Deposits North of the Ringarooma River'; UR 1926/92-95.

History & Heritage Studies

- . Dickens, G. 1990 *The Mt Cameron Water Race: A century of operation*. Dept. Resources and Energy Report No. 1990/5, Rosny Park, Tasmania.
- . Dickens, G. 1992 *The Mt Cameron Water Race Board: A history of management*. Tasmanian Dept. of Mines Report No. 1992/21, Rosny Park, Tasmania.
- Gaughwin, D. 1991 *The North East Tasmania Historic Sites Inventory Project*. Forestry Commission, Tasmania.
- McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.
- McConnell, A. & Stanton, S. 1997 *Archaeological Survey Report - The Marsh Creek Proposed Damsite, Gladstone Area*. Report to Rushy Lagoon Resources, Gladstone, Tasmania.

Photographs/Sketch/Plan

See attached

Data by: Anne McConnell & Maddy Maitri | **Date of record:** 24/8/2005 (AMcC) | **Date of Field Inspection:** 5-6/8/2005

SITE NAME: **'Mt Cameron Water Race'****Feature List & Description**

Feature No.	Feature Type	Description	Photo
MCR 1	stock water dam (or bywash?)	Small reservoir (c.10m x 10m x 1 m deep), irregular to rounded, with c.7m of feeder race off the Mt Cameron Water Race. There is considerable treading of the reservoir by stock. Probably relatively recently constructed for stock (but possibly originally a bywash). [MCH 12 of McConnell & Stanton 1997]	
MCR 2	borrow pit	A large pit (c.30m long by 15-20m wide) c.20m south of the Mt Cameron Water Race; roughly rectangular in shape and with sides that slope in towards the base. [MCH 11 of McConnell & Stanton 1997]	
MCR 3	Scotia Siphon intake	Features at this site include a bywash, intakes for the two phases of siphon – the earlier being a dry stone lined earth mound, and the older being a concrete block. The feature is well preserved. [MCH 5 of McConnell & Stanton 1997]	
MCR 4	Scotia Siphon	At the east end there are two siphon channels (?) which run between 10m and c.130m apart. The northern channel is c.1m wide by 0.5m deep and the southern channel is c.1.8m wide at the surface, 1.1m at the base and 0.9m deep with spoil on both sides. West of MCR 6 neither channel can be observed for c.150. For the westernmost c.250m the southern channel is extant but the north channel is not visible but is marked by discontinuous sections of iron pipe. The channel can only be seen again just before the end of the siphon (at the Scotia Race offtake – MCR 8). The Scotia Siphon is the Mt Cameron Water Race No.6 Siphon. It was 3,105 ft long when originally constructed in 1888-1890 (of 3' diameter by 19'7" long ¼ inch iron pipes), replaced by 30" wood stave pipes in 1910-11; dismantled in 1922; replaced with 15" diameter, 16 gauge galvanised iron pipe for 2,940' in 1935. The northern channel is probably the low-level race from the Scotia Siphon intake to the No.1 Government Dam completed in 1938 (Dickens 1990). [MCH 4 of McConnell & Stanton 1997]	✓
MCR 5	modern offtake race	A small water race (<50cm wide and c.0.3m deep) which runs approximately NW-SE. Appears to be a distributory of the Mt Cameron Water Race. [MCH 9 of McConnell & Stanton 1997]	
MCR 6	modern offtake race	A few metres N of the main channel which terminates (shallows out & is untraceable) a few more metres to the W is a large square channel (c.4' wide x 0.5m deep) which runs NW (inspected for c.100m). The channel head is slightly larger a trapezoidal pit with a concrete bulkhead set into the ground with 2 pvc pipes openings c.0.2m above the channel floor. This appears to be an underground feed/conduit from the Mt Cameron Water Race. The construction materials and fresh nature of the race and its location imply this is a recent race constructed to supply water for stock to 'Rushy Lagoon'. Immediately to the W of the offtake channel head is a muddy depression c.5-6m diameter – possibly a bywash. [MCH 8 of McConnell & Stanton 1997]	✓
MCR 7	artefact	Part of an iron cylinder of c. 1.5m diameter; of thick iron; rivetted. There is a second fragment nearby. Not in original position. Possibly part of a small boiler or water tank – the diameter seems too large for the artefact to be part of an iron pipe. [MCH 10 of McConnell & Stanton 1997]	✓

SITE NAME: **'Mt Cameron Water Race'****Feature List & Description**

Feature No.	Feature Type	Description	Photo
MCR 8	Scotia Race offtake	A set of interconnecting channels with two channels (siphon lines?) coming together into one main race just west of the Scotia offtake which is a channel which runs approximately south at this point. The Scotia race takes off from the north channel (from E) at right angles and there is a concrete block set in each wall of the main Mt Cameron Water Race c.1-2m W of the offtake. From this point west the Mt Cameron Water Race channel is larger and there is no evidence of a second race. The south channel (from E) intersects the Scotia Race c.15m south of the north channel offtake and from this point curves around to the north to join the north (main channel) c.20m west of the Scotia Race offtake. The Scotia Race at the offtake is about the same size as the siphon channels.	✓

Data by: Anne McConnell & Maddy Maitri	Date of record: 24/8/2005 (AMcC)	Date of Field Inspection: 5-6/8/2005
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CULTURAL HERITAGE SITE INFORMATION SHEET

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SITE NAME: 'Scotia Cottage & Water Race Reserve'**Heritage Listings/Status -***no listings***Site Type/Function:****Type of site: Tin mining water race reserve****Present use: abandoned****Site Location & Owner Information:**

Mapsheets : Swan Island (8415) (1:100,000 mapsheet)

Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River and the Scotia & Newhaven Mines on the south side of the present road to the Dorset Dredge. Bounded by c. GR⁵8425/⁵⁴6737 - ⁵8440/⁵⁴6736 - ⁵8438/⁵⁴6720 - ⁵8423/⁵⁴6722.

Owner – Crown Land (Deferred State Forest).

Historical Information:

In the late 1880s four 5 acre reserves were created along the Mt Cameron Water Race to house 'Channel Keepers' residences. The reserves were vested with the Mt Cameron Water Race Board. This reserve was for the 'Scotia Channel Keeper'.

A Channel Keepers cottage was built on each reserve. The cottages were all built to the same plan – 4 main rooms, corrugated iron clad walls and roof, 2 chimneys and internal pine lining. The Scotia Channel Keepers Cottage was the first to be built - in July 1888. It was known as 'Scotia Cottage' as it was located adjacent to the Scotia Race which was being built at the same time (1988). Scotia Cottage was sold and transported to the Monarch Mine in 1924.

Site Description & Setting

The reserve is located on the sandy plains of the Great Northern Plain a mile to the south of the Mt Cameron Water Race, but beside (on the W side) of the Scotia Race. The Scotia Race runs through the NE corner of the reserve. The area is well vegetated with eucalypt woodland and shrubby-heathy understorey (with consequent poor ground surface visibility).

Some 70% (NE two thirds) of the reserve area was inspected but no clear evidence of the former cottage was located. There are a few features which might be related – a car (?) chassis (SA 3), a mound of dirt (SA 4) and two 44-gallon drums (SA 5). These may however be associated with a c.E-W track that runs through the area and from its location and nature (a c.4' wide depression that crosses the Scotia and Doone (?) races but is cut by the present dirt road) is thought to be the alignment of an early track in the area (possibly a track from the Reserve to the Mt Cameron Race or to access mines to the west), possibly the original road into the area. The Doone Mine Race also appears to take off from the Scotia Race in this area (on the NE edge).

The concentration of features in the reserve area and adjacent indicates that the reserve was placed in a strategic and accessible location, but the later age of some of the features also suggests that developments were focussed in the area of the reserve.

Cultural Significance:

This Study - Of State level cultural significance as part of the Mt Cameron Water Race. This significance is mainly historical.

Other Comment:

Further survey of the reserve is required to locate the former cottage area and any other features and artefacts.

Report References :

Dickens, G. 1990 *The Mt Cameron Water Race: A century of operation*. Dept. Resources and Energy Report No. 1990/5, Rosny Park, Tasmania.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See plan attached. No photographs taken (poor visibility).

Data by: Anne McConnell & Maddy Maitri**Date of record:** 24/8/2005 (AMcC)**Date of Field Inspection:** 5-6/8/2005

SITE NAME: 'Scotia Race'

Heritage Listings/Status -
no listings

Site Type/Function:
Type of site: **Water Race (mining)**
Present use: abandoned

Site Location & Owner Information:

Mapsheets : Swan Island (8415) (1:100,000 mapsheet)
Gladstone (1:25,000 mapsheet)

Location – Runs from the Mt Cameron Water Race south to the Scotia Mine (with a major offtake to the Doone Mine) approximately around the 50m contour. GR⁵842/⁵⁴682 to c. ⁵841/⁵⁴664

Owner – Crown Land (Deferred State Forest).

Historical Information:

There is no detailed historical information for the Scotia Race, which was a branch of the Northern Extension of the Mt Cameron Water Race. Its history is therefore strongly related to the history of this part of the Mt Cameron Water Race. Information from Dickens (1990) includes the following -

- The Scotia Race was constructed by 1888, and extended in 1910 [this was after the mine closed? – may have been for the Newhaven Mine which may have still been operating?], with the branch race to the Doone Mine being constructed in 1915.
- The Scotia Channel Keepers Cottage (& reserve) was located alongside the Scotia Race and was built in July 1888 - at the same time as the Scotia Race - and was known as 'Scotia Cottage'.
- The dismantling of the Scotia Siphon for this effectively closed down the whole Northern Extension in 1922, including the Scotia and Doone branches. This is supported by Scott (1926a) who reports in 1926 that the Scotia Race was not flowing as the Mt Cameron Water Race was not being supplied north of the Ringarooma River.
- In c.1935 the Scotia and Doone Races were reopened when the Scotia Siphon was upgraded as part of the re-opening of the Northern Extension
- The Doone Race saw little activity after the closure of George Mallinson's Doone Mine in 1941. The race was re-opened and scrubbed clean in 1953 when the mine reopened, but the mine and race both closed again in 1955.
- The removal of the Scotia Siphon in 1956 effectively closed the Scotia and Doone Races for the last time.

Site Description & Setting

The Scotia Race runs from the Mt Cameron Water Race (taking off at end of the Scotia Siphon) south to the E side of the Scotia Mine. It takes a sinuous line following approximately the 50m contour, particularly in the steeper ground south of the Water Race Reserve. It is intermediate in size between the Mt Cameron Water Race and the offtake mine feeder races. The channel size averages c.3' wide by 3' deep (possibly deeper originally). It is clearly an old channel as it has large, mature eucalypts (c.70-100 yrs old) growing out of the bank of spoil alongside the race.

North of the Water Race Reserve there is a smaller parallel channel c.5m to the W for over at least half its length (and linked to the main race at the north end) and two offtakes were located, and there is possibly another which fed the W working face of the Lochaber Mine. In the area of the Water Race Reserve it is unclear what happens as the present Dorset Dredge Road has cut across the race at a point where it appears to split into two main races (the W one possibly the Doone Mine race). Both races flow south at least for c.400m and are c.100m apart.

The easternmost race appears to be the main race for the Scotia Mine and is cut to the southern end of the mine on the east side, a distance of c.1.8km from the Mt Cameron Water Race (and some of the original south end may have been lost by later mining). The southern section of the race has a series of offtakes to the west. These are likely to have been cut progressively from the south as the Scotia Mine (and possibly the Newhaven Mine) was mined north to ensure a supply of water to the working faces of the Mine. At the south end the race splits into four separate feeder races, again possibly a time series. The offtakes also bifurcate, usually with the south race being the original subsidiary race.

The race is in good condition and the channel is intact and traceable over its full length except for 2 locations in the south half - where the present Dorset Dredge Road has been built over the top of it and one washout where it runs along a steep slope above the Ringarooma River. Also in the south section the main channel flows out at one point but there is a linking channel on the W side (a repair?).

SITE NAME: 'Scotia Race'**Cultural Significance:**

This Study - Considered to have high local significance as a relatively intact main mine water race; probable regional significance for historical reasons as a key part of the early Scotia Mine; and together with the Scotia Mine possibly has State significance as a good representative and high integrity example of an alluvial mine of the earliest main phase of tin mining in Tasmania (& NE Tasmania).

Other Comment:

The location of the race is reasonably well mapped by GPS. The Doone Mine race and other offtakes however have not been traced or fully traced to date and the dam to the W of the main race and north of the mine has not been relocated.

Report References :

Dickens, G. 1990 *The Mt Cameron Water Race: A century of operation*. Dept. Resources and Energy Report No. 1990/5, Rosny Park, Tasmania.

Nye, P.B. - 4/7/1932 - 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See attached

Data by: Anne McConnell & Maddy Maitri**Date of record:** 24/8/2005 (AMcC)**Date of Field Inspection:** 5-6/8/2005

SITE NAME: 'Scotia Mine'

Heritage Listings/Status -

no listings

Site Type/Function:

Type of site: **Tin Mine**

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – C.1-2 km NW of Gladstone on the north side of the Ringarooma River – bounded by the River and Newhaven Creek (on the E, S & W). Area encompassed within in c.GR^{5835/54}663 - ^{5841/54}668 - ^{5843/54}663 - ^{5840/54}658.

Owner – Crown Land (Deferred State Forest).

Historical Information:

Overview (based on Kinnane 2003a – which is in part based on Nye 1932)

The Scotia deposit (lead) was one of the first located in northeast Tasmania. It operated between c.1881 and 1908.

The Scotia Tin Mining Company was formed in 1881 to develop the lead adjacent to the Ringarooma River. Little information is available on the activities of the Scotia Tin Mining Company (c.1881- c.1901), but Nye (1932) provides some basic information (see *Additional Historical Notes* below). By 1891 the Scotia Company and T.W. Brown had opened six working faces in the present southern end of the Scotia Workings close to the Ringarooma River. The workings were 3-5m deep and bottomed on slate. During the 1890s production gradually declined.

In 1901 exploration located deeper ground at the northern end of the workings and under the management of James Galloway the Scotia Mine became a leading northeast Tasmanian tin producer. Mining continued until 1905, but production then declined and the mine was closed in 1908.

With mining it became apparent that the Scotia deposit was in the form of a narrow high-grade gutter developed at the base of the lead. In 1916 Twelvetrees (1916, 22) described the Scotia Mine as having been "a highly valuable adjunct to the Gladstone field' due to its high yields of tin" (Twelvetrees 1916, 25). Production from the Scotia Mine was not accurately reported, however the Scotia Company is reported as having produced 500 tonnes and J. Galloway 500 tonnes. Department records for 1901 – 1908 however show that around 185 tons was produced over this period (Nye 1932).

Since the closure of the Scotia Mine in 1908 there has been several drilling programs carried out in the area of the Scotia Lead. These include three lines of holes (28 holes) north of the Scotia Mine by C.G. Ryan of the Pioneer Tin Mining Company soon after the Scotia Mine closed; 855 holes by the Tasmanian Department of Mines between 1935 and 1944; drilling by RioTinto in 1958; check drilling by Storeys Creek Tin Mining Company in 1965; drilling and augering across the lead by BMI Mining between 1970 and 1973; check drilling by Amdex Mining in 1976; further drilling by Amdex in the early 1980s as part of a joint venture with Australian Anglo American Prospecting Pty Ltd; and drilling by VDM since 2001.

In 1938 the area was declared a Special Reserve by the Department of Mines and made exempt from mining. The reservation was made to allow drilling to occur and to prevent private companies from tendering for ground in the area until the assessment could be completed (Dickens (pers comm), Duncan (pers comm)). In 1965 the government cancelled the Special Reserve Status.

Additional Historical Notes

- Based on inspection in 1916, Twelvetrees (1916, 22) described the Scotia Mine as 'a very old one' that was taken up and opened out by James Galloway. He also notes that the workings were in drift 60' deep; that it was reported that the ground was payable at 10' from the surface and the bedrock surface sloped down to the north; and that topaz, sapphire and smoky quartz were also recovered from the deposits.
- The earliest available mining lease charts (early 1880s and ?-1885) shows the Scotia Mine area as being under lease to James Ogilvie, Charles Croft, Alexander Hesslop and D. Campbell. Also on the ?-1885 mining lease map a 'Cemetery Site is shown at the south end of the Scotia Mine (GRc.838/666) in an area not previously held under mining lease. The area is later held under various mining lease so it assumed that the site was not used for burials.
- Between 1901 and 1908 the mine is variously referred to as being run/managed by James Galloway (Twelvetrees 1916, Wilson 1988 & Kinnane 2003a) or by Messers Ross & Galloway (Miller & Miller 1979). Wilson (1988) describes James Galloway as having previously been a carter and, in the 1890s, a builder.
- Scott (1926a) notes that in 1926 J.T. Shields held all leases over the mine.

SITE NAME: **'Scotia Mine'**

- Nye (1932) provides a map of workings & also provides the following description – 'The face of this mine and the ground ahead of it is included in the lease 10857M of 20 acres held by T. Stanley, the remainder of the workings not being leased. This mine was formerly one of the most productive in the district, and approximately 35 acres of ground have been worked out. It was one of the earliest found, the Scotia Tin Mining Company being formed in 1881. Little or no information is available in connection with the earlier workings. In 1891 the Scotia Company and J.W. Brown were working six faces on what is now the southern part of the workings. These workings were 10' to 15' deep and the slate bottom was generally flat with a gently slope to the north-west. These workings were generally payable, but later the production was decreased. In 1901 however deeper ground was found in the northern part of the workings, and the mine under Mr Galloway became the leading producer. The deposit eventually assumed the form of a deep lead with a narrow gutter towards the face. Active mining was carried on until 1905, but the production dwindled in 1906, 1907 and 1908 when it appears to have stopped. ... The production of this mine is not known with any certainty. According to local hearsay the Scotia Company produced 500 tons and J. Galloway 500 tons. No record of the workings of the Company are available, but from 1901 (when the deeper ground was discovered) until 1908, departmental records show a production of 185.35 tons, the greatest yield being 94 tons during 1904. ... The existing workings were worked with a tail race going through a tunnel to the south-west into the Ringarooma River. This became long, and owing to the fall of the gutter to the north, it was necessary to use hydraulic elevators near the face to bottom the lead'.
- Miller & Miller (1979. 81) note that "this mine had a reputation for being very temperamental".

Site Description & Setting

The Scotia Mine open workings are c.30 ha in area. The workings are contiguous and comprise areas of earlier (?) shallower workings on the east (SA17), south, south west (SA 23 & 24), and north west (SA 25) sides, with remnant tail races to the west into Newhaven Creek and south onto the Ringarooma River flood plain; and deeper main workings.

At the north/northeast end of the main workings, which appear to have followed the main lead north, the working faces range from c.5-20m high (the working faces of the shallow excavations range from <1m to c.3m. There are more tail races to the west in this section. The floor of the workings is relatively flat with areas of sediment that were not mined, tailings mounds of various types, including cobble mounds, and in places the workings bottom out on bedrock (particularly in the southwest corner). There were no artefacts observed within the mined area other than some sections of discarded iron pipe.

Around the edge of the open cut on the eastern side are a series of shallow races. These presumably brought water from the main Scotia Race to the working faces. There are only a couple of places where these feeder races are larger races (eg, SA 19). There are also a small number of what appear to be shallow exploratory shafts near the edge of the mine near the northeast (SA 19 & 20) and at the southwest end (3 un-numbered pits).

Artefactual material is very limited around the mine edge. The only artefacts noted were a sparse scatter of steel pipe sections around the eastern edge and one on the floor of the mine, and four areas with a scatter of domestic artefacts, all also on the eastern edge of the workings or nearby. The pipe is of only two or three types and all is highly corroded, often disintegrating. Most pipe sections are of c.8"-12" diameter and most are rivetted iron pipe. The domestic artefacts (glass, ceramic, and a miners pick) are all consistent with late 1800s-early 1900s mining activity (except for SA 7 which is later), and at least one piece is of Chinese origin. The artefact scatters were confined the crest of the spur on which the Scotia Mine is located, essentially between the eastern face of the mine and the N-S track. The dense scatter beside the track possibly is the location of a former miners hut. It is disturbed by the track, but there may be undisturbed archaeological deposits in the area.

The lack of evidence of post c.1908 disturbance of the Scotia Mine and generally in the area (except for the Dorset Power Line) is a striking aspect of the site.

Individual features are listed and briefly described on the attached pages and survey map.

Cultural Significance:

This Study - The Scotia Mine is considered to be of high regional significance for the following reasons –

- it has regional historical importance as one of the earlier mines (ie, a company enterprise rather than an area worked by a small number of individuals) and for its relatively high tin production over its operating life;
- as a good, high integrity example of a typical alluvial tin mine of the main phase of early mining (c.1880-1910) that represents the three main ways of working alluvial ground (ie, small scale shallow manual workings, sluicing and use of hydraulic elevators) (its significance in this respect is enhanced by the presence and integrity and preservation of the Scotia Race) .
- of some scientific significance given it is a typical alluvial tin mine of the main phase of early mining (c.1880-1910) and given its good preservation, and including the possible presence of a relatively undisturbed hut site; and
- for its associations with the Mt Cameron Water Race, James Galloway and Chinese miners.

(The Scotia Mine may have state level significance as part of a relatively undisturbed, high integrity area of early 'drift' tin mining sites (including the Scotia Mine, Newhaven Mine, Mallinson's Workings, Bells Shaft and

SITE NAME: 'Scotia Mine'

the North Scotia Track) and the Mt Cameron Water Race which supplied water to the mines of the area and which dates to the same period, but there is not enough information at present about other alluvial tin mines and fields in Tasmania to determine if this is the case or not).

Other Comment:

The southern edge of the Mine has not been archaeologically surveyed.

Report References :

Archival

- . Scott, J.B. – 21/8/1926 (a) – 'Scotia Mine'; UR 1926/96-98.
- . Scott, J.B. – 1/9/1926 (b) – 'Alluvial Deposits North of the Ringarooma River'; UR 1926/92-95.
- . Nye, P.B. – 4/4/1926 – 'The Mineral Resources and the Mining Industry of the North Eastern Districts in Relation to the Possible Provisions of Hydro-Electric Power'; UR 1926/9-27.
- . Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.
- . MRT Mining Lease Charts.

Historical Sources

Kinnane, N.R. 2003a *EL 32/2001, NE Tasmania. Annual Report on Exploration April 2002 to April 2003*. For Mineral Holdings Australia Pty Ltd Niugini Resources Pty Ltd.

Miller, G & Miller, S. 1979 *Of Rascals & Rusty Relics: An introduction to North-East Tasmania*. OBM, Hobart.

Twelvetrees, W.H. 1916 'The Gladstone Mineral District'. *Geological Survey Bulletin No.25*, Department of Mines, Tasmania.

Wilson, G. (Ed) 1988 (?) *As the River Flows*. The Ringarooma Council with the aid of the Australian Bicentennial Authority.

Heritage Studies

Gaughwin, D. 1991 *The North East Tasmania Historic Sites Inventory Project*. Forestry Commission, Tasmania.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See photos and plan attached

Data by: Anne McConnell & Maddy Maitri

Date of record: 24/8/2005 (AMcC)

Date of Field Inspection: 5-6/8/2005

SITE NAME: **'Scotia Mine'****Feature List & Description**

Feature No.	Feature Type/Name	Description	Photo
SA 6	power pole	A collapsed weathered, timber pole (c.4m long) with a timber cross bar near the top (c.2" x 2" cross section) with vertical metal bolts at each end.	✓
SA 7	artefact scatter	1 small green rectangular bottle; '1941' is stamped on the base.	
SA 8	artefact scatter	A low density scatter of mainly domestic artefacts (glass, ceramic, brick and metal) on both sides of the track just near the crest of the knoll on the east side of the Scotia Mine in a relatively open area that primarily a mossy ground cover (typical of early mining sites in NE Tas). East of the track the artefacts include a miners pick head (located near the eastern end of the scatter), other metal fragments, brick (wire cut), dark green bottle glass, amethyst glass, solar purple glass, amethyst base with scalloped edge (c.10cm diam), amethyst decorative bottle neck, green glazed stoneware (Chinese ginger jar?). On the west side, and extending c.30m W of the track, the artefacts included amethyst and clear glass, white ceramic 'Wedgewood', pale green glass embossed withy 'M', an iron ring/collar with 6" diameter large fragments of flat metal. The MRT mining lease maps show that between 1890 and 1903 a mining lease was held by Hee Sung for this approximate area (the feature is near the north boundary of the lease) which is consistent with the artefacts.	✓
SA 9	artefact	1 insulator	
SA 10	artefact scatter	scatter of metal and ceramic (domestic ware) on the east side of the track.	
SA 11	artefact scatter (incl. iron pipe)	1 section of flattened, highly corroded (with large sections corroded away) and partly broken up rivetted iron pipe on the edge of the workings and on the south side of a water race; and a scatter of artefacts in the same area that comprises – 1 piece clear glass, 1 piece of dark green bottle glass (with 'Bottle Company of Victoria around bottom edge of side), and 1 piece green bottle glass (stippled bottle with push up).	✓
SA 12	artefact scatter	A low density scatter of c. 3m x 2m on the edge of the workings; includes fragmented green bottle glass, window glass (?) and white domestic ware.	
SA 13	track (?)	Benching on the west bank of Newhaven Creek at the lower end. The benching runs from the creek bank diagonally up the bank and onto the spur above the west bank. The track possibly continues up the creek a short distance but the creek banks are heavily vegetated and the alignment is a very subtle feature and difficult to clearly identify.	
SA 17	shallow workings/ dam (?)	A large depression c.45m x 18 with a 1.5m high earthen bank along the east side. There is a section of water race running into the east to the edge of the depression. The bank has mature eucalypts growing put of it suggesting a relatively early 1900s age. Interpreted as part of the earlier shallow workings at the south end of the Scotia Mine or a small associated dam.	✓
SA 18	pits/shafts	Two pits. One pit is c.5m from the edge of the main Scotia workings and c.2-3' x 6', oriented NE-SW and with a low spoil mound around it that has a mossy ground cover. The second pit is c.20m from the edge of the mine and is a c.3' x 6' rectangular pit with vertical walls and a present day depth (possibly partly infilled) of 3-4m. It is oriented approximately N-S and has an unvegetated (except by moss) spoil mound on the NW and SE corners. Both pits/shafts appear to be contemporary and contemporary with the historical mining of the Scotia. The pits are interpreted as two historical exploration pits or small shafts.	✓

SITE NAME: **'Scotia Mine'****Feature List & Description - continued**

Feature No.	Feature Type/Name	Description	Photo
SA 19	water race	This water race runs north from the mine face for c.40m then bends and runs east and appears to connect to the main Scotia Race. Just west of the N-S track there are at least three, possibly four, small offshoot races that run approximately parallel and west. The race is very large (c. 2' wide x 4' deep) at its western end and has spoil on both banks. (At the western end it is the largest water race in the Scotia Mine area and is larger than the Scotia Race). It appears relatively fresh in this area – possibly more recently disturbed/redug. East of the offshoots it becomes a clear but smaller race (c.2' wide and c.1-2' deep and has vegetation on the banks and in the channel.	✓
SA 20	pit/shaft	Similar to the SA 18 pits/shafts.	✓
SA 21	coarse tailings mound	An approximately triangular mound (of sides c.10') of quartz cobble (coarse tailings) in the base of the workings. It is the southernmost of a several small low quartz cobble mounds in the base of the northern part of the mine.	✓
SA 22	iron pipe	1 section of rivetted iron pipe which is highly corroded (with large sections corroded away).	✓
SA 23	shallow workings	Large area of shallow workings (possibly continuing to the SE but not inspected beyond area shown). This area has faces of between c.4' and c.12'. The floor of these workings is uneven and at several places the floor has bottomed on bedrock (including in area a). There are also small inliers of unmined deposit with original vegetation on the surface (eg, point b). At point c there is a line of rocks placed along the edge of the workings. The rocks have not been shaped and appear to be naturally occurring quartz cobbles and nodules of silcrete found in the mining. The row is only 1-2 rows high and 1-2 rocks wide. Some of the rocks have fallen down the mine face (low).	✓
SA 24	shallow workings	Small area (c.30m x 50m) of shallow workings on the west side of the Scotia Mine and on the slopes above Newhaven Creek. The bank height is c.4'-6' and the floor of the workings is uneven and at several places the floor has bottomed on bedrock. There is an associated tail race (?) on the W side which runs west down toward Newhaven Creek.	✓
SA 25	shallow workings	Small area (c.70m long x 20-30m wide) of very shallow workings on the north west side of the Scotia Mine running around the slope above Newhaven Creek. The area may have extended further to the NE but have been disturbed by later races/tail races of the Scotia Mine. The bank height is c.2'-3' and the floor of the workings is relatively even with a straight earth ridge running E-W near the N side.	
SA 26	iron pipe	1 section of iron pipe in base of workings; highly corroded.	✓
SA 27	iron pipe	1 section of iron (or tin?) pipe on the eastern side of the mine in an area of tea tree scrub; highly corroded.	✓

Data by: Anne McConnell & Maddy Maitri

Date of record: 24/8/2005 (AMcC)

Date of Field Inspection: 5-6/8/2005

Anne D. McConnell GPO Box 234, Hobart, Tasmania, 7001; ph 03 6239 1494; annemc@aaa.net.au

SITE NAME: 'Newhaven Mine'

Heritage Listings/Status -
no listings

Site Type/Function:
Type of site: **Tin Mine**
Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River in the head waters of Newhaven Creek and immediately north of the Scotia Mine.
Area encompassed within in c.GR⁵8385/⁵⁴6680 - ⁵8390/⁵⁴6710 - ⁵8410/⁵⁴6700 - ⁵8410/⁵⁴6675

Owner – Crown Land (Deferred State Forest).

Historical Information:

There is no historical information on the Newhaven Mine except for a few references in Nye (1932) who names the Newhaven Mine and shows it on his map of the area. This may be because the Newhaven Mine was regarded as part of the Scotia Mine, and this is suggested by Nye's (1932, 24) comment that 'the name 'Newhaven Mine' is given to 'the old Scotia Workings at the head of Newhaven Creek and north of the main Scotia face'. This also suggests the Mine was no longer operating by 1926 and had not been operating for some time. Nye (1932) also notes that the 'ground was unleased' in 1932. Nye (1932) provides a brief description of the mine at this time – "the ground is for the most part 25' to 30' deep and bottom is generally visible, but in some places holes suggest the use of elevators that have worked deeper ground".

The MRT Mining lease charts also show a strong connection between the Scotia and Newhaven Mines. The earliest recorded lease for the area is held by D. Campbell who at the same time (early 1880s) holds the lease over part of the Scotia Mine. D. Campbell holds the lease of the area until between 1890 and 1903, when the lease areas are significantly changed and the lease for the area is taken out by James Galloway (at the same time s he takes out most of the leases for the Scotia Mine. Galloway continued to hold the leases to all areas until between 1903 and 1909 by which time the Scotia mine closes. E.M Shields takes out Galloway's leases for both Mines and he holds these until at least 1936.

Site Description & Setting

The main Newhaven working is an approximately triangular area (c.200m x 150m) of alluvial workings on upper eastern tributary of Newhaven Creek. The workings extend up the eastern tributary valley(s?) to the NE from the bed of Newhaven Creek and extend N up the central tributary (but were not followed more than c.25m). The shallower workings are at the south end on Newhaven Creek proper and up the east side. The workings are deepest on the north and west side where faces are over c.6m high. The floor of the workings is irregular with inliers of remnant unworked deposit, an irregular mine floor, and occasional cobble (coarse tailings) mounds. The western slopes of the Newhaven Creek valley have not been disturbed by mining and there was no mining evidence in this area. There are limited tailings and it appears that Newhaven Creek was used as the tail race for the mine (supported by the degree of fill of the south end of the creek valley) and water supply was from the Scotia Race. There is an area with no eucalypts and only low heathy vegetation on a gentle slope on the east side of the workings which may have been a previously cleared area for huts, equipment, etc.

There is a second area of workings on the east side of Newhaven Creek between the main workings and the N end of the Scotia Mine. The workings (c.50m x 75m) are only c.10m N of the northernmost point of the Scotia Mine and a straight deep (c.4-5m high) narrow channel (tail race?) runs W to join the main workings at the S end in Newhaven Creek. There is another deep, but more irregular, channel which cuts off from the first channel and runs SW into Newhaven Creek another c.30m to the S (possibly working following a narrow lead or a second tail race). These subsidiary workings are fed by minor races that run from the Scotia Race west into the east side (working face).

No artefactual material was noted in the vicinity of the Newhaven Mine. The ground surface visibility was poor on the east side due to high thick bracken, but where visibility was better there was also not evidence of races or artefacts.

The workings are revegetated throughout by mature eucalypts and casuarinas and the age of the regrowth vegetation is similar to that of the Scotia Mine, implying a similar age and no subsequent reworking.

Cultural Significance:

This Study - Of local significance (possibly of regional significance) as part of the early tin mining evidence of the area – refer Scotia Mine.

SITE NAME: 'Newhaven Mine'**Other Comment:**

This Mine has been fully surveyed except for the northern extension at the north end. There may be additional races and some artefacts which have not been located due to the dense vegetation cover around the edges of the mine.

Report References :

Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

See 1 general photo attached.

Data by: Anne McConnell & Maddy Maitri**Date of record:** 24/8/2005 (AMcC)**Date of Field Inspection:** 5-6/8/2005

Anne D. McConnell GPO Box 234, Hobart, Tasmania, 7001; ph 03 6239 1494; annemc@aaa.net.au

SITE NAME: 'Mallinson's Workings'

Heritage Listings/Status -

no listings

Site Type/Function:

Type of site: Tin Mine

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Swan Island (8415) (1:100,000 mapsheets)

Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River to the northeast of the Scotia Mine and south of the Lochaber Mine.

Western edge of working face at c.GR⁵8455/⁵⁴6745, with an associated dam at c.GR⁵8450/⁵⁴6740 (dam wall).

Owner – Crown Land (Deferred State Forest).

Historical Information:

There is very little historical information for these workings. The name is given by Nye (1932) who names them 'Mallinson's Workings' and shows them on his map of the area.

The first mining lease over the area appears to have been taken out in the late 1870s/early 1880s by Alexander Corrie as part of an area documented as the New Imperial Tin Mine. These leases have been given up by 1885 and a smaller lease has been taken out over the Mallinson's Workings area by a John Thompson. Thompson held this lease until some time between 1890 and 1903. There is no lease over this area until at least 1909 when a lease is recorded as being taken out over the area by a D.R. Mallinson. This partly corroborates Twelvetrees (1916) who comments that the mine was being worked in 1910s by Mr A. Mallinson.

Twelvetrees (1916) provides a brief description from his 1916 inspection - the 'faces were 7'-8' and some of the workings, including the tail race, bottomed onto bedrock' also noting that the workings adjoin the 5 acre Water Race Reserve (lease 5359M). He also reports that an australite was found on the bottom of the mine (8' from the surface). It appears from Twelvetrees (1916) that by 1916 the workings were no longer operating.

In 1932 Nye (1932) notes that the workings are 'not under lease at present'. Nye (1932, 25-26) further notes that the workings are situated in the south-east part of former lease 9678/M, 15 chains to the southwest of the Lochaber workings and comprise a 'working some 5 chains long and half a chain wide' which was 'opened up in a general westerly direction at the head of a small gully falling into the Ringarooma River' and that 'the depth ranged up to 12' at the western end'. He also reports that 'it is stated that 2 tons of tin ore were won' and goes on to remark that 'there is deeper ground (leads) in this area which are not yet worked out' and that the deposit could be worked with water from the Scotia Race.

Site Description & Setting

The W edge of this working is c.150m NW of the Water Race Reserve and less than 100m N of the present Dorset Dredge Road. Only the extreme western point, which is a working face c.3-5m high, was inspected. The workings in this area are revegetated with mature eucalypts and thick shrubby vegetation and on the basis of this appear to be of similar age to the Scotia and Newhaven Mines.

On the NW corner of this section of workings above the face is a shallowly excavated (c.2-3'), flat floored square excavation with a shallow race running into the N side from the N (appears to be some constructed working area).

Immediately to the south is a c.6' high earth bank that runs N-S (SA 2) and on the west side is an area of shallowly excavated ground (SA 1). These are interpreted as being part of the dam shown by Nye (1932) in the same location with the earth bank being the dam wall and the shallow excavation the dam itself (and where earth was excavated for the dam wall). These two features are also revegetated.

Cultural Significance:

The preliminary assessment (given that little of the mine has been inspected) is that the mine is likely to be of local significance, mainly for historical reasons.

Other Comment:

This site requires further historical research and field survey.

SITE NAME: 'Mallinson's Workings'**Report References :**

Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Twelvetrees, W.H. 1916 'The Gladstone Mineral District'. *Geological Survey Bulletin No.25*, Department of Mines, Tasmania.

Photographs/Sketch/Plan

No photographs taken.

Data by: Anne McConnell & Maddy Maitri**Date of record:** 24/8/2005 (AMcC)**Date of Field Inspection:** 5-6/8/2005

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SITE NAME: 'Lochaber Mine'

Heritage Listings/Status -
no listings

Site Type/Function:
Type of site: **Tin Mine**
Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River, south of the Mt Cameron Water Race and west of the Cape Portland Road.
Area encompassed within in c. GR⁵8465/⁵⁴6782 (GPS) – GR⁵855/⁵⁴675 - ⁵848/⁵⁴674.

Owner – Crown Land (Deferred State Forest).

Historical Information:

The main period of operation of the Lochaber Mine is understood to have been the early 1880s (& possibly late 1870s), with small scale mining after c.1885 through to the 1910s, with a second period of operation from 1932 to ?. Twelvetrees (1916) noted that 'the Lochaber workings have produced fair tin in their time'.

According to Twelvetrees (1916) after 1885 production declined and the mine was worked by small parties, and that in 1916 'a little work' was still being done at the Lochaber Mine. The mine appears to have closed soon after this as when the area was inspected by J.B. Scott in 1926 the mine was closed and Scott commented that "From the appearance of the faces it is many years since productive work was in progress (Scott 1926b, 93). Scott (1926b) also noted that in 1926 the mine comprised leases 4234/M and 412/M in the name of E.R. Groves and others; that a branch of the Mt Cameron Water Race passed 'through the ground' and a large area of ground had been worked and the average depth of working was 20'.

With respect to this phase of mining Nye (1932, 25-26) noted that "The mine workings are situated on 7413/M and the country to the south and east, but have not progressed as far as 10841/M. The deposit worked is that of the Lochaber Lead. It was found on the bank of the Pig & Whistle Creek and was then followed and worked in a general westerly direction. ... The upper layers of the deposit have been sluiced on the north-west side of the gutter. The ground has a maximum depth of 65'-70' in the vicinity of the present face. ... Little or no records exist in connection with the working of this mine. It was apparently included within the property of the Imperial Tin Mining Co. Reg. during the eighties it was reported in 1885 that the Company was getting 2-4 tons per week. Since then it appears to have been leased and worked by individuals. There are no official records of production during past workings. In 1901, Twelvetrees stated that the former production was 0.5 tons per month."

Nye (1932, 25-26) commented in relation to the 1932 visit that "during the early part of this year, Standage and party began operations and obtained 1.64 tons of tin ore. ... This mine is being worked with water from the Mt Cameron Water Race. ...". Nye (1932, 25-26) goes on to describe the mine – "The tail race is cut at the lowest possible level and ends in a tunnel cut through the low ridge separating the workings from the valley of the Pig & Whistle Creek. As the lead falls to the north-west, it is necessary to elevate the material and the present operators are elevating it 29 feet with a hydraulic elevator. The water for the elevator is taken direct from a small intake near the head of the old No.6 [Scotia] Siphon. Water is also run into the dam on lease 10841/M and is stored and used for nozzle water".

Site Description & Setting

Only the western edge (point) of the mine was inspected: The W edge of the mine is c.500m NW of the Water Race Reserve and c.350m of Mallinson's Workings. This extreme western point is a working face c.3-5m high, and the workings in this area revegetated with mature eucalypts and thick shrubby vegetation (and on the basis of this appear to be of similar age to the Scotia and Newhaven Mines and Mallinson's Workings).

Several water races were noted in the general area – these had an E-W, NE-SW or NW-SE orientation and are likely to be races supplying water to the working faces of the Lochaber Mine, in some cases from the Scotia Race. The two sections of race in the creek on the east side of the Lochaber Mine (LM 2) are also considered to be part of the mine, but it is not clear which period of mining they relate to. To the N of the western point of the mine a metal artefact (an iron collar) (SA 14), possibly associated with water pumping/hydraulic elevating, was located beside one of the races. A costean was also noted in the area but is likely to be much more recent than the early phase of mining at the Lochaber.

SITE NAME: 'Lochaber Mine'

Cultural Significance:

This Study - The preliminary assessment (given that little of the mine has been inspected) is that the mine is likely to be of local significance, mainly for historical reasons.

Other Comment:

The mine needs further historical research and ground survey.

Report References :

Archival

Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.

Scott, J.B. – 1/9/1926 (b) – 'Alluvial Deposits North of the Ringarooma River'; UR 1926/92-95.

History & Heritage Studies

Twelvetrees, W.H. 1916 'The Gladstone Mineral District'. *Geological Survey Bulletin No.25*, Department of Mines, Tasmania.

Photographs/Sketch/Plan

No photographs taken.

Data by: Anne McConnell & Maddy Maitri | **Date of record:** 24/8/2005 (AMcC) | **Date of Field Inspection:** 5-6/8/2005

SITE NAME: 'Bells Shaft Exploration Pits'

Heritage Listings/Status -

no listings

Site Type/Function:

Type of site: **Tin Prospecting Excavations**

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) (1:100,000 mapsheet)
Gladstone (1:25,000 mapsheet)

Location – On crest of low rise approximately 350m SW of the Mt Cameron Water Race/Scotia Race junction.
GR c.⁵8393/⁵46796

Owner – Crown Land (Deferred State Forest).

Historical Information:

There is no historical information for these features. It is possible that they are costeans and/or smaller exploratory shafts related to, and of the same vintage, as Bells Shaft which is, based on Nye's (1932) map, c.100m to the SW.

Little is known about Bells Shaft. It is unusual in the local region in being a deep lead mining shaft. According to Twelve trees the shaft was 56' deep. Twelvetrees (1916, 23-24) also notes that in relation to Bells Shaft "No one knows much about the results obtained in sinking the shaft, though rumour says that both gold and tin were obtained".

It is thought from the historic mining lease maps that the shaft and associated exploration occurred in the late 1870s/early 1880s as these charts show a W.S. Bell as having a 20 acre lease in this area in at least the early 1880s but that this and other lease in the area have expired and not been re-taken up by 1885. The site therefore is likely to be relatively early. No further leases are taken up in the site area until 1903-1909 when James Galloway has a mining lease over a large part of the area which extends south to the Scotia and Newhaven Mines over which he also has the mining lease at this period.

(Note - On the early 1880s chart this lease is in the NW corner of a large area of leases that run east to the area of the present Lochaber Mine title 'New Imperial Tin Mine'. The area comprises a number of individual leases including an adjacent lease also in the name of W.S. Bell and a set of adjoining leases held by G.R. Bell and Alexander Corrie. These have also expired by 1885).

Site Description & Setting:

A set of 4 pits in a c.40m diameter area on the crest of a low sandy ridge that runs NW-SE and slopes down to the SE. The area has an open eucalypt woodland with a sparse low understory vegetation, mainly of sags. The northernmost pit is c. 2' x 6' and has relatively deep vertical sides. It has a low mound of spoil on all four sides. This is the largest pit and appears to be a deep pit rather than a shallow costean. The next largest pit is the one at the S end and this is approximately the same dimensions, but it is not clear if this was originally as deep or if it has been deepened and enlarged by animal burrowing. The other two pits are shallow c.1' x 4' pits that are typical of historical costeans.

The exploratory pits were located in a c.30m wide transect being walked S/SE from the Mt Cameron Water Race to the Water Race Reserve. Bell's Shaft was not relocated and no other exploratory pits were noted in the general vicinity. It is possible that there may be other clusters of early exploration pits in the general area.

Cultural Significance:

This Study - Not assessed as the significance is dependent on the relationship of these features to Bells Shaft.

Other Comment:

The relationship between these features and Bells Shaft needs to be established.

Report References :

Nye, P.B. – 4/7/1932 – 'Site of Old No.6 Syphon, Mt Cameron Water Race'; UR 1932A/17-44.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Twelvetrees, W.H. 1916 'The Gladstone Mineral District'. *Geological Survey Bulletin No.25*, Department of Mines, Tasmania.

MRT Mining Lease chart (early 1880s, ?-1885)

SITE NAME: 'Bells Shaft Exploration Pits'**Photographs/Sketch/Plan***No photographs taken.***Data by:** Anne McConnell & Maddy Maitri**Date of record:** 24/8/2005 (AMcC)**Date of Field Inspection:** 5-6/8/2005

Anne D. McConnell GPO Box 234, Hobart, Tasmania, 7001; ph 03 6239 1494; annemc@aaa.net.au

SITE NAME: 'North Scotia Track

Heritage Listings/Status -
no listings

Site Type/Function:
Type of site: Road (mining related)
Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River NW of Gladstone and in the area of the Water Race Reserve on the present road to the Dorset Dredge. Traced from GR⁵8475/⁵⁴6735 to GR c.⁵8403/⁵⁴6760.

Owner – Mainly Crown Land (Deferred State Forest).

Historical Information:

There is no historical information for this site.

Although approximating the alignment of the present road to the Dorset Dredge, its nature suggests an earlier date than the mid-1900s date for the commencement of the operation of the Dorset Dredge in this area. It could be a mid-later 1900s bulldozer line that the present Dorset Dredge road was approximately built on, but its location also suggests that this is not likely. Its position suggests it is either the early main access road/track to the mines of the Great Northern Plain that lie NW of Gladstone – as shown on Nye's (1932) map, or it is part of an unmapped track connecting the Water Race Reserve to the Mt Cameron Water Race which connected to the road/track to the Scotia Mine.

Site Description & Setting

Only a c.650m section of this track was inspected (in the area of the Water Race Reserve). The track could not be located c.100m beyond the E side of the Reserve (it may have connected with a more N-S track here?). It was traced to the present Dorset Dredge Road where it has been destroyed by this later road. A similar track was picked up on the N side of the present road c.150m to the W and was traced for c.200m. The track formation continues NW on a bearing of 300°, but was not followed further. It is crossed by at least 1 shallow race in this section.

For the length inspected the track is a subtle feature. It is a shallow depression (c.20cm deep) c.4' wide, and there are no clear banks on the sides which suggests the route is depressed through use rather than being bulldozed. There are no large trees along the track, but the track carries shrubby heathy vegetation very similar to that adjacent.

Cultural Significance:

This Study - Considered to potentially have regional significance for historical reasons (either for its association with the Mt Cameron Water Race or as one of the main historical mining access tracks in the area). Not considered to have high significance in relation to its fabric as it has been significantly overprinted by the present road to the Dorset Dredge.

Other Comment:

The site requires further historical research and field survey.

Report References :

Gaughwin, D. 1991 *The North East Tasmania Historic Sites Inventory Project*. Forestry Commission, Tasmania.
McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Photographs/Sketch/Plan

No photographs taken

Data by: Anne McConnell & Maddy Maitri | **Date of record:** 24/8/2005 (AMcC) | **Date of Field Inspection:** 5-6/8/2005

SITE NAME: 'Dorset Dredge Power Line'

Heritage Listings/Status -

no listings

Site Type/Function:

Type of site: Electricity Supply Line (mining related)

Present use: abandoned

Site Location & Owner Information:

Mapsheets : Cape Portland (8416) & Swan Island (8415) (1:100,000 mapsheets)
Gladstone (1:25,000 mapsheet)

Location – North of the Ringarooma River (NW of Gladstone) running south of and roughly parallel to the present road to the Dorset

Dredge from the Scotia Mine area NW to north of the Aberfoyle Mine.

Mapped (on 1:25,000 map) from c. GR⁵838/⁵⁴673 to GR c.⁵817/⁵⁴690; with a power pole at GR⁵8419/⁵⁴6668.

Owner – Mainly Crown Land (Deferred State Forest).

Historical Information:

This site is understood from Greg Dickens (pers comm) to be the power line route from Gladstone to the Dorset Dredge on the Ringarooma River. According to Dickens (1990) the Dorset Dredge commenced operations in this NW location (at the McGregor – Black Duck area) in 1964 and operated until 1971. It utilised water from the Mt Cameron Water Race and relied on an external electricity supply. The power line route can be clearly seen in the 2002 air photos as a band of cleared land running from the dredge site SE to the N end of the Scotia Mine and then bending to run S along the E side of the mine (also a track).

Site Description & Setting

This power line route was only inspected in the N-S section along the east side of the Scotia Mine. In this area the power line route is also a track which runs south to the Ringarooma River (and the same alignment on the other side is the extension of the main street of Gladstone). This route across the river from Gladstone and along the east side of the Scotia Mine is also thought to have been the main access to the Scotia Mine from Gladstone (G. Dickens, pers comm).

Known or probable evidence for the power line identified are –

- a single insulator (SA 9) located on the E side of the track at the crest of the spur where a track takes off to the E;
- a sawn off, round, c.1' diameter, timber post in the same area as SA9 which is understood from N. Kinnane (pers comm) to have been part of the power line to the Dorset Dredge; and
- a collapsed weathered, timber pole (c.4m long) with a timber cross bar near the top (c.2" x 2" cross section) with vertical metal bolts (SA 6), also on the E side of the track, but further north (at the N end of the Scotia Mine).

It is unclear if SA6 is part of the power line to the Dorset Dredge (early) or part of an earlier rural electricity supply or telegraph line to the area (or possibly to Scotia Cottage) (it is not considered to be electricity supply to the Scotia Mine as electricity was not being generated at this time, but it may have been a telegraph line).

Cultural Significance:

This Study - Considered to have regional significance historically for its association with the Dorset Dredge (which is assessed as being of regional significance by Gaughwin (1991)) (note: this assessment is based on very limited historical research and field survey).

Other Comment:

Only a short section of the route was inspected.

Report References :

Air Photos - Northern Revision, 2002, Run 5E, 1356-140 (A111), colour, 1:42,000 (TASMAP).

Dickens, G. 1990 *The Mt Cameron Water Race: A century of operation*. Dept. Resources and Energy Report No. 1990/5, Rosny Park, Tasmania.

Dickens, G. – July 2005 – discussion.

Gaughwin, D. 1991 *The North East Tasmania Historic Sites Inventory Project*. Forestry Commission, Tasmania.

McConnell, A. 2005 *Historic Heritage Survey & Assessment of the area of the Scotia & Endurance Tin Mines, Gladstone, Tasmania*. Report for Van Dieman Mines Pty Ltd, Canberra, ACT.

Kinnane, N. – August 2005 – discussion.

Photographs/Sketch/Plan

See attached

Data by: Anne McConnell & Maddy Maitri

Date of record: 24/8/2005 (AMcC)

Date of Field Inspection: 5-6/8/2005

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS.....p1

SITE NAME: 'Endurance Mine'



1. View of south west corner of southern tailings (view south)



2 View of south west corner of southern tailings (view northwest)



3 View of west end of southern tailings in the West Endurance area (view west)



4 View west from southern tailings to unmined swampy area to west.



5 View of central tailings with Blue Lake and Mt Cameron behind.



6 View east along SW corner of Blue Lake in study area



7 View of rehabilitation works (c.1980s) on the southern tailings.



8 Area of EA1a, southern tailings (view NW).

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS.....p2

SITE NAME: 'West Endurance Water Race 1'



9 Area of EA1c, southern tailings (view NW).



10 EA2, southern tailings (view SW).



11 EA3, southern tailings (view N).



12 EA4, southern tailings (view NW).



13 EA6, southern tailings (view SW).



14 EA10 - 'six cell jig (view E).



15 EA10 - six cell jig (view W).



16 EA11 – sluice box

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS.....p3

SITE NAME: 'Endurance Mine'



17 EA12 (view W).



18 EA17



19 EA18 - six cell jig (view E).



20 EA19 (view E).



21 EA19 – cobble mound (coarse tailings).



22 EA23 – view to sluice (view S).



23 EA23 – view of sluice box and sluice trestle remnants (view NE).



24 EA23 – view to hut foundations (bed logs) (view NE).

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS.....p4

SITE NAME: 'Endurance Mine'



25 EA26 – view to unflooded workings on lake edge (view NE).



26 EA23b – view to pipes and timbers on the edge of the workings (view S).



27 EA29 – shallow workings (c.1970s?) (view N).



28 EA30 – pipes in race (view N)



29 EA30 – pipes beside the race (for an elevator?), showing the general condition of pipes on the site.



30 EA31 & 43 – main workings at northwest corner of the Endurance Mine (Clifton 1980?), now filled with water, and the outlet channel (view NE)



31 EA32 – mound of iron pipes and timber in forested area.)



32 EA40 – power pole in swampy area - part of the Moorina Endurance Power Line

SITE NAME: **'South Endurance Road'**



Bridge on the South Endurance Road west of the Endurance Mine (view W).

SITE NAME: 'Mt Cameron Water Race'



1 Main race west of the Scotia Siphon (view W).



2 Line of pipes along alignment of north channel of the Scotia Siphon – near west end (view E).



3 Partly buried pipe at the west end of the north channel of the Scotia Siphon (view W).



4 Shallow channel on alignment of the Scotia Siphon at the east end (view W).



5 Mt Cameron Water Race at the junction of the Scotia Siphon outlet and offtake of the Scotia Race (view E).

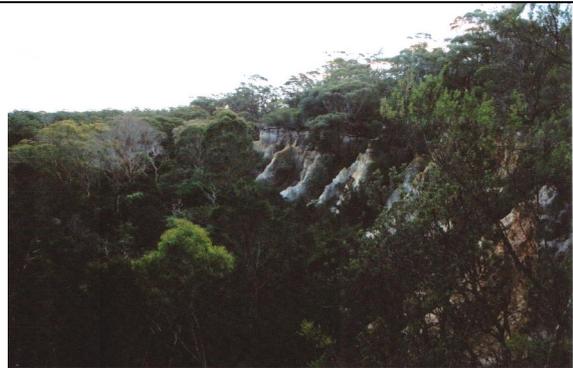


6 MCR 7 race offtake (view E).

SITE NAME: **'Scotia Mine'**



1 View E-W across the central part of the Scotia Mine (view W).



2 View along north-central east side of the Scotia Mine workings (view NW).



3 View across the northern end of the Scotia Mine workings (view S).



4 View from the bottom of the northern end of the Scotia Mine Workings to working face (same face as 3) (view S).



5 SA8 – miners pick in artefact scatter



6 SA8 – general view of artefact scatter.



7 SA17 – shallow workings/dam at southeast end of the Scotia mine.



6 SA18 – small pit/exploration shaft

SITE NAME: **'Scotia Mine'**



9 SA19 – view of large race where it ends at the working face of the mine (view SW)



10 SA21 – cobble mound (coarse tailings) in the base of the main workings (view E)



11 SA23 – general view of the shallow workings in the southwest corner of the Scotia Mine (view NE)



12 SA23b – general view of the shallow workings in the southwest corner of the Scotia Mine (view E)



13 SA23c – line of boulders on the edge of the shallow workings in the southwest corner of the Scotia Mine (view S)



14 SA22 – section of iron pipe showing the degree of corrosion and disintegration of the earlier period pipes.

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS

SITE NAME: 'Newhaven Mine'



View of the southeast section of the Newhaven Mine workings showing the degree of revegetation.

CULTURAL HERITAGE SITE INFORMATION SHEET – PHOTOGRAPHS

SITE NAME: 'Dorset Dredge Power Line'



Power Pole on track near the Scotia Mine (SA6), possibly part of the Dorset Dredge Power Line.

Appendix 2

HERITAGE SURVEY MAPS

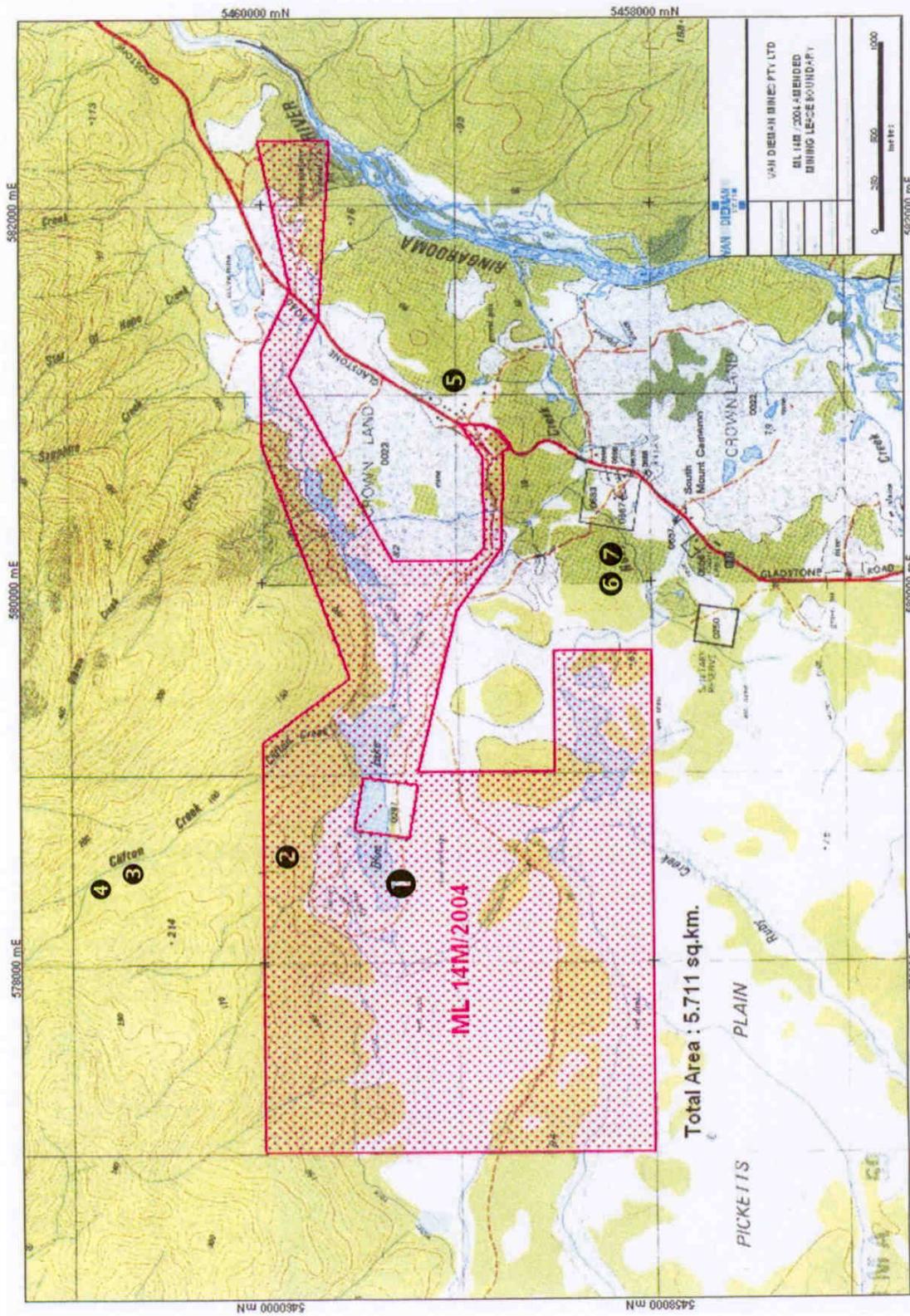


Figure 4 Endurance area showing the VDM Mining Lease area and previously identified historic heritage sites in the vicinity of the mining lease (1 – Endurance Mine; 2 – Blue Lake Camp; 3 – Clifton Camp 2; 4 – Clifton Camp 2; 5 – Long Gee’s Camp; 6 – Ruby Creek Camp 1; 7 – Ruby Creek Camp 2) (taken from the project Brief (Duncan 5/7/2005)).

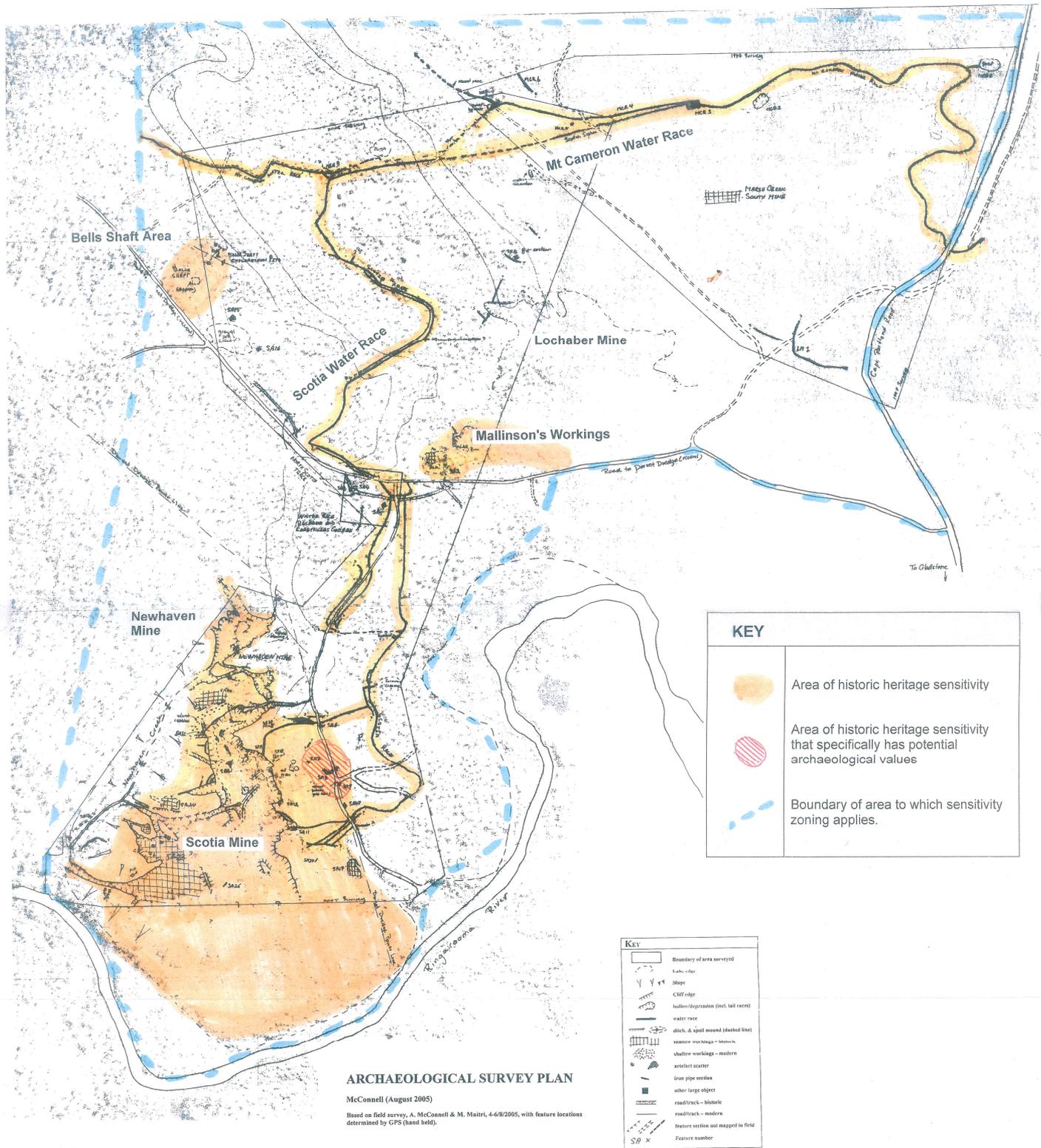


Figure 6 Scotia area showing areas of known and potential historic heritage sensitivity in the mining lease area and identified heritage in the Scotia area (for a detailed map of historic heritage in the Scotia area refer Appendix 2).