Lake Johnston
Nature Reserve

Site Development Plan
2001

Parks and Wildlife Service

Department of Primary Industries,
Water and Environment
# Lake Johnston Nature Reserve

## Site Development Plan - 2001

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1 Introduction

This site plan has been prepared to conform with the Lake Johnston Nature Reserve Management Plan 1999 (LJNRMP 1999). It provides for the development of facilities specified in the management plan to enable controlled, limited licenced tour visits for the purpose of viewing and learning about the reserve’s special values.

The site plan is intended to provide the basis for approval of the project in accordance with the requirements of the LJNRMP 1999 and the West Coast Council Planning Scheme.

1.1 Values and Significance of the Reserve

The Lake Johnston Nature Reserve lies some 8 kilometres south of Rosebery in central western Tasmania. Reserved in 1999, it has an area of approximately 138 ha.

The area was reserved because it contains unreserved or poorly reserved rainforest communities of conservation significance. It is notable for:
- the rare restricted endemic *Orites milliganii*
- the endemic conifer *Diselma archeri*
- at least seven of the Tasmanian endemic pine species
- lying within the biggest patch of deciduous beech, *Nothofagus gunnii*, in Tasmania
- two separate but identical subalpine patches of Huon pine, *Lagarostrobos franklinii*, believed to be derived from trees present on the site for over 10 000 years.

Research on Huon pines in the reserve has produced a climatic record going back some 5 000 years – one of the most significant of such records in the world.

1.2 Background to Development

In accordance with Section 25 of the *National Parks and Wildlife Act 1970*, the Lake Johnston Nature Reserve Management Plan 1999 (LJNRMP 1999) declared the Lake Johnston Nature Reserve to be a reserve to which the public has not a general right of access. Access is restricted to scientific or management personnel, licenced tour groups, and on infrequent occasions, special interest groups approved by the Director.

The LJNRMP 1999 identifies two management zones to take account of and protect environmental, educational and visitor values of the reserve. One of these zones, the Controlled Visitor Access Zone, is defined covering a portion of the existing access road (Stage 1) and an area for potential future pedestrian access to view Huon pine stands (Stage 2).

The LJNRMP 1999 states that walking access will be confined to Stage 1 until such time as funding is made available for Stage 2.

In September 2001 a funding application to the Regional Tourism Program was successful. A grant of $35 000 has been teamed with State Government funding to make development of stage 2 possible.
1.3 Proposed Development

It is proposed to develop a high quality ‘ecotourism’ experience within the Controlled Visitor Access Zone (Map 1). The development will be in accordance with and use a site that has been identified for visitor access within the LJNRMP 1999.

The development consists of Stage 1 and Stage 2 as identified in the LJNRMP 1999. Both stages are to be undertaken at the same time.

- **Stage 1** - a section of existing vehicular track will be repaired to a stable four wheel drive track to enable safe vehicle access. Parking and a turnaround will be provided and a visitor viewing area (Map 2).

- **Stage 2** – construction of a boardwalk and viewing platform to define and control pedestrian access (Map 2).

The proposed development, combined with the provision of high quality visitor information and interpretation by licenced tour operators, will provide visitors with a unique, quality experience.

Works will be undertaken by experienced Parks and Wildlife employees. It is expected that approximately $50 000 will be spent on development. On completion of the boardwalk construction there will have been employment for up to 270 work days.
2.0 Planning Objectives

The management objectives for nature reserves as set out in Schedule 4 of the *National Parks and Wildlife Act 1970* apply to the reserve.

The LJNRMP 1999 identifies the following set of specific objectives for the reserve, consistent with management objectives for nature reserves.

- Conserve the stands of Huon pine.
- Conserve flora species and communities of conservation significance, National Estate flora values, and natural flora diversity for the Reserve.
- Conserve subfossil deposits.
- Develop public understanding of the values and goals for management of Lake Johnston Nature Reserve.
- Conserve natural landscapes and sites of geoconservation and National Estate significance in the reserve.
- Control and limit visitor access and facilities, on the basis of the precautionary principle, to that which is ecologically sustainable and does not threaten the values of the Reserve.
- Enrich visitor experience of Reserve values through education and interpretation.

3.0 Management Plan Requirements

The proposed development aims to provide a solution that best meets all the objectives identified within the LJNRMP 1999.

To ensure appropriate management of differing conditions, the LJNRMP 1999 defines two management zones:
1. Controlled Visitor Access Zone
2. Controlled Scientific Zone

The Controlled Visitor Access Zone has as its primary objective to provide low impact, low density, non-intrusive controlled visitor opportunities consistent with the protection, maintenance and monitoring of environmental features and values. Boundaries of the zone are set at least ten metres from any existing live Huon pine or other significant features (Map2).

The Zone provides for a limited number of strictly controlled tour visitors accompanied by licenced guides, or visits for scientific, management, or infrequent special interest purposes approved by the Director.

Facilities within the Zone may include and will not exceed a small interpretive sign, vehicle access on the existing or realigned four wheel drive track, vehicle parking and turnaround area and walking tracks, boardwalks, platforms or similar. These are to be precisely sited to avoid any disturbance of the pines or features to which the zone provides viewing access.

Tour groups using the Zone will be limited to a maximum of 8 persons per visit. Only one such group will be
allowed in the reserve at any one time and only four tours will be permitted each day provided the total tour group numbers excluding guides do not exceed 700 each year for the first two years of operation. Further restrictions on subsequent years are outlined within the LJNRMP 1999.

Prior to provision of any facilities and services in Stage 2 of the Zone a site plan or similar environmental and heritage effects assessment for Stage 2 is to be released for public comment for a minimum period of 30 days before the development is finalised and approved.

Section 5.4.1 and Appendix 5 of the LJNRMP 1999 provide guidance on the nature of the development and the requirements for application and assessment.

As part of the planning process for the proposed development, environment and heritage assessments of the site have been undertaken by Department of Primary Industries, Water and Environment staff. They have been used in the preparation of this document.
Precise boundary of the Controlled Visitor Access Zone - Stage 2

Termination of road access and provision of vehicle turnaround and parking

Viewing platform

Boundaries of the Controlled Visitor Access Zone set at least 10m from the Huon pine and precisely delineated to protect Reserve values.

Map 2 - Proposed Location of Vehicle Turnaround, Parking, Boardwalk and Viewing Platform
4.0 Environmental effects assessment and management response

A detailed description of the natural and cultural environment is provided in the LJNRMP 1999. This section presents an assessment of possible effects of the development on reserve values and the proposed management responses to avoid or mitigate these effects.

4.1 Climate

The reserve is characterized by cool temperatures. Rainfall averages 3300mm per annum and snow falls occur above the 600m level.

Environmental effects
Due to high rainfall soils in the area are susceptible to erosion if disturbed. Erosion along roadside drainage lines could serve as a vector for the spread of plant disease.

Management response
Construction works and maintenance will only be undertaken when the track and drains are dry.

Workers will not be permitted on site during weather conditions which in the opinion of the District Manager or Senior Ranger, make difficult the observance or enforcement of plant hygiene requirements.

4.2 Landforms, geology and soils

The geology of the area comprises of a wide belt of Cambrian volcanic and similar rocks known as the Mt Read volcanics.

The volcanic rock is typically covered by a high organic peat layer which is rarely more than 500mm deep.

Environmental effects
While the peat is resistant to erosion once lost it is not readily replaced and subsequently the underlying substrate frequently becomes eroded.

Management response
The boundary of the Controlled Visitor Access Zone is set at least 10 m from any significant geological features.

The proposed boardwalking rests on small support posts which require minimal excavation (Figures 1 and 2, Pictures 1 and 2). The viewing platform has been engineered to minimise the number of foundation posts (Figure 3). Therefore there will be negligible disturbance to the peat soils.

4.3 Natural landscapes and water quality

Lake Johnston Nature Reserve contains large relatively undisturbed areas with topographic and catchment integrity where natural processes continue largely unmodified by human intervention.

The Reserve has been assessed as an indicative area of National Estate significance as a natural landscape (Tasmanian Public Land Use Commission, 1997).

Environmental effects
Water quality objectives for the reserve are still to be set by the Board of Environmental Management and Pollution and the Director.
Because of its values as a natural landscape, the reserve has important scenic values which must be maintained.

**Management response**

A combination of Tasmanian duckboarding and raised plank boardwalking (see Figures 2 and 3) has been identified as the most suitable walkway for this remote and sensitive area. At the most it will be 600mm wide, constructed close to the ground and well integrated into the landscape. It will weave through the vegetation and at no point protrude above the skyline.

A raised crossing over a small water course will ensure no interference with water quality and drainage patterns.

**4.4 Flora**

The reserve contains ten rainforest communities currently either unreserved or poorly represented in the existing reserve system (Bacon, 1992) and which are considered to be of biogeographic significance in terms of their species composition, biodiversity and structural forms.

At least 7 of the Tasmanian endemic pine species occur in the Reserve. The area lies within the biggest single patch of deciduous beech *Nothofagus gunnii* in Tasmania. The extensiveness of the stands of intermediate pine *Athrotaxis laxifolia* in the area is also important.

The reserve contains two disjunct but genetically identical subalpine patches of Huon pine *Lagarostrobos franklinii*. Genetic studies indicate the pines which occur at elevations of up to 1000 metres above sea level have reproduced vegetatively and may be derived from one or a few single individuals which may have been present on the site over 10 000 years ago.

**Environmental effects**

The occurrence of unique and rare species and assemblages are considered globally significant. Threats to their viability include direct human impacts, fire, exotic flora and plant disease.

Approximately 30% of the Reserve and adjacent area has been damaged by bush fires since white settlement. All rainforest and alpine communities are extremely sensitive to fire. Further burning of disturbed sites may lead to local extinction of species and communities.

There is some evidence of introduced flora along roadsides leading to the Reserve. These include varieties of thistles, burrs and pampas.

The introduction of *Phytophthora cinnamomi* is generally not likely to be a significant pathogen in the reserve because of its elevation. Some nearby, lower altitude areas already have *Phytophthora cinnamomi*. Therefore the threat to the reserve could become an issue if the higher end predictions of global warming provide suitable conditions for the pathogen.

**Management response**

The track and viewing platform have been sited so as to avoid any unnecessary interference with the existing environmental qualities of the site. The specific route of the walkway
Timber planks

- Fasten planks to supports with nails and no. 8 galvanized wire
- Place bearers as often as necessary
- Bearers may be fastened to pegs with nails
- Chicken wire along entire length

Picture 1 RAISED PLANK BOARDWALKING – Overland Track
Cradle Mountain – Lake St Clair National Park
Figure 2  TASMANIAN DUCKBOARDING – scale drawing

Picture 2  TASMANIAN DUCKBOARDING – Mt Field National Park
has been chosen on specialist botanical advice in order to avoid significant and unique vegetation (Map 2).

A defined elevated walking track will alleviate the risk of erosion, disease spread or trampling over a wider non-defined area.

Interference with plant root systems will be limited due to the proposed boardwalking that rests on small support posts which require limited excavation.

The boardwalk will be constructed from the vehicle parking area out so as to avoid trampling of vegetation during the construction phase.

Track materials will be airlifted on site and stockpiled at already degraded sites to avoid damage to vegetation.

Vehicle access will remain on the existing four wheel drive track and will terminate in a turnaround area located at an already disturbed and degraded site.

Workers will not be permitted on site during periods of high fire danger. In addition the use of machinery which produce sparks, such as chainsaws, will not be permitted when the relative humidity is less than 40% and the fire danger rating for the relevant fuel type is 20.

Workers will not be permitted to light fires or smoke within the Reserve.

All vehicles entering the Reserve will be fitted with a fire extinguisher.

No foreign soil will be imported to the area.

All material, tools, and machinery will be thoroughly washed down. Visitors to the site will wear sterile footwear at all times.

A monitoring program will be established on completion of the project to ensure the immediate identification and removal of exotic species. Control measures will be in accordance with the Parks and Wildlife Service Weed Manual 1988.

4.5 Fauna

The Lake Johnston Nature Reserve Management Plan 1999 includes appendices of vertebrates and invertebrates known to be present within the area.

There are no recorded rare or threatened species within the reserve. However, a comprehensive fauna survey of the entire Reserve has not yet been carried out.

*Environmental effects*

Until such time as a comprehensive fauna survey is undertaken any modification of habitat should err on the side of caution.

*Management response*

The track and viewing platform have been sited so as to minimise harmful impacts on indigenous fauna. All construction will maintain a 20 metre buffer from the Huon pine canopy.

The quick and easy installation of raised plank boardwalking, where
appropriate, will ensure minimal site disturbance and a shorter interference time with fauna.

Prefabrication off-site where possible will assist in quick installation.

4.6 Aboriginal heritage

Aboriginal Heritage has been identified within 5 kilometres of the Reserve. The available evidence suggests that the use of the area would have been intermittent.

Environmental effects
An Aboriginal heritage assessment of the proposed walkway has been undertaken as part of the preparation for this site plan. No immediate evidence of Aboriginal Heritage was apparent.

As yet, there has not been a reserve wide, detailed, systematic investigation of Aboriginal Heritage.

Management response
Aboriginal Heritage values will be protected under the Aboriginal Relics Act 1975.

Construction work will cease if any sub-surface indicators of Aboriginal heritage are located. Work will only resume after consultation with an authorised Aboriginal Heritage Officer.

Sites identified by the Officer will not be indicated in any plan or signage. The boardwalk will not be built within the vicinity of any sites that are identified.

Likely interference with Aboriginal Heritage is minimal given that the proposed combination of Tasmanian duckboarding and raised plank boardwalking rests on a frame. Its occasional small support posts are driven into the ground with a sledge hammer. Excavation is not required.

4.7 Historic heritage

The general area including the Reserve has been subject to mineral exploration since the 1890s.

Environmental effects
A survey of historic records has revealed only one example of historic heritage within the bounds of the Reserve. It is known to be the Mt Read boundary marker, a Huon pine tree blazed on three sides probably marking the corner of a mining lease.

This marker is not located within the Controlled Visitor Access Zone.

Management response
As part of this plan a closer survey of the proposed walkway has been undertaken. There is no evidence of historic heritage.

Construction work will cease if any sub-surface indicators of historic heritage are located. The representative examples of historic heritage will remain in situ and work will only resume after consultation with an authorised Heritage Officer.

4.8 Visitation

Although there are no accurate records of the site’s usage, foot tracks throughout the Reserve indicate
significant past visitation and some present illegal visitation.

The Management Plan allows licenced tours into the reserve. A niche market of eco-tourists with a scientific interest are likely visitors to partake in licenced tours of the area. In the longer term, and at full capacity for the first five years, a maximum 1400 tour group visitors will be provided for annually.

Environmental effects
Despite a restricted general right of access illegal visitation is evident. There are foot tracks leading to the Huon pines and Lake Johnston. On occasions litter has been found along the vehicle track within the reserve.

Management response
A defined elevated boardwalk and viewing platform will alleviate trampling over a wider non-defined area.

The licenced tour operator and any tour staff will be required to strictly supervise tour clients to ensure compliance with regulations. Any failure to do so which could compromise reserve values will result in cancellation of the licence

5.0 Development detail
The development set out in this site plan will commence immediately approval is received. Funding for the project has been secured and must be expended by the end of the 2002 calendar year.

A construction timetable has been prepared setting out intended commencement and completion dates for major components of the work.

5.1 Vehicle track, turnaround and parking
The existing vehicle track will be repaired to a stable four wheel drive vehicle track. It will terminate at a turnaround and parking area located at an all ready disturbed and degraded site (Picture 3).

Management response
The track surface, side drains and culverts will be formed to ensure that drainage from the road is directed to the western side of the road. This will require some reshaping of the existing formation and construction of low road side berms on the eastern side of the track.

All works will be in accordance with plant pathogen hygiene protocols of DPIWE.

5.2 Siting of boardwalk
The Western District of the Parks and Wildlife Service will be responsible for the proposed boardwalk development.

The final siting of the boardwalk has taken place on site under appropriate professional supervision from the Resource Management and Conservation Division of DPIWE and with direct involvement of scientists. Alternative routes for the boardwalk have been considered on site.

Alternatives, although more direct in their approach to the viewing area, would require expensive construction on steep slopes with considerable excavation and elevation (Appendix 1). It was considered that these options were
not in keeping with the principles and policies of the LJNRMP 1999.

Management response
Map 2 shows the route proposed for the boardwalk. All construction activity will be kept within the precisely located Controlled Visitor Access Zone.

Access to and from the site will be via the existing road.

The favoured Tasmanian duckboarding and raised plank boardwalk will begin at the vehicle turnaround and parking area and follow the contour west south west 200 metres to a viewing platform located at a lookout above and at least 20 metres away from the Huon pine trees (Picture 4).

70 metres along the walkway the boardwalk will cross the unnamed creek via a small foot bridge. It is anticipated that steps may be required to make this traverse.

The walkway will weave through vegetation including Bauera (*Bauera rubioides*), Scoparia (*Richea scoparia*), Pineapple grass (*Astelia alpina*) and Waratah (*Telopea truncata*). An unusual hybrid *Richea curtisii* was noted by the botanist during the site assessment. The boardwalk route avoids this species.

The Aboriginal and Historic surveys also confirm that the boardwalk will not traverse features of significance.

Impacts to fauna habitat have been minimised by restricting the walkway where possible to already disturbed foot tracks.

Construction waste will be removed from the site on a daily basis.
A portable toilet will be provided on site for all workers involved in the project.

5.3 Boardwalk and viewing platform design

Requirements for the structural design of the proposed boardwalk have been taken from the Australian Standard™ on Walking Tracks (AS 2156.1-2001 and AS 2156.2-2001). The design criteria have taken into account factors such as the location, expected use and type of recreational opportunity.

The boardwalk and viewing platform for Lake Johnston Nature Reserve will be a class 3 walking track.

Work carried out for the provision of the boardwalk will be in accordance with the criteria set out in the Australian Standard™.

Repair, maintenance and emergency works associated with the infrastructure will also be carried out in accordance with the Standard™.

More specifically

The boardwalk:

Raised horizontal plank boardwalking and Tasmanian duckboarding have been identified as the most suitable styles of walkway for the Reserve.
The raised plank technique has been used with success in many remote locations including Cradle Mountain – Lake St Clair National Park (Picture 1). Raised double planks are an effective way of traversing, soft wet remote areas. The treated pine planks strung across the ground on timber support frames have small occasional posts which do not require excavation.

Tasmanian duckboarding will be combined with the raised plank boardwalking where necessary. This form of boardwalking allows for curves to be included in the design to better fit the structure to the landscape.

Both provide total protection to the soil and flora (Department of Lands Parks and Wildlife and Australian National Parks and Wildlife Service 1987, 701.4 and 701.5). The ongoing user impacts are considered minimal and are limited to construction activities and support post installation.

The viewing platform:

The viewing platform will be engineered to minimise the number of foundation posts (Figure 3). It will comply with Part 2 of the Australian Standard™ on walking track infrastructure (AS – 2156.2) and will be prefabricated and reassembled on site. This will eliminate the need for on site sawing, drilling and production of waste.

A viewing area of 8m² has been allowed to accommodate one group of 8 people at once on the platform. This exceeds space requirements of the Building Code of Australia for public viewing areas, making it large enough to accommodate entire tour groups at once to reduce the temptation to leave the boardwalk.

The boardwalk and viewing platform terminates at a rocky knoll which offers a unique opportunity to view the Huon pines yet maintaining a 20m buffer.
Picture 3  TURNING CIRCLE – proposed site

Picture 4  VIEWING PLATFORM LOOKOUT – proposed site
Figure 3  VIEWING PLATFORM – scale drawing

Plan

**Platform 1 - 3.6m x 2.4m**

**SKETCH PLAN - LAKE JOHNSTON VIEWING PLATFORM**

not for construction purposes
References


Appendix 1 - Lake Johnston Nature Reserve
Controlled Visitor Access Zone
Options Considered for Siting of Boardwalk

Precise boundary of the
Controlled Visitor Access Zone - Stage 2

Option 1
flat boardwalk

Option 2
staircase

Option 3
graded track across the hill
Lake Johnston Nature Reserve Controlled Visitor Access Zone - options considered for siting of boardwalk.

This paper details options for the development of a walking track to view the Huon Pine grove at Lake Johnston. It has been undertaken after a basic on-site visit to the area with Ranger staff Wayne Dick and Krissy Ward.

The proposal is based on the desire to provide a Class 3 (Australian Standard 2156.1/2) track for visiting walkers and commercial clients. The site makes it extremely difficult to stay within prescriptions of Class 3 for all options and consequently the upgrading of the track class is likely to be required for two of the options. This will have an added consequence of the need for higher levels of maintenance should those options be implemented.

Costs provided are nominal at this stage and will require further refinement when the final decision on which route is to be completed.

Estimates do not include transport of materials, airlift to site or any interpretation.

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<tr>
<th>Technique</th>
<th>Cost</th>
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<td>450mm Treated Pine Double Planking, with chicken wire, 200x38 tread and sleepers</td>
<td>$35 per metre</td>
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<td>600mm Treated Pine duckboard, 25mm thick tread, 150X50 bearers, with chicken wire</td>
<td>$60 per metre</td>
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<tr>
<td>900mm Treated Pine duckboard, 50mm thick tread, 150x50 bearers, with chicken wire</td>
<td>$75 per metre</td>
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<td>900mm stairway, Treated Pine, 50mm thick tread</td>
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<td>600mm wide bridge, single span – 3 metres, no handrails</td>
<td>$240 each</td>
</tr>
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<td>900mm wide bridge, single span – 3 metres, no handrails</td>
<td>$300 each</td>
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<tr>
<td>Viewing platform – Type C handrails - per square metre</td>
<td>$450 per square metre</td>
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<td>Type A and B Handrails</td>
<td>$100 per metre</td>
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<tr>
<td>Type C Handrails</td>
<td>$70 per metre</td>
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Recommendation

After consideration of all the issues outlined in the management plan, Option 1 is the only track that does not require extensive clearing of vegetation. It can be installed with the absolute minimum of ground disturbance and uses the least intrusive track construction techniques whilst protecting values at the site. Options two and three would both require more clearing of vegetation, significantly more ground disturbance and a higher degree of track engineering to resolve problems on steep grades. The level of infrastructure and future maintenance requirements are also considered excessive given expected use of the area.
Option 1 - Total of approximately 195 metres – Class 3, AS2156

Northern, low key, sidle track (less than 8° track slope, < 8° side slope) from existing road, creek crossing and sidling (less than 8° track slope, < 8° side slope) to elevated viewpoint.

Estimated as follows

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<thead>
<tr>
<th>Length</th>
<th>Description</th>
<th>Cost</th>
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<tr>
<td>30 metres</td>
<td>450mm wide Double Planking with chicken wire mesh to reduce risk of slippage</td>
<td>$1050</td>
</tr>
<tr>
<td>3 metre</td>
<td>600mm wide Low key elevated bridge</td>
<td>$240</td>
</tr>
<tr>
<td>165 metres</td>
<td>600mm wide elevated boardwalk with chicken wire to reduce risk of slippage</td>
<td>$9900</td>
</tr>
<tr>
<td>10m²</td>
<td>elevated viewing deck with Type C or better handrails</td>
<td>$4500</td>
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<td><strong>Total</strong></td>
<td><strong>$15,690</strong></td>
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**Option 2 – Total approximately 140 metres – Class 2 and 3, AS2156**

Sidle from road (less than $8^\circ$ track slope, $< 8^\circ$ side slope), direct stairway descent ($30^\circ$ track slope), creek crossing and sidling (less than $8^\circ$ track slope, $< 8^\circ$ side slope) to elevated viewpoint.

The sidle from the road would need to be 900mm wide to match the stairway descent.

The descent to the creek poses some difficulties in that over 20 metres of vertical height needs to be lost in a very short space of time. With 150mm risers on the stairs a minimum of 133 steps would be required with at least three landings on the way down. By the Australian Standard, the maximum number of steps allowed is 36 before a landing of 900mm. For the steepness of the site it would be unwise to make the treads any less than 900mm width with handrails on both sides. In effect this would equate to a Class 2 track prescription, which would then need to comply to the Building Code (BCA) for all stairs and handrails.

Once the creek is crossed the track could revert to Class 3 with a sidle to an elevated viewpoint with Type C or better handrails.

| 50 metres | 900mm wide elevated boardwalk with chicken wire to reduce risk of slippage | $3750 |
| 30 metres | 900mm wide stairway with intermediate landings | $2700 |
| 60 metres | Type A handrails to BCA (both sides) | $6000 |
| 3 metre | 600mm Low key elevated bridge | $240 |
| 60 metres | 600mm wide elevated boardwalk with chicken wire to reduce risk of slippage | $3600 |
| 10m$^2$ | elevated viewing deck with Type C or better handrails | $4500 |

**Total** | **$20790** |
Option 3 – Total approximately 195 metres – Class 2 and 3, AS2156

Sidle across contour from carpark (less than 8° track slope, > 20° side slope), switchback and sidle across contour to creek (less than 8° track slope, > 20° side slope), creek crossing and sidling (less than 8° track slope, < 8° side slope) to elevated viewpoint.

This track sidles south from the carpark, switches back and sidles to the creek crossing before joining the low key sidle to the elevated viewpoint. Once again it is difficult to contemplate a 600mm wide walkway on a > 20° side slope, so it is suggested that the minimum tread width be 900mm. With this type of sideslope the fall height would also be in excess of 2 metres and handrails would be required along the entire sidle. In effect this would then equate to a Class 2 track prescription, which would then need to comply to the Building Code (BCA) for all handrails.

Once the creek is crossed the track could revert to Class 3 with a sidle to an elevated viewpoint.

<table>
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<tr>
<th>Length (m)</th>
<th>Description</th>
<th>Cost (Aus$)</th>
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<tr>
<td>145</td>
<td>900mm wide elevated boardwalk with chicken wire to reduce risk of slippage</td>
<td>$10,875</td>
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<tr>
<td>145</td>
<td>Type A or B handrails (fall side only)</td>
<td>$14,500</td>
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<td>70</td>
<td>900mm wide elevated boardwalk with chicken wire to reduce risk of slippage</td>
<td>$5,250</td>
</tr>
<tr>
<td>70</td>
<td>Type A or B handrails (fall side only)</td>
<td>$7,000</td>
</tr>
<tr>
<td>50</td>
<td>600mm wide elevated boardwalk with chicken wire to reduce risk of slippage</td>
<td>$3,000</td>
</tr>
<tr>
<td>3</td>
<td>Low key elevated bridge</td>
<td>$240</td>
</tr>
<tr>
<td>10m²</td>
<td>Elevated viewing deck with Type C or better handrails</td>
<td>$4,500</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>$45,365</strong></td>
</tr>
</tbody>
</table>