

SNZ HB 8630:2004



New Zealand Handbook

Tracks and Outdoor Visitor Structures

SNZ HB 8630:2004



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COMMITTEE REPRESENTATION

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Tracks and Outdoor Visitor Structures

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RELATED DOCUMENTS

Reference is made in this document to the following:

NEW ZEALAND STANDARDS

NZS 3109:1997	Concrete construction
NZS 3602:2003	Timber and wood-based products for use in building
NZS 3604:1999	Timber framed buildings
NZS 3605:2001	Timber piles and poles for use in building
NZS 3640:2003	Chemical preservation of round and sawn timber
NZS 4121:2001	Design for access and mobility – Buildings and associated facilities
NZS 4203:1992	General structural design and design loadings for buildings
NZS 4210:2001	Masonry construction – Materials and workmanship
NZS 8690:2003	Water safety signage

JOINT AUSTRALIAN/NEW ZEALAND STANDARDS

AS/NZS 2312: 2002	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS 3750.15:1999	Paints for steel structures – Inorganic zinc silicate paint
AS/NZS 4360:1999	Risk management

AUSTRALIAN STANDARDS

AS 2319:2001	Rigging screws and turnbuckles
AS 2321:2001	Short-link chain for lifting purposes
AS 2741:2002	Shackles
AS 2841:1986	Galvanized steel wire strand

OTHER STANDARD

DIN 1480:1975	Turn buckles, forged (open types)
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OTHER PUBLICATIONS

Auckland City Council	'Guidelines for the Design of Outdoor Visitor Structures' clause ACC D1, Access Routes, structures Geometry D1.7.1
Building Industry Authority	The New Zealand Building Code Handbook and Approved Documents
Department of Conservation	Visitor Strategy 1996
RR C 271B	US Federal Specification (for Shackles)
FF C 450	US Federal Specification (for Rope Grips)

NEW ZEALAND LEGISLATION

Building Act 1991 and Building Regulations 1992

Chartered Professional Engineers of New Zealand Act 2002

Health and Safety in Employment Act 1992

Latest revisions

The users of this Handbook should ensure that their copies of the above-mentioned New Zealand Standards and referenced overseas Standards are the latest revisions or include the latest amendments. Such amendments are listed in the annual Standards New Zealand Catalogue, which is supplemented by lists contained in the monthly magazine *Standards Update*, issued free of charge to committee and subscribing members of Standards New Zealand.

FOREWORD

This document provides specifications for the design, construction, and maintenance of tracks and outdoor visitor structures. It is aimed at encouraging consistent standards for tracks and outdoor visitor structures New Zealand-wide. Application of these specifications will ensure that tracks and outdoor visitor structures provide the right level of service to meet track users' recreation and safety needs, and will help protect the facilities and the environment from damage.

Tracks enable visitors to access and experience natural areas and the design of a track should enhance this experience. These specifications identify six predominant users of tracks and these user groups define the six main categories of track. These specifications and accompanying information will provide track users with clear and consistent expectations of the level of service provided on tracks and outdoor visitor structures.

Following the adoption of these specifications, those responsible for the management of tracks and outdoor visitor structures will need to address the following:

- (a) The identification of distinct and current, predominant track user groups;
- (b) The organization's current track classifications;
- (c) A gap analysis between the expectations of the organization's predominant track users and track classes currently provided. The results of this analysis should be confirmed or adjusted by survey/consultation of track users and the organization's key stakeholders;
- (d) The alignment of any existing track classification system with these specifications;
- (e) Communicating the specifications to stakeholder organizations and the public; and
- (f) Developing technical prescriptions covering track development and maintenance.

All existing tracks will need to be assessed in accordance with these specifications. If a track does not meet these specifications, a number of options will need to be considered. These options include:

- (a) Determining whether a more appropriate visitor/user group should apply to the track;
- (b) Upgrading the track to meet the specifications; or
- (c) Downgrading the track to better align with user needs.

Background

In the 1970s the Department of Lands and Survey prepared a guide to the construction and maintenance of tracks for the New Zealand Walkway Commission. In 1992 the Department of Conservation (DOC) and the Hillary Commission reviewed the Walkway Commission standards and published 'A Track Classification for Walkways and other Foot Tracks in New Zealand'. This guideline became the de-facto standard for tracks in New Zealand and was adopted by many agencies as a standard for tracks.

In 1996, DOC published its 'Visitor Strategy' for the management of recreational opportunities on the protected areas it manages. This strategy outlined the goals and directions for the management of recreation facilities and services that are a key part of most recreational opportunities. As part of the strategy, the department profiled seven key visitor groups (or customers) and the level of service required to meet their recreation needs. To ensure that the appropriate level of service is provided, DOC has developed facility (track, hut, structure etc.) standards appropriate for each visitor group. The

department's track standards (1998) were developed in consultation with interested community and user groups, and the structure standards (1997) in consultation with the engineering industry. DOC has subsequently used its standards to assess the condition of its tracks and structures throughout the country.

In 2000, the Auckland Regional Council (ARC) produced a track standard for its regional parks closely aligned to the DOC standards with the aim of providing consistent standards for visitors in Auckland. In 2001, the Auckland City Council (ACC) also based its track standards for its park and reserve areas on those of DOC. Both the ARC and ACC have referred to the same user group profiles used by DOC. These profiles have helped each agency define the distinct levels of service that it will provide. The ACC has an additional track user group; those visitors who use tracks in urban park settings. This Handbook incorporates the Department of Conservation, Auckland Regional Council and Auckland City Council standards to provide comprehensive specifications for all agencies involved in the management of tracks and outdoor visitor structures.

The visitor/user groups are described briefly in table 1 and more fully in Appendix A.

Review of Handbook

Suggestions for improvement of this Handbook will be welcomed. They should be sent to the Chief Executive, Standards New Zealand, Private Bag 2439, Wellington 6020.

NEW ZEALAND HANDBOOK

TRACKS AND OUTDOOR VISITOR STRUCTURES

1 Introduction

1.1 Scope

This document provides performance specifications for tracks and outdoor visitor structures and provides a consistent framework for those responsible for the design, construction, maintenance and/or management of tracks and outdoor visitor structures. Also covered are the basic requirements for on-site or off-site information concerning tracks and their current condition. Roadend/roadside facilities such as toilets and carparks, and backcountry accommodation are not included within the scope of this Handbook.

The Handbook provides specifications for tracks suitable for use by cyclists/mountain-bikers and walkers, but it does not include tracks that are designed and constructed specifically for mountain-biking.

1.2 Application

This Handbook shall apply to the tracks provided by the Central Government (Department of Conservation), District and City Councils, some Regional Councils (e.g. Auckland and Wellington), private track owners and voluntary groups. This Handbook shall apply to tracks provided in areas such as the following:

- (a) National, forest and regional parks;
- (b) Local authority managed parks and reserves;
- (c) Department of Conservation managed reserves and conservation areas;
- (d) Historic places; and
- (e) Walkways and easements across private land.

1.3 Definitions

For the purposes of this Handbook, the definitions in the New Zealand Building Code (NZBC) and the following shall apply.

ACCESSIBLE. Having features that permit use by people with disabilities.

ACCESSIBLE ROUTE. A continuous route that can be negotiated unaided by a wheelchair user from the street boundary or car park.

ACCESS STRUCTURE. A structure which provides access from one place to another and on which it is not expected that persons will stop and congregate for viewing.

ACCESS WIDTH. The clear width of deck available to the user of a structure.

ANCILLARY BUILDING. Applies to a building or structure not intended for human habitation and which may be exempted from some amenity provisions, but required to comply with structural and safety-related aspects of the NZBC. Examples include a bridge, derrick, fence, free standing outdoor fireplace, jetty, mast, path, platform, pylon, retaining wall, tank, tunnel or dam.

BARRIER. A handrail that is positioned to prevent injury from falling.

BENCHING. Cutting into a slope to create a flat surface on which to walk.

BOARDWALK. A pedestrian bridge with an effective fall height of not more than 3.0 m, and spans not greater than 2.5 m.

BRIDGED. Watercourse with a bridge or culvert built across it.

CABLEWAY. A bridge having a cage or harness, which runs on a cable, for transportation of goods or persons.

CABLE STRUCTURE. A structure consisting of a suspension bridge, wire crossing or cableway.

CHARTERED ENGINEER. An engineer who is registered under the Chartered Professional Engineers of New Zealand Act 2002 and holds a current registration certificate.

CULVERT. Enclosed or open pipes, boards or drains across or under a track designed to take water off or away from the surface of a track.

DEAD LOAD. The load due to the self-weight of the structure.

DECK. The walking surface of a structure.

DEPARTMENT OF LANDS AND SURVEY. Government department responsible for the management of national parks and reserves and walkways, until it was replaced by the Department of Conservation in 1987.

DESIGN ENGINEER. Design engineer means a structural engineer who on the basis of experience and qualifications is competent to undertake the design of outdoor visitor structures.

EASY TRAMPING TRACK. Track catering predominantly for less experienced trampers (referred to by DOC as Back Country Comfort Seekers). For DOC, these tracks currently are:

Whirinaki/Okahu (Whirinaki Forest Park), Te Puia (Kaweka Forest Park), Pouakai Circuit, Queen Charlotte, Travers, Sabine/Speargrass, St James, Mt Somers, Lake Daniells, Copland Valley/Welcome Flat, West Matukituki, Rees/Dart, Caples, Greenstone, South Coast-Port Craig, Hollyford.

EFFECTIVE FALL HEIGHT (H_e). The fall height, H_f , plus the fall surface adjustment value. A calculated value as determined by 3.20, taking into account fall height (H_f) and the fall surface.

EVEN FOOTING. Where the foot can be placed flat somewhere on the track surface.

FALL HEIGHT. The fall height, H_f , is the greatest potential height from which a person may fall from a structure, measured at no more than a distance L_f from the position on the structure being assessed.

FOUNDATIONS. The part of the structure that transfers the load to the ground.

GALLERY/GANTRY. A pedestrian bridge constructed on a very steep, vertical or overhanging surface. Types include the following:

- (a) Cantilevered – supported from below.
- (b) Suspended – suspended from above.

GRAB RAIL. A handrail that is provided for support on steps and stairs.

GREAT WALKS. The great walks are tracks managed by DOC and are: Milford, Routeburn, Rakiura, Kepler, Abel Tasman Coast, Heaphy, Tongariro Northern Circuit and Waikaremoana.

GUARDRAIL. A handrail that is positioned to stop access to hazardous areas.

LADDER. A structure with treads or rungs, and with or without stiles or handrails, greater than 60° pitch.

LANDING. An access structure consisting of a level area used to provide access to a stairway or ladder, or located at an intermediate level in a system of stairways, ramps or ladders.

LIGHT MAINTENANCE VEHICLE. A vehicle or combination of vehicles having a gross vehicle weight not exceeding 7.2 kN consisting of 3 axle loads of 2.4 kN each, spaced 1500 mm apart. Each axle load shall consist of two wheel loads of 1.2 kN each spaced at 500 mm centre to centre. Each wheel load shall be applied over a square not greater than 150 mm x 150 mm. Typical examples include a power carrier or a 4-wheel motorcycle towing a trailer.

LIVE LOAD. The load imposed on the structure by users.

MAJOR WATERCOURSE. A stream or river that in normal flow is 0.5 m or deeper at the point where the track has to cross it.

MARKER. The markings used to define the course or route of a track. Markers are usually used where the route is not obviously created by the formation of the track on the ground, e.g. where benching has been used or a hardened surface applied. In forested areas markers are usually fixed to trees, while in open country (e.g. tussock or farmland), posts or piles of rocks may be used to define the route. Types of markers include:

- (a) Poles/posts;
- (b) Cairns (piles of rocks);
- (c) Plastic triangles (Department of Conservation standard);
- (d) Permolate (venetian blind);
- (e) Blaze (cut made in bark of tree) – not recommended.

MINOR WATERCOURSE. A stream or river that in normal flow is less than 0.5 m deep at the point where the track has to cross it.

NEW ZEALAND WALKWAY COMMISSION. Body established under the Walkways Act 1975 to administer the management of walkways. The commission's duties are now undertaken by the New Zealand Conservation Authority.

OUTBUILDING. Defined in the NZ Building Code as applying to a building not intended for human habitation and that is an accessory to the principal use of the associated buildings. Examples are carports, garden sheds, toilets and garages.

OUTDOOR VISITOR STRUCTURES. Temporary or permanent structures not intended for human habitation consisting of the following types:

- (a) Viewing platforms;
- (b) Pedestrian bridges, galleries/gantries and boardwalks;
- (c) Ladders, stairways and ramps;
- (d) Cableways.

Outdoor visitor structures are buildings not intended for human habitation as they are always open to the elements (i.e. have no walls or roofs) and do not have any services or equipment. Although exempted from some amenity provisions, they are required to comply with structural and safety related aspects of the Building Code.

NOTE – Outdoor Visitor Structures shall be classified as Category IV as specified in NZS 4203.

PEDESTRIAN BRIDGE. An access structure for pedestrians. Light maintenance vehicles may use the bridge provided the bridge has been designed to carry their load.

PREDOMINANT VISITOR GROUP/USER GROUP. Generally defined as the visitor/user group with the highest numbers using the track, but will be the visitor/user group with the lowest level of backcountry walking experience/skill if that group is present in significant numbers.

RAISED. Track formation where hardfill is used to raise the track surface above the surrounding ground.

RAMP. A sloping artificial structure to permit access, having no risers and a gradient between 0° and 18° (1 in 3).

RECREATION OPPORTUNITY SPECTRUM (ROS). A classification system that describes the recreational opportunities and settings available on all land along a continuum of eight categories from urban to wilderness.

RESTRICTED LOAD STRUCTURE. A structure designed to carry a restricted load, normally expressed as a number of people. The load restriction is indicated by signs. Restricted loads may be used for the design of cable structures only and for the assessment of existing structures.

REVIEWING ENGINEER. The design engineer or a person nominated by the design engineer who on the basis of experience and qualifications is competent to undertake the construction review of outdoor visitor structures.

SAFE CROSSING. The place where a user can safely cross a stream, river or other watercourse without assistance. The ability to make a safe crossing is determined by assessing the:

- (a) Likely experience of the majority of visitors attempting the crossing;
- (b) Murkiness of the water;
- (c) Depth of the water;
- (d) Swiftiness of the current;
- (e) Nature of the bed (even, slippery or rocky, etc);
- (f) Presence of obstacles/barriers (such as logs, steep river banks);
- (g) Run-out.

SERIOUS HARM. Serious harm is defined using the relevant parts of the First Schedule of the Health and Safety in Employment Act 1992. Serious harm for the purposes of this document is:

- (a) Any of the following conditions that amounts to or results in permanent loss of bodily function, or temporary severe loss of bodily function: penetrating wound of eye, bone fracture, laceration, crushing;
- (b) Loss of consciousness from lack of oxygen;
- (c) Loss of consciousness, (or acute illness requiring treatment by a registered medical practitioner), from absorption, inhalation, or ingestion of any substance;
- (d) Any harm that causes the person harmed to be hospitalized for a period of 48 hours or more commencing within seven days of the harm's occurrence.

SIGNIFICANT HAZARD. A situation where in a given year one or more visitors has a high likelihood of dying or sustaining serious harm. Factors to be considered in assessing whether, in the case of a fall from the track, the hazard is significant, and death or serious harm could occur are:

- (a) Height of fall;
- (b) Secondary consequences of a fall (e.g. being swept away in a river);
- (c) Width of track (e.g. a 2 m wide track will be less hazardous than a 0.3 m wide one);
- (d) Track conditions (e.g. even, slippery or rough surface); or
- (e) Presence of hidden hazards (e.g. proximity to undercut riverbank).

STAIRWAY. A structure with an artificial suspended stepped walking surface, and a gradient between 18° and 47°.

STRUCTURE HEIGHT. The measurement from deck level to the ground at the position being assessed.

SUSPENSION BRIDGE. A pedestrian bridge having cables as its primary structural elements.

TRACK. An access way on the ground, with or without an overlaid surface. A track provides a relatively clear or obvious path/route for the user to follow. Each track is designed and maintained to meet the specific access/walking needs of a particular visitor/user group.

TRACK SURFACE WIDTH. In locations where the track surface is rough and uneven, the width of walking surface within the track formation on which inexperienced trampers can safely place their feet.

VIEWING PLATFORM. A structure built primarily to allow persons to stop and congregate for viewing.

VISITOR GROUP/USER GROUP. Groups of visitors/users as defined in Appendix A. The visitor/user group identifies the profile of the places each group visits, the nature of the visit, the activities undertaken and the experience sought.

WALKING DISTANCE. The length of the track or section of track between two significant places, expressed in metres or kilometres.

WALKING TIME. Is expressed in hours and minutes. It is based on the estimated time it would take a person of average fitness from the predominant visitor group to walk between the two points in normal weather conditions.

WINDFALL(S). Trees and branches blown over by the wind and blocking the track.

WIRE CROSSING. A pedestrian bridge having cables only for foot and hand holds.

1.4 Symbols

For the purposes of this document, the symbols in NZS 4203 and the following apply:

- A_r Area over which a restricted load is applied.
- C_c Coefficient for building category.
- C_e Coefficient for building exposure.
- C_r Coefficient for roof slope.
- H_e Effective fall height.
- H_f Measured fall height.

H_{fs}	Impact surface adjustment value.
H_s	The structure height at the point of being assessed.
K_{ff}	Consequence of failure factor.
K_{vg}	Visitor group factor.
L_f	Distance from edge of structure to point from which H_f is measured.
Q	Factored live load for the ultimate limit state.
Q_b	Basic live load for the ultimate limit state.
Q_l	Lateral load to be applied to a structure.
Q_r	The total design live load on a restricted load structure.
S	Basic snow load.
S_g	Open ground snow level.
ψ_a	Area reduction factor.
ψ_s	Short-term load factor.
ψ_u	Live load combination factor for the ultimate load state.

1.5 Abbreviations

BCA	Backcountry Adventurers
BCC	Backcountry Comfort Seekers
DOC	Department of Conservation
DV	Day Visitors
NZBC	New Zealand Building Code
ROS	Recreation Opportunity Spectrum
RS	Remoteness Seekers
SST	Short Stop Travellers
UR	Urban Residents

1.6 Interpreting this document

For the purpose of this document, the word 'shall' refers to the practices that are mandatory for compliance with this document. The words 'should' or 'may' refer to practices that are advised or recommended.

Notes to tables form part of the requirements of this document whereas notes elsewhere are for information and guidance only.

Clauses prefixed by 'C' and printed in italic type are intended as comments on the corresponding clauses. They are not to be taken as the only or complete interpretation of the corresponding clause nor should they be used for determining in any way the mandatory requirements for compliance with this specification.

The appendix described as 'normative' contains requirements, whereas an 'informative' appendix provides additional details, background information and explanation related to the contents.

2 Tracks

2.1 Establishing the Visitor/User Group

When planning for the development of new tracks and the upgrade and maintenance of existing tracks, it is important to identify who the primary users (visitor group) are and therefore the track classification that will be adhered to. Six 'visitor groups' or user groups act as key drivers for the type of track to be developed as listed in table 1. DOC uses the phrase 'visitor group' to broadly define the characteristics of the users of the facilities and places it manages. Other agencies may wish to use these visitor group names, but some may find it more helpful to use the user group numbers, or their own identifier, to distinguish track users. Detailed information on visitor/user groups and corresponding track requirements is given in Appendix A. A detailed comparison of track categories is given in table 5.

Table 1 – Identifier visitor/user group	
User Group	Visitor Group (Terms used by DOC)
1	Urban Residents (UR) – Not used by DOC
2	Short Stop Travellers (SST)
3	Day Visitors (DV)
4	Backcountry Comfort Seekers (BCC)
5	Backcountry Adventurers (BCA)
6	Remoteness Seekers (RS)

2.1.1 Predominant visitor/User group

The predominant visitor/user group shall be identified for all tracks, in accordance with table 1.

NOTE –

- (1) To identify the correct category of track, the predominant track user group needs to be identified. Like other types of outdoor facilities, tracks are used by a wide range of different visitors, but it is the predominant user group that determines the track specifications. The choice of predominant group is critical as it is important that the conditions of the track are appropriate for the majority of visitors or for a significant minority of a lesser experienced visitor group.
- (2) The choice of the predominant visitor/user group is made by considering the relative numbers of each group, taking account of the numbers (if any) of the least experienced group. The most appropriate user group for any track, however, is ultimately identified through user, public and key stakeholder surveys, and long-term market research. The current condition of the site will also influence the choice of the visitor/user group.
- (3) The predominant visitor/user groups apply to most tracks all year round. On some tracks, however, winter conditions make the track unsuitable for the predominant user group (eg: BCC or DV) and the track will be managed for BCA visitors during the winter. Examples include: Milford Track, Routeburn Track, Kepler Track, Rees/Dart Track, Travers/Sabine Track and the Tongariro Northern Circuit.
- (4) Overnights do not as a group determine the requirements for tracks. For the purposes of this document the track requirements for DV shall apply to tracks managed on sites for overnights.

2.2 Classification of Tracks

Tracks shall be classified into six main categories that cater for corresponding visitor groups as set out in table 2.

Table 2 – Track categories		
Track classification	User group	Visitor group (used by DOC)
Path	1	Urban Residents (UR) – not used by DOC
Short Walk	2	Short Stop Travellers (SST)
Walking Track	3	Day Visitors (DV)
Tramping Track – Great Walk – Easy Tramping Track	4	Backcountry Comfort Seekers (BCC)
Tramping Track	5	Backcountry Adventurers (BCA)
Route	6	Remoteness Seekers (RS)

2.2.1 Naming of Tracks

Tracks shall be named in accordance with table 3, for purposes of providing visitor information.

Table 3 – Naming of Tracks		
User group	Track classification	Track name (to be used in visitor information)
1	Path	path
2	Short Walk	walk
3	Walking Track	walking track
4	Great Walk Easy Tramping Track	name of track (eg Milford Track, St James Walkway)
5	Tramping Track	track
6	Route	route
NOTE – User group numbers and visitor group names should not be used on signs or in visitor information on tracks.		

2.3 Paths

2.3.1 General

Paths shall be well formed and provide for easy walking suitable for all ages and most fitness levels. Access shall be provided on a durable surface such as concrete, chip seal, asphalt or compacted gravel. Many Paths shall cater for people with mobility difficulties or limitations (see 2.3.8) and children in mountain buggies or prams.

NOTE – Some Paths may be suitable for cyclists/mountain-bikers as well as pedestrians (see 2.3.9). They are usually located in well-populated areas and close to public amenities, and designed to meet the expectations of people who want to enjoy a particular attraction or site along or at the end of the Path, in comfort and without physical challenges (see figure 1).



Figure 1 – Path – Wellington Botanic Gardens

2.3.2 *Track formation/Geometry*

2.3.2.1 *Formation/Marking*

The Path formation shall be well defined, so that users can easily find their way in either direction in all weather and low light conditions. Markers will not usually be required. Any track markers used (other than poles) shall follow the specifications set out in Appendix B.

The whole track may be benched or raised.

2.3.2.2 *Maximum grade*

The maximum grade for a Path shall be 7° (1 in 8).

2.3.2.3 *Steps*

Steps shall be constructed to enable safe and comfortable use. All steps shall have a maximum riser height of 180 mm and a minimum tread length of 310 mm.

The maximum vertical rise between landings for all steps shall be 2.5 m. A landing is defined as a break of at least 1 m in a run of steps.

2.3.3 *Surface/Pavement*

2.3.3.1 *Walking surface width*

Paths shall have a minimum track width of 1.2 m.

NOTE – The minimum width may be reduced for environmental or aesthetic reasons for short sections provided there is a low risk to user safety. Such sections shall cover no more than 5 % of the total length of each Path.

2.3.3.2 *Track surface*

The surface of a Path shall be well formed and even and shall be made of durable material, such as concrete, chip seal or asphalt, or compacted gravel.

The track surface shall be such that it can be walked on comfortably without getting footwear wet or muddy in both dry and wet weather. The surface shall allow users to walk without having to constantly look down at where they place their feet.

The maximum height of any discontinuity on the walking surface for Paths shall be 5 mm.

2.3.4 *Structures*

2.3.4.1 *Boardwalks*

Boardwalks shall be used over wet, swampy, sandy or muddy sections to achieve a stable dry surface for visitor comfort and/or to protect the environment.

2.3.4.2 *Minimum width*

The minimum width for new access structures shall be 1.2 m.

2.3.4.3 *Bridges*

All major and minor watercourses shall be bridged.

2.3.4.4 *Ladders*

No ladders shall be used on Paths.

2.3.4.5 *Guardrails or barriers*

Where a significant hazard exists, a barrier or guardrail shall be provided. Barriers and guardrails shall extend for the full length of path along which the significant hazard exists.

C2.3.4.5

Existing guardrails or barriers will only be replaced at the end of their life if a significant hazard exists.

2.3.4.6 *Viewing platforms*

Viewing platforms may be provided in appropriate places along the path.

2.3.5 *Furniture*

2.3.5.1 *Seats and picnic tables*

Seats and picnic tables may be provided.

2.3.6 *Vegetation*

Vegetation shall be cleared from the total width of the Path formation and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface.

Windfalls blocking the Path shall be cleared within 48 hours of notification.

All cut vegetation shall be removed from the path surface and disposed of out of sight of path users.

2.3.7 *Information for visitors*

2.3.7.1 *Signage*

Paths shall be clearly signposted with directional signs at entrances and at all junctions.

Where sprays or chemicals have been or are to be used on the track, temporary signs shall be erected for an appropriate time as a warning to track users.

C2.3.7.1

An orientation/track information sign should be provided at path entrances where more than one walking option exists.

2.3.7.2 *Track condition*

The presence of any poor track condition shall be brought to the attention of visitors at visitor information centres and/or at Path entrances.

2.3.7.3 *Recommended footwear*

Paths shall be suitable for all types of walking footwear.

2.3.8 *Paths for people with mobility difficulties*

Paths may be developed or maintained to a barrier-free standard for use by people with mobility difficulties or limitations. For such Paths, the specifications in 2.3.1 to 2.3.7 above shall apply, with the following variations.

2.3.8.1 *Maximum grade*

The maximum grade shall be 5° (1 in 11.4).

2.3.8.2 *Steps*

No steps shall be used.

2.3.8.3 *Walking surface width*

The minimum width shall be 2.0 m over its entire length.

2.3.8.4 *Structures/gates*

No stiles, turnstiles or kissing gates shall be used.

2.3.8.5 *Signage*

The path shall be clearly labelled as a path for people with mobility difficulties by use of appropriate symbols and words at path entrances and at junctions with any tracks that are not paths.

2.3.9 *Paths for cyclists and pedestrians*

Some paths may be managed for both cyclists (including mountain-bikers) and pedestrians. For such paths, the requirements in 2.3.1 to 2.3.7 above shall apply, with the following variations.

2.3.9.1 *Steps*

No steps shall be used.

2.3.9.2 *Structures*

No walk-over stiles shall be used.

2.3.9.3 *Visibility on corners*

Vegetation clearance, especially on corners, shall be sufficient to allow good visibility (a 10 m minimum sight distance) for cyclists and walkers.

2.3.9.4 *Signage*

The path shall be clearly labelled as a path for pedestrians and cyclists by use of appropriate symbols and words at path entrances and at junctions with any tracks on which cycles are not permitted.

2.4 Short Walks

2.4.1 *General*

Short Walks shall be well formed and provide for up to one hour's easy walking suitable for most ages and fitness levels (See figure 2.)

NOTE – Some Short Walks may cater for people with mobility difficulties or limitations (see 2.4.8) and children in mountain-buggies and prams. Some may be suitable for cyclists/ mountain-bikers as well as pedestrians (see 2.4.9).



Figure 2 – Short Walk – Bridal Veil Falls Walk, Waikato

2.4.2 Track formation/Geometry

2.4.2.1 Formation/Marking

The track shall be well defined to allow inexperienced users to easily find their way in either direction in all weather conditions. Markers will not usually be required. Any track markers used (other than poles and cairns) shall follow the specifications set out in Appendix B.

Part or all of the track may be benched or raised.

2.4.2.2 Maximum grade

The maximum grade shall be 10° (1 in 5.7), not including steps.

NOTE – The maximum grade may increase up to (and including) 15° (1 in 3.7) over sections of track up to 50 m long, as long as these steeper sections provide firm footing in wet weather conditions. The length of track with grades between 10° (1 in 5.7) and 15° (1 in 3.7) shall not exceed 5 % of total track length.

C2.4.2.2

When building a new track, or realigning an existing one, the grade should not exceed 10° (1 in 5.7).

2.4.2.3 Steps

The maximum gradient for all steps shall be 37° (1 in 1.5). The maximum vertical rise between landings for all steps shall be 2.5 m. A landing is defined as a break of at least 1 m in a run of steps. Steps shall have a grab rail installed on one side where the safety of users is at risk.

The treads of all steps must have an even surface and must not be muddy or rough.

Where the gradient on existing flights of steps is greater than 37° (1 in 1.5) it shall be reduced to 37° or less.

Steps shall be constructed in such a way as to enable comfortable use by children and elderly people, with a maximum riser height of 190 mm and a minimum tread length of 250 mm.

C2.4.2.3

Each step in a run of steps should also have the same riser height and the same tread length.

2.4.3 Surface/Pavement

2.4.3.1 Walking surface width

The minimum walking surface width for Short Walks shall be 0.75 m with a maximum of 2.0 m. Existing tracks wider than 2 m should be maintained only to a width of 2 m or less.

NOTE – The minimum width may be reduced (for environmental or aesthetic reasons) for short sections of track provided there is minimal risk to visitor safety and that such sections cover no more than 5 % of total track length.

2.4.3.2 Track surface

The track surface shall be well formed and even (wet areas drained) and suitable for walking shoes (see figure 3). In dry weather the track surface shall be such that it can be walked on comfortably without getting footwear wet or muddy, and without the users having to constantly look down at where they place their feet.

Up to 10 % of the total length of the track may have short, wet or muddy sections, provided that the mud or water will not go over the top of users' walking shoes and that these sections provide reasonably firm footing in wet weather conditions.

C2.4.3.2

Some track users are likely to be children under five with a shoe height of around 50 mm. To ensure that wet or muddy sections of track are not excessively long, they should constitute no more than 10 m in every 50 m.



Figure 3 – Track surface – Mud below footwear

A proportion of the total length of a Short Walk, Walking Track, Great Walk and Easy Tramping Track may have wet/muddy sections such as this where the mud and water does not go over the footwear. In this case, the mud is less than 50 mm deep and will not go over a child's footwear.

2.4.4 Structures

2.4.4.1 Boardwalks

Boardwalks may be used over wet, swampy, sandy or muddy sections of the track to achieve a mainly dry surface and/or protect the environment. Alternatives to boardwalks, such as drainage of wet areas or raised, hardened sections of track, may also be used.

2.4.4.2 Width

The minimum width for new access structures shall be 1.2 m.

2.4.4.3 Bridges

All major or minor watercourses shall be bridged.

2.4.4.4 Ladders

No ladders shall be used on Short Walks.

2.4.4.5 Guardrails or barriers

Guardrails or barriers shall be constructed where a significant hazard to inexperienced visitors (including children) exists.

C2.4.4.5

Existing guardrails or barriers will only be replaced at the end of their life if a significant hazard exists.

2.4.4.6 Viewing platforms

Viewing platforms may be provided in appropriate places along the track.

2.4.5 Furniture

2.4.5.1 Seats and picnic tables

Seats and picnic tables may be provided in appropriate places along the track.

2.4.6 Vegetation

Vegetation shall be cleared from the total width of the track formation up to a maximum width of 1 m on either side of the centre of the track, and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface. Significant tree limbs and trunks may intrude into or above the track provided these do not obstruct users or place them at risk.

Windfalls blocking the track shall be cleared within 48 hours of notification.

All cut vegetation shall be removed from the track surface and where practicable, out of view of the track.

2.4.7 *Information for visitors*

2.4.7.1 *Signage*

Short Walks shall be clearly signposted with directional signs (which include both walking times and distances) at all track entrances and track junctions. Significant points of interest along or at the end the track shall be signposted.

At locations where there is a significant change from a Short Walk to other types of track, signs shall be provided with appropriate symbols and words to describe the change.

Where sprays or chemicals have been or are to be used on the track, temporary signs shall be erected for an appropriate time as a warning to track users.

C2.4.7.1

An orientation/track information sign should be provided at track entrances where more than one walking option exists.

2.4.7.2 *Track condition*

The presence of any poor track condition shall be brought to the attention of visitors at visitor information centres and/or at track entrances.

2.4.7.3 *Recommended footwear*

The recommended footwear for Short Walks is walking shoes.

2.4.8 *Short Walks for people with mobility difficulties*

Short Walks may be developed or maintained to a barrier-free standard for use by people with mobility difficulties or limitations. For such tracks, the requirements in 2.4.1 to 2.4.7 shall apply, with the following variations.

2.4.8.1 *Maximum grade*

The maximum grade shall be 5° (1 in 11.4).

2.4.8.2 *Steps*

No steps shall be used.

2.4.8.3 *Surface width*

The minimum width shall be 1.2 m over its entire length.

2.4.8.2 *Track surface*

Track surface shall be well compacted, with no loose material.

2.4.8.5 *Structures/Gates*

No stiles, turnstiles or kissing gates shall be used.

2.4.8.6 *Signage*

The track shall be clearly labelled as one suitable for people with mobility difficulties by use of appropriate symbols and words at track entrances and at junctions with other tracks.

2.4.9 *Short Walks for cyclists and pedestrians*

Some short walks may be managed for both cyclists (including mountain-bikers) and pedestrians. For such tracks, the requirements in 2.4.1. to 2.4.7. shall apply, with the following variations.

2.4.9.1 Steps

No steps shall be used.

2.4.9.2 Passing bays

Where there is a long section of track at the minimum width of 0.75 m, passing bays shall be developed in practical and appropriate places. These shall have a minimum width of 1 m and a minimum length of 3 m.

2.4.9.3 Track surface

The track surface shall be well compacted so that tyres do not unduly degrade the surface.

2.4.9.4 Culverts

Open culverts (i.e. either wooden or natural drains going across the track, with no cover) shall be no greater than 150 mm in width. Wooden culverts and water cutout boards shall not protrude more than 30 mm above the surface of the track.

2.4.9.5 Structures

No walk-over stiles shall be used.

2.4.9.6 Visibility on corners

Vegetation clearance, especially on corners, shall be sufficient to allow good visibility (e.g. a 10 m minimum sight distance) for cyclists and walkers.

2.4.9.7 Signage

The track shall be clearly labelled as one suitable for pedestrians and cyclists by use of appropriate symbols and words at track entrances and at junctions with any tracks on which cycles are not permitted.

2.5 Walking Tracks

Walking Tracks cater for those who want an extended walk that takes from a few minutes to one full-day return. These tracks are usually reasonably easy day trips and are required to be of a standard to enable use by relatively inexperienced visitors with a low level of backcountry skill and wanting a low level of risk (see figure 4). Some may be suitable for cyclists/mountain-bikers as well as pedestrians (see 2.5.8).



Figure 4 – Walking Track – Orongorongo, Rimutaka Forest Park

2.5.1 Track formation/Geometry

The track shall be well defined. Benching and raised formation may be used provided any negative environmental impacts are minimized.

2.5.1.1 Marking

The track shall be clearly marked where necessary, to allow inexperienced users to easily find their way in either direction in all weather conditions. Track markers (other than poles) shall comply with the specifications prescribed in Appendix B.

2.5.1.2 Maximum grade

The maximum grade shall be 15° (1 in 3.7) not including steps. The grade may rise to 20° (1 in 2.7) over sections of track up to 100 m long, as long as these steeper sections provide reasonably firm footing in wet weather conditions. The length of track with grades between 15° and 20° shall not exceed 10 % of total track length.

C2.5.1.2

When building a new track, or realigning an existing one, the grade should not exceed 15°, and where practicable, should be 10° max.

2.5.1.3 Steps

The maximum gradient for all steps shall be 41° (1 in 1.2). The maximum vertical rise between landings for all steps shall be 4 m. (A landing is defined as a break of at least 1 m in a run of steps.)

Flights of steps with a gradient between 37° (1 in 1.5) and 41° shall have an even, firm tread surface (i.e. not muddy or rough).

Steps shall be constructed in such a way as to enable comfortable use by children and elderly people, with a maximum riser height of 225 mm and a minimum tread length of 300 mm.

C2.5.1.3

Although the maximum gradient is 41°, new steps should be constructed with a maximum gradient of 37° (i.e. a riser height of no more than 225 mm and a tread length of around 300 mm) for greater comfort and safety of the predominant visitor group. Each step in a run of steps should also have the same riser height and the same tread length.

2.5.2 Surface/Pavement

2.5.2.1 Track surface width

The minimum walking surface width shall be 0.75 m. This may be reduced to 0.6 m where the track grade is less than 5° (1 in 11.4) and there are no hazards from falling on both sides of the track.

The minimum widths (0.75 m and 0.6 m) may be reduced (for environmental or aesthetic reasons) for short sections of track provided there is a low risk to visitor safety and that such sections cover no more than 5 % of the total track length.

The maximum track surface width shall be 2.0 m. It is recommended that existing tracks wider than 2.0 m be maintained to a maximum reduced width of 2.0 m or less.

2.5.2.2 Track surface

The track surface shall be mostly well formed and even with wet areas drained. In dry weather the track surface shall be such that it can be walked on comfortably in light walking boots without getting footwear wet or muddy (see figure 5).

Up to 20 % of the total length of track may have:

- (a) short wet or muddy sections (provided the water or mud will not go over the top of track user's boots); or
- (b) uneven or rough sections where the track surface is broken by rock, roots, scree or other obstacles. These sections must still provide reasonably firm footing in wet weather conditions.

C2.5.2.2

Some track users are likely to be children under five with a shoe or boot height of around 50 mm. To ensure that wet or muddy sections and/or rough and uneven sections of track are not excessively long, they should constitute no more than 20 m in every 80 m.



Figure 5 – Track surface – Mud above footwear

A proportion of the total length of a Short Walk, Walking Track, Great Walk and Easy Tramping Track may have wet/muddy sections such as this provided the mud and water does not go over the top of the footwear. In this case, the mud is more than 50 mm deep and would go over the top of a younger child's shoes. This surface would be unacceptable on a Short Walk or Walking Track.

2.5.3 Structures

2.5.3.1 Boardwalks

Boardwalks may be used over wet, swampy, sandy or muddy sections of the track to achieve a mainly dry surface for visitor comfort and/or to protect the environment.

Alternatives to boardwalks, such as drainage or raised hardened sections of track, may also be used.

2.5.3.2 Width

The minimum width for new access structures shall be 0.75 m.

2.5.3.3 Bridges

All major watercourses shall be bridged.

All permanent minor watercourses wider than 1 m (in normal flow conditions) shall be bridged. Where a minor watercourse is wider than 1 m at the point of crossing but is easily crossed in normal flow conditions by the predominant visitor group (without water going over the top of footwear) a bridge or culvert shall not be built. (See figure 6.)

C2.5.3.3

Existing bridges across minor watercourses that do not flow all year round and that do not require bridging according to 2.5.3.3 will not be replaced when they reach the end of their life.



Figure 6 – Walking Track – Minor watercourse

Where a water course is >1 m wide and is easily crossed in normal flow without getting feet wet, a bridge or culvert will not be built.

2.5.3.4 Ladders

No ladders shall be used on Walking Tracks.

2.5.3.5 Guardrails or barriers

Guardrails or barriers shall be constructed where a significant hazard to the predominant visitor group exists.

C2.5.3.5

Existing guardrails or barriers will only be replaced at the end of their life where a significant hazard exists.

2.5.3.6 Viewing platforms

Viewing platforms may be provided in appropriate places along the track.

2.5.3.7 Shelters

Shelters may be provided in appropriate locations along walking tracks where:

- (a) The total walking time from the start of the track without shelter exceeds three hours;
- (b) There are significant numbers of users walking or using the whole length of the track; and
- (c) There is a significant level of exposure to adverse weather conditions on the most distant parts of the track.

Where shelters are provided, toilets should also be provided at those locations that are or may become popular stops for the consumption of food.

2.5.4 Furniture

Seats and picnic tables may be provided in appropriate places along the track.

2.5.5 Vegetation clearance

Vegetation shall be cleared from the total width of the track formation up to a maximum width of 1 m on either side of the centre of the track, and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface. Significant tree limbs and trunks may intrude into or above the track provided these do not obstruct users or place them at risk.

Windfalls blocking the track shall be cleared (or the track diverted) within 14 days of notification.

All cut woody vegetation shall be removed from the track surface and, if practicable, out of view of the track.

Where the track is an actively managed historic site, vegetation control may be managed so as to protect the historic integrity of the track.

2.5.6 Information for visitors

2.5.6.1 Signage

Walking Tracks shall be clearly signposted with directional signs (which include both walking times and distances) at all track entrances and track junctions. Significant points of interest along or at the end the track shall be signposted.

At locations where there is a significant change from Walking Track to another standard of track, signs shall be provided with appropriate symbols and words to describe the change.

Where sprays or chemicals have been or are to be used on the track, temporary signs shall be erected for an appropriate time as a warning to track users.

C2.5.6.1

An orientation/track information sign should be provided at track entrances where more than one walking option exists.

2.5.6.2 Track condition

Visitors shall be informed of the presence of any temporary poor track condition, such as recent slips, or permanent track information, such as unbridged streams, at visitor information centres and/or at track entrances.

2.5.6.3 *Recommended footwear*

The recommended footwear for Walking Tracks is light walking boots.

2.5.7 *Historic walking tracks*

Historic walking tracks include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile (e.g. width, cuts, fills, drains, culverts, stonework and cobbles) and alignment (route, grade and curvature) of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.

2.5.8 *Walking tracks for cyclists/mountain-bikers and pedestrians*

Some walking tracks may be managed for both cyclists/mountain-bikers and pedestrians. Cyclists and mountain-bikers using suitable walking tracks require a reasonable level of fitness and some technical riding skills. For such tracks, the specifications in 2.5.1 to 2.5.7 above shall apply, with the following variations.

2.5.8.1 *Steps*

No more than 5 % of the total length of track shall consist of steps.

2.5.8.2 *Track surface width*

The minimum walking surface width shall be 0.75 m.

2.5.8.3 *Passing bays*

Where there is a long section of track at the minimum width of 0.75 m, passing bays shall be developed in practical and appropriate places. These shall have a minimum width of 1 m and a minimum length of 3 m.

2.5.8.4 *Track surface*

The track surface shall be well compacted so that tyres do not unduly degrade the surface.

2.5.8.5 *Culverts*

Open culverts (i.e. either wooden or natural drains going across the track, with no cover) shall be no greater than 200 mm in width. Wooden culverts and water cutout boards shall not protrude more than 50 mm above the surface of the track.

2.5.8.6 *Structures*

Walk-over stiles should not be used.

2.5.8.7 *Visibility on corners*

Vegetation clearance, especially on corners, shall be sufficient to allow good visibility (a 10 m minimum sight distance) for cyclists/mountain-bikers and walkers.

2.5.8.8 *Signage*

The track shall be clearly labelled as one suitable for pedestrians and cyclists/mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which cycles are not permitted.

2.6 Great Walks and Easy Tramping Tracks

These tracks cater for less experienced trampers (DOC refers to them as Backcountry Comfort Seekers) expecting a low risk experience in the backcountry (see figure 7). The Great Walks and Easy Tramping Tracks will generally be multi-day tramping tracks. Some Easy Tramping Tracks may be suitable for mountain-bikers as well as pedestrians (see 2.6.8).



Figure 7 – Great Walk and Easy Tramping Track – Nearing Howden Hut, Routeburn Track

2.6.1 Track formation/Geometry

These tracks shall be well defined by the formation or by markers.

NOTE – Benching and raised formation may be used provided any negative environmental effects are minimized.

2.6.1.1 Marking

Marking of the track shall be through use of poles or markers. Track markers (other than poles) shall follow the specifications set out in Appendix B.

2.6.1.2 Maximum grade

There shall be no maximum grade.

2.6.1.3 Steps

Steps may be used on these tracks (see figure 8). Existing flights of steps shall have a gradient not exceeding 41° (1 in 1.2). The maximum vertical rise between landings for all steps shall be 4 m. (A landing is defined as break of at least 1 m in a run of steps.)

Steps shall be constructed to enable reasonably comfortable use by the predominant visitor group, with a maximum riser height of 200 mm and a minimum tread length of 250 mm.

C2.6.1.3

Although the maximum gradient is 41°, new steps should be constructed with a maximum gradient of 37° (i.e. a riser height of no more than 200 mm and a tread length of around 250 mm) for greater ease of use and safety of the predominant visitor group. Each step in a run of steps should also have the same riser height and the same tread length.



Figure 8 – Steps

Steps on Paths and Short Walks must not have a rough tread surface nor a vertical rise between landings of more than 2.5 m. Steps on all tracks should have similar riser heights as well as tread lengths (unlike those in figure 8) on a run of steps.

2.6.2 Surface/Pavement

2.6.2.1 Track surface width

The minimum track surface width for tracks in particular environments shall be in accordance with table 4.

Table 4 – Minimum track widths	
Track environment	Minimum width
Open forest	0.3 m
River flats	0.3 m
Tops	0.3 m
Flat terrain	0.3 m
Steep slopes	0.6 m
Where room for passing is required	0.6 m

The maximum width for these tracks is 1 m. Tracks with a surface width greater than 1 m shall be maintained to a reduced width of 1 m or less.

2.6.2.2 Track surface

Over 70 % of the total track length for Great Walks and over 50 % for Easy Tramping Tracks, shall have wet areas drained and a surface that provides firm and even footing.

Up to 30 % of the total track length for Great Walks and up to 50 % for Easy Tramping Tracks may have one or both of the following:

- (a) Uneven, steep or rough sections where the track surface is broken by rocks, roots, scree or other obstacles; or
- (b) Deep, muddy or wet sections as long as the mud or water does not come over the top of the boot.

These sections, where they are on steep slopes, must still provide reasonably firm footing in wet weather conditions.

Great Walks and Easy Tramping Tracks do not have to be entirely even or without wet/muddy sections. Less experienced trampers may find this undesirable as many are looking for a degree of challenge, not a smooth, completely dry track for its whole length. Tracks that are within the percentage requirements above shall not be upgraded to reduce the percentage of wet/muddy and rough/uneven track surface.

C2.6.2.2

Some track users are likely to be children over ten and the height of their boots will be around 100 mm. To ensure that muddy/uneven sections of track are not excessively long, they should constitute no more than:

- (a) 400 m in every 1,000 m for Great Walks;
- (b) 600 m in every 1,000 m for Easy Tramping Tracks.

2.6.3 Structures

2.6.3.1 Boardwalks

New boardwalks may be constructed and existing ones replaced at the end of their life only if the boardwalk is essential to protect the environment or if there is no reasonable alternative route through or around a wet, sandy or muddy section.

2.6.3.2 Width

The minimum width for new access structures shall be 0.6 m.

2.6.3.3 Bridges

All major watercourses shall be bridged.

All minor watercourses shall be bridged where:

- (a) No reasonable alternative wet weather track exists;
- (b) They cannot be safely crossed unassisted when in flood; and
- (c) The frequency with which floods occur results in the watercourse acting as a barrier or becoming a significant hazard to:
 - (i) over 5 % of the predominant visitor group (BCC) a year for Great Walks, or
 - (ii) over 10 % of the predominant visitor group (BCC) a year for Easy Tramping Tracks.

C2.6.3.3

Existing bridges across minor watercourses will not be replaced when they reach the end of their life unless the above criteria apply.

2.6.3.4 Ladders

Ladders may be used on these tracks. On a Great Walk, ladders shall not exceed 2 m in length.

2.6.3.5 Guardrails or barriers

Guardrails or barriers shall be constructed where a significant hazard to the predominant visitor group exists and there is no reasonable alternative option such as:

- (a) Widening the track; or
- (b) Diverting the track; and
- (c) Installing temporary warning signs until the hazard has been mitigated.

C2.6.3.5

Existing guardrails or barriers will be replaced at the end of their life only if a significant hazard exists and there is no reasonable alternative option for reducing the risk to visitor safety.

2.6.3.6 Viewing platforms

Viewing platforms shall not generally be provided on these tracks.

2.6.3.7 Shelters

Shelters may be provided in appropriate locations along these tracks where:

- (a) The total walking time from the start of the track or between huts without shelter exceeds four hours;
- (b) There are significant numbers of visitors using the track; and
- (c) There is a significant level of exposure to adverse weather conditions on the most distant parts of the track.

Where shelters are provided, toilets should also be provided at those locations that are or may become popular stops for the consumption of food.

2.6.4 Furniture

Seats and picnic tables are not generally provided on these tracks.

2.6.5 Vegetation

Vegetation shall be cleared from the total width of the track formation up to a maximum width of 0.5 m on either side of the centre of the track to ensure that there is a clear passage and clear view of the track walking surface, the way ahead and the next marker/pole.

Windfalls blocking the track shall be cleared or the track diverted within 7 days of notification during the peak season for Great Walks, or 14 days during the peak season for Easy Tramping Tracks.

All cut woody vegetation shall be removed from the track surface and, where practicable, out of view of the track.

Where the track is an actively managed historic site, vegetation control may be managed so as to protect the historic integrity of the track.

2.6.6 Information for visitors

2.6.6.1 Signage

Great Walks and Easy Tramping Tracks shall be clearly signposted with directional signs (which include both walking times and distances) at all track entrances and track junctions. Significant points of interest along the track shall be signposted.

At locations where there is a significant change from Great Walk or Easy Tramping Track to another standard of track, appropriate symbols and words to describe the change shall be used on the relevant sign.

Where sprays or chemicals have been or are to be used on the track temporary signs shall be erected for an appropriate time as a warning to track users.

Permanent hazard warning signs are only to be installed where there is no other practicable option.

C2.6.6.1

An orientation/track information sign should be provided at track entrances where more than one walking option exists.

2.6.6.2 *Track condition*

The presence of any difficult track section, such as un-bridged streams, or temporary poor track condition, such as recent slips, shall be brought to the attention of visitors at visitor information centres, track entrances and/or huts.

2.6.6.3 *Recommended footwear*

Recommended footwear for these tracks is light walking boots or tramping boots.

2.6.7 *Historic tramping tracks*

Historic tramping tracks include old railways, tramways, roads, trails used by Māori, water-race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile (e.g. width, cuts, fills, drains, culverts, stonework and cobbles) and alignment (route, grade and curvature) of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.

2.6.8 *Easy tramping tracks for mountain-bikers and pedestrians*

Some Easy Tramping Tracks may be managed for both mountain-bikers and pedestrians. Mountain-bikers using suitable easy tramping tracks require a good level of fitness and some technical riding skills. For such tracks, the requirements given in 2.6.1 to 2.6.7 shall apply, with the following variations.

2.6.8.1 *Steps*

No more than 10 % of the total length of track shall consist of steps.

2.6.8.2 *Track surface width*

The minimum track surface width shall be 0.6 m.

2.6.8.3 *Passing bays*

Where there is a long section of track at the minimum width of 0.6 m, passing bays will be developed in practical and appropriate places. These shall have a minimum width of 1 m and a minimum length of 3 m.

2.6.8.4 *Track surface*

The track surface shall be well compacted so that tyres do not unduly degrade the surface.

2.6.8.5 *Culverts*

Open culverts (i.e. either wooden or natural drains going across the track, with no cover) shall be no greater than 200 mm in width. Wooden culverts and water cutout boards shall not protrude more than 50 mm above the surface of the track.

2.6.8.6 *Visibility on corners*

Vegetation clearance, especially on corners, shall be sufficient to allow good visibility (a 10 m minimum sight distance) for mountain-bikers and pedestrians.

2.6.8.7 *Signage*

The track shall be clearly labelled as one suitable for pedestrians and mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which cycles are not permitted.

2.7 Tramping Tracks

These tracks cater for Backcountry Adventurers, including trampers, hunters, anglers and mountaineers. A few may be suitable for mountain-bikers as well as pedestrians (see 2.7.9). Tramping Tracks generally follow the lie of the land and are commonly not formed (see figure 9).



Figure 9 – Tramping Track – Mt Ellis Track, Mt Richmond Forest Park

2.7.1 General

Tramping Tracks shall be marked, and may traverse a wide range of terrain and cater for backcountry visitors with generally moderate to high backcountry skills and experience. Trips on these tracks vary in length from half-day to multi-day.

2.7.2 Track formation/Geometry

2.7.2.1 Marking

The track shall be marked except where a formed track exists and can be easily followed. Markers, poles or cairns must be clearly visible from one to the next, in either direction, in all but the worst weather conditions. Track markers (other than cairns and poles) shall follow the specifications set out in Appendix B.

Tracks across recent slips shall be marked.

2.7.2.2 Benching

In developing new tracks, or upgrading existing ones, benching is to be limited to where:

- (a) Environmental or visitor impacts need to be mitigated, for example to provide an alternative route to avoid severe erosion and deep gullies centred on the track on steep slopes; or
- (b) No practicable alternative option for redesigning or rerouting the track exists, for example where a steep slip has taken out a section of track; and
- (c) There is high enough use to warrant benching.

2.7.2.3 Maximum grade

There is no maximum grade.

2.7.2.4 Steps

Steps should generally not be used except where their use will prevent erosion or significant visitor impacts.

Steps must not have a gradient that exceeds 45° (1 in 1). The maximum vertical rise between landings for all steps is 8 m. (A landing is defined as break of at least 1 m in a run of steps.)

New steps shall have a maximum riser height of 250 mm and a minimum tread length of 250 mm.

2.7.3 Surface/Pavement

2.7.3.1 Walking surface width

There is no minimum width on Tramping Tracks. Where surface material such as gravel is used, the maximum surface width shall be 0.3 m.

2.7.3.2 Track surface

The track surface shall generally be the natural surface and may include mud, water, roots and embedded rocks.

Major obstacles such as windfalls are to be removed or the track diverted around them. Generally minor obstacles such as rocks, tree roots and earth are not to be removed.

2.7.4 Structures

2.7.4.1 Boardwalks

Boardwalks are not generally provided on Tramping Tracks. Instead where muddy, sandy or swampy conditions exist tracks are to be drained, rerouted or raised. If there is no alternative, new boardwalks may be constructed or existing ones replaced only where they are necessary to mitigate significant environmental effects.

2.7.4.2 Width

The minimum width for new access structures shall be 0.6 m.

2.7.4.3 Bridges

Watercourses shall be bridged where they cannot be safely crossed without the help of others during times of normal water flow. Bridges may be 3-wire crossings.

Watercourses shall also be bridged where:

- (a) No reasonable alternative wet weather track exists; and
- (b) They cannot be safely crossed unassisted when in flood; and
- (c) Floods occur with a frequency that means the watercourse is a barrier to progress or becomes a significant hazard to over 25 % of the predominant visitor group (BCA) a year; and
- (d) There is no accommodation/shelter within 2 hours walking distance where visitors can wait until the river/stream conditions improve.

C2.7.4.3

Existing bridges across any watercourse will not be replaced at the end of their life unless the above criteria are met.

2.7.4.4 Ladders

Ladders may be used where a significant hazard exists.

2.7.4.5 Guardrails, barriers, chains or handwires

Guardrails, barriers, chains or handwires may be used at locations where a significant hazard to visitors exists but only where no other reasonable option such as re-routing the track exists.

C2.7.4.5

Existing guardrails, barriers, chains or handwires are only to be replaced at the end of their life if a significant hazard exists.

2.7.4.6 Viewing platforms

Viewing platforms are generally not provided.

2.7.4.7 Shelters

Shelters may be provided in appropriate locations along these tracks where:

- (a) The total walking time from the start of the track return (if on a day Tramping Track) without shelter, or from the start of the track or between huts without shelter exceeds four to five hours;
- (b) There are significant numbers of relatively inexperienced visitors using the track; and
- (c) There is exposure to adverse weather conditions on the most distant parts of the track.

Where shelters are provided, toilets should also be provided at those locations that are or may become popular stops, provided the visitor numbers warrant it.

2.7.5 Furniture

Seats and picnic tables are generally not provided.

2.7.6 Vegetation

Vegetation shall be cleared to ensure there is a clear passage and a clear view of track markers, poles or cairns. Cut woody vegetation shall be cleared from the track surface.

Where a formed or benched track is required as in 2.7.2.2 or 2.7.4.1, vegetation shall be cleared to ensure a clear view of the track surface and the way ahead.

Where the track is an actively managed historic site, vegetation control shall be managed so as to protect the historic integrity of the track.

2.7.7 Information for visitors

2.7.7.1 Signage

Direction signs shall be placed at all track entrances and at junctions or crossing points where there is a significant risk of getting lost. Direction signs are to show walking times, and may show distances.

At locations where there is a change from Tramping Track to Route, appropriate symbols and words to describe the change shall be used on the relevant sign.

Where sprays or chemicals have been or are to be used on the track, temporary signs shall be erected for an appropriate time as a warning to track users.

2.7.7.2 *Track condition*

Track condition information regarding, for example, unusual track conditions, shall be made available at track entrances or through off-site means.

2.7.7.3 *Recommended footwear*

The footwear recommended for these tracks is tramping boots.

2.7.8 *Historic tramping tracks*

Historic tramping tracks include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks shall be taken into account in track upgrading and maintenance. The profile (e.g. width, cuts, fills, drains, culverts, stonework and cobbles) and alignment (route, grade and curvature) of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.

2.7.9 *Tramping tracks for mountain-bikers and pedestrians*

A few Tramping Tracks may be managed for both mountain-bikers and pedestrians. In most cases these shall be tracks that were originally formed and benched. Mountain-bikers using tramping tracks require a very good level of fitness and, in most cases, advanced technical riding skills. For such tracks, the specifications in 2.7.1 to 2.7.8 above shall apply, with the following variations.

2.7.9.1 *Track surface width*

The minimum rideable surface width shall be 0.3 m.

2.7.9.2 *Visibility on corners*

Vegetation clearance, especially on corners, shall be sufficient to allow good visibility for mountain-bikers and pedestrians.

2.7.9.3 *Signage*

The track shall be clearly labelled as one suitable for pedestrians and mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which mountain-bikes are not permitted.

2.8 Routes

Routes are generally unformed and lightly cut and cater for experienced backcountry users who have navigation and river-crossing skills (see figure 10).



Figure 10 – Route – Lyell Hut Route, Rakaia Valley

2.8.1 Track formation/Geometry

2.8.1.1 Maximum grade

There is no maximum grade.

2.8.1.2 Marking

Marking on routes shall be by way of cairns, poles or markers and they shall be visible from one to the next, in either direction, in all weather conditions except moderate to heavy mist. Track markers (other than cairns and poles) shall follow the specifications set out in Appendix B.

C2.8.1.2

Unmarked routes (generally defined by use and with no marking or vegetation clearance) are not considered to be routes covered by this Handbook.

2.8.1.3 Steps

Steps shall not be used on routes.

2.8.2 Surface/Pavement

2.8.2.1 Walking surface width

There is no minimum walking surface width.

2.8.2.2 Track surface

The track surface shall be natural (i.e. not formed) and may be rough.

2.8.3 *Structures*

2.8.3.1 *Boardwalks*

Boardwalks shall not be provided on Routes.

2.8.3.2 *Width*

Structures have no prescribed width.

2.8.3.3 *Bridges*

(a) Where a significant hazard exists, major watercourses shall be bridged.

(b) Bridges may be three-wire crossings.

(c) Minor watercourses shall not be bridged.

2.8.3.4 *Ladders, handwires or chains*

Ladders, handwires or chains may be used where a significant hazard exists.

2.8.3.5 *Guardrails or barriers*

Guardrails or barriers shall not be used on Routes.

2.8.3.6 *Viewing platforms*

Viewing platforms are not provided on Routes.

2.8.3.7 *Shelters*

Shelters are not provided on Routes.

2.8.4 *Furniture*

Seats and picnic tables are not provided on Routes.

2.8.5 *Vegetation*

Vegetation and windfalls shall be cleared to enable adequate vision of markers or the route.

2.8.6 *Information for visitors*

2.8.6.1 *Signage*

Direction signs should be installed at junctions with Tramping Tracks, Easy Tramping Tracks and Great Walks. Direction signs shall show walking times, and may show distances.

Where sprays or chemicals have been or are to be used on the Route, temporary signs shall be erected for an appropriate time as a warning to track users.

2.8.6.2 *Track condition*

Route condition information (e.g. about unbridged rivers) may be provided through off-site means.

C2.8.6.2

Unmarked routes that are defined by significant use may be shown on maps and route guides.

2.8.6.3 *Recommended footwear*

Recommended footwear for Routes is tramping boots.

2.8.7 *Historic routes*

Historic routes may include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile (e.g. width, cuts, fills, drains, culverts, stonework and cobbles) and alignment (route, grade and curvature) of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.

Table 5 – Comparison of Track Specifications

Track category						
	Path 1 (UR)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
General description	Well formed on a durable surface such as concrete, chip seal, asphalt or compacted gravel. Easy walking, mostly in urban settings, and for all ages and most fitness levels. Many will cater for people with mobility difficulties.	Well formed. Up to 1 hour's easy walking (return). Suitable for most ages and fitness levels. All watercourses are bridged. Some may cater for people with mobility difficulties.	An extended walk that takes from a few minutes to a full day return. Suitable for relatively inexperienced people with a low level of backcountry skill. All but the smallest watercourses are bridged.	Generally multi-day tramping track catering for relatively inexperienced backcountry trampers. Well constructed tramping track with a track surface and bridges across rivers and major streams.	Marked tramping track that generally follows the lie of the land and is commonly not formed. May be multi-day or backcountry tracks taking less than a day. Key river crossings are bridged.	Generally unformed, lightly cut route catering for the most experienced of backcountry visitors. Routes follow the lie of the land and are not formed.
Track formation, marking	Well defined so that users can easily find their way in either direction in all weather and low light conditions. Markers will not usually be required. The whole track may be benched or raised.	Well defined so that inexperienced users can easily find their way in either direction in all weather conditions. Markers will not usually be required. Part or all of the track may be benched or raised.	Well defined track. Clearly marked where necessary so that inexperienced users can easily find their way in either direction in all weather conditions. Benching and raised formation may be used provided any negative environmental impacts are minimized.	Well defined by the track formation or by markers. Any marking to be poles or markers. Benching and raised formation may be used provided any negative environmental impacts are minimized.	Marked track (except where a formed track exists and can be easily followed). Markers, poles or cairns must be clearly visible from one to the next, in either direction, in all but the worst weather conditions. In developing new tracks or upgrading existing ones, benching is to be limited to where: • impacts need to be mitigated, or • there are no other options, and • there is high use. Routes across recent slips are to be marked.	Generally unformed. Must be marked. Marking can be cairns, poles or markers and they must be clearly visible from one to the next, in either direction, in all weather conditions except moderate to heavy mist. Unmarked routes (generally defined by use and not maintained), are not covered in this Handbook.

Maximum grade	- 7° (1 in 8) - 5° (1 in 11.4) on paths for people with mobility difficulties	- 10° (1 in 5.7), excluding steps - 5° (1 in 11.4) for short walks for people with mobility difficulties - up to 15° (1 in 3.7) over sections of track up to 50 m long, as long as there is firm footing in wet weather and that the total track length between 10° and 15° does not exceed 5 %.	- 15° (1 in 3.7), excluding steps - up to 20° (1 in 2.7) over sections of track up to 100 m long, provided there is reasonably firm footing in wet weather and that the total track length between 15° and 20° does not exceed 10 %.	None	None	None
Steps	- Steps shall be constructed to enable safe and comfortable use - All steps to have a maximum riser height of 180 mm and a minimum tread length of 310 mm - Maximum vertical rise between landings is 2.5 m - No steps to be used on paths for people with mobility difficulties.	- Maximum gradient is 37° (1 in 1.5) - Max vertical rise between landings is 2.5 m - Steps are to have a handrail on one side if the safety of users is at risk - Treads must have an even surface and must not be muddy or rough - Where steps have a gradient greater than 37° (1 in 1.5) it must be reduced to 37° or less - Steps must enable comfortable use by children and elderly people, with a maximum riser height of 190 mm and a minimum tread length of 250 mm - No steps to be used on paths for people with mobility difficulties.	- Maximum gradient is 41° (1 in 1.2) - Max vertical rise between landings is 4 m - Existing flights of steps with a gradient between 37° (1 in 1.5) and 41° must have an even, firm tread surface (ie not muddy or rough) - Steps must be constructed to enable comfortable use by children and elderly people, with a maximum riser height of 225 mm and a minimum tread length of 300 mm.	- Steps may be used - Existing flights of steps must not have a gradient that exceeds 41° (1 in 1.2) - Maximum vertical rise between landings is 4 m - Steps are to be constructed to enable reasonably comfortable use by the predominant visitor group, with a maximum riser height of 200 mm and a minimum tread length of 250 mm.	- Steps should generally not be used except where their use will prevent erosion or significant visitor impacts - Flights of steps must not have a gradient that exceeds 45° (1 in 1) - Maximum vertical rise between landings is 8 m - New steps shall have a maximum riser height of 250 mm and a minimum tread length of 250 mm.	- Steps shall not be used.

Table 5 – Comparison of Track Specifications (continued)

Track category	Path 1 (UR)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
Walking surface width	Minimum – 1.2 m - The minimum width may be reduced (for environmental or aesthetic reasons) for short sections of path (covering up to 5 % of total path length) provided there are low risks to visitor safety. - Minimum width shall be 2 m over the whole length for paths for people with mobility difficulties.	Minimum – 0.75 m Maximum – 2.0 m - Existing tracks wider than 2 m should generally be maintained to a reduced width of 2 m or less. - The minimum width may be reduced (for environmental or aesthetic reasons) for short sections of track (covering up to 5 % of total track length) provided there are low risks to visitor safety. - Minimum width shall be 1.2 m over the whole length for tracks for people with mobility difficulties.	Minimum – 0.75 m Maximum – 2.0 m - Minimum width may be reduced to 0.6 m where the track grade is less than 5° (1 in 11.4) and there are no hazards from falling on both sides - The minimum widths (0.75 m and 0.6 m) may be reduced (for environmental or aesthetic reasons) for short sections of track (covering up to 5 % of total track length) provided there is a low risk to visitor safety. - Existing tracks with a surface width greater than 2 m should generally be maintained to a reduced width of 2 m or less.	Minimum – 0.3 m in open forest, river flats, tops or flat terrain - Minimum – 0.6 m where there are steep slopes and/or room for passing is required. - Walking surface width, where the track surface is rough and uneven, is the width of walking surface within the track formation on which inexperienced trampers can safely place their feet. - Maximum width – 1 m. - Tracks with a surface width greater than 1 m shall be maintained to a reduced width of 1 m or less.	No minimum width - Where surface material (eg gravel) is used, maximum surface width is 0.3 m.	No minimum width

Track surface	- Well formed and even - Durable (e.g. concrete, chip seal, asphalt or a surface such as compacted gravel) - Can be walked on comfortably without getting footwear wet or muddy in both dry and wet weather. Can be walked on without users having to constantly look down at where they put their feet. - Maximum height of any discontinuity on the surface shall be 5 mm.	- Well formed and even (wet areas drained) - Track surface that, in dry weather, can be walked on comfortably without getting footwear wet or muddy. Can be walked on without users having to constantly look down at where they put their feet. - Up to 10 % of total track length may have short, wet or muddy sections, provided the water or mud will not go over the top of visitor's footwear and that these sections provide reasonably firm footing in wet weather conditions - Some users are likely to be children under five and the height of their shoes will be around 50 mm - The length of any wet or muddy section should be no more than 10 m in every 50 m - Surface is to be well compacted, with no loose material, on tracks for people with mobility difficulties.	- Mostly well formed and even (wet areas drained) - Track surface that, in dry weather, can generally be walked on comfortably without getting footwear wet or muddy - Up to 20 % of the total track length may have short, wet or muddy sections (provided the water or mud will not go over the top of footwear) or have uneven or rough sections where the track surface is broken by rock, roots etc. These sections must still provide reasonably firm footing in wet weather conditions - Some users are likely to be children under five and the height of their shoes will be around 50 mm - The length of any wet or muddy section should be no more than 20 m in every 80 m.	- Over 70 % of the total track length (for Great Walks), and over 50 % (for Easy Tramping Tracks) will have wet areas drained and a surface that provides firm and even footing. - Up to 30 % of the total track length (for Great Walks) and up to 50 % (for Easy Tramping Tracks) may have: i) uneven, steep or rough sections where the track surface is broken by rocks, roots, scree or other obstacles; and/or ii) deep, muddy or wet sections as long as the mud or water does not come over the top of the boot. - These sections, where they are on steep slopes, must still provide reasonably firm footing in wet weather conditions - Some users are likely to be older children over ten and the height of their boots will be around 100 mm - The length of any wet or muddy section should be no more than 400 m in every 1000 m for Great Walks and no more than 600 m in every 1000 m for Easy Tramping Tracks - Tracks meeting the requirements for the percentage that can be wet/muddy and rough will not be upgraded to reduce the percentage of wet/muddy and rough surface.	- Track surface will generally be the natural surface and may include mud, water, roots and embedded rocks. - Major obstacles such as windfalls are to be removed or the track diverted around them, but generally rocks, tree roots and earth are not to be removed.	Surface is natural (ie not formed) and may be rough.
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Table 5 – Comparison of Track Specifications (continued)

	Path 1 (UR)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
Track category						
Recommended footwear	All types of walking footwear	Walking shoes	Light walking boots	Light walking boots or tramping boots	Tramping boots	Tramping boots
Boardwalks	Shall be used over wet, swampy, sandy or muddy sections to achieve a stable dry surface for visitor comfort and/or to protect the environment.	May be used over wet, swampy, sandy or muddy sections to achieve a mainly dry surface and/or protect the environment. Drainage of wet areas or raised hardened sections of track may also be used as alternatives to boardwalks.	May be used over wet, swampy, sandy or muddy sections to achieve a mainly dry surface for visitor comfort and/or to protect the environment. Drainage or raised hardened sections of track may also be used as alternatives to boardwalks.	New boardwalks may be constructed, and existing ones replaced at the end of their life only if essential to protect the environment or if there is no reasonable alternative route through or around a wet, sandy or muddy section.	Generally not provided. Instead where muddy or swampy conditions exist tracks are to be drained, re-routed or raised. If there is no alternative, new boardwalks may be constructed, or existing ones replaced, only where they are necessary to mitigate significant environmental effects.	Are not to be provided.
Minimum structure width	1.2 m	1.2 m	0.75 m	0.6 m	0.6 m	No prescribed width.
Bridges across major watercourses	All major watercourses shall be bridged.	All major watercourses shall be bridged.	All major watercourses shall be bridged.	All major watercourses shall be bridged.	- Watercourses shall be bridged where they cannot be safely crossed without the help of others during times of normal water flow. - Bridges may be three wire crossings.	- Major watercourses shall be bridged where a significant hazard exists. - Bridges may be three wire crossings.

Bridges across minor watercourses	All minor watercourses shall be bridged.	All permanent minor watercourses wider than 1m (in normal flow conditions) shall be bridged. However, where a watercourse is wider than 1m at the point where the track has to cross it, and where it can be easily crossed (in normal flow conditions) without water going over the top of footwear, a bridge or culvert shall not be built. - Existing bridges across minor watercourses that do not flow all year round and that do not require bridging according to the criteria above, will not be replaced when they reach the end of their life.	Minor watercourses shall be bridged where: (a) no reasonable alternative wet weather track exists; and (b) they cannot be safely crossed unassisted when in flood; and (c) the frequency with which floods occur results in the watercourse acting as a barrier or becoming a significant hazard to over 5 % (Great Walks) or over 10 % (Easy Tramping Track) of total BCC visitors a year. - Existing bridges across minor watercourses will not be replaced when they reach the end of their life unless the above criteria are met.	Minor watercourses shall also be bridged where: (a) no reasonable alternative wet weather track exists; and (b) they cannot be safely crossed unassisted when in flood; and (c) floods occur with a frequency that means the watercourse is a barrier or becomes a significant hazard to over 25 % of the predominant visitor group (BCA) a year, and (d) there is no accommodation or shelter within two hours walking distance. Existing bridges across any watercourse will not be replaced at the end of their life unless the above criteria are met.	Minor watercourses shall not be bridged.
Ladders	No ladders	No ladders	Ladders may be used. On a Great Walk, ladders must not exceed 2 m in length.	Ladders may be used where a significant hazard exists.	Ladders may be used where a significant hazard exists.

Table 5 – Comparison of Track Specifications (continued)

Table 5 – Comparison of Track Specifications (continued)						
Track category	Path 1 (UR)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
Guardrails, barriers, chains and handwires	A barrier or guardrail shall be provided where a significant hazard exists and shall extend for the full length of path along which the significant hazard exists. Existing guardrails and barriers will only be replaced at the end of their life where a significant hazard exists.	Guardrails or barriers will be constructed where a significant hazard to inexperienced visitors (including children) exists. Existing guardrails and barriers will only be replaced at the end of their life where a significant hazard exists.	Guardrails or barriers shall be constructed where a significant hazard to the predominant visitor group exists. Existing guardrails and barriers will only be replaced at the end of their life where a significant hazard exists.	Guardrails or barriers will be constructed where a significant hazard to the predominant visitor group exists and there is no reasonable alternative option such as widening or diverting the track or installing warning signs on a temporary basis. Existing guardrails and barriers will be replaced at the end of their life only if a significant hazard exists and there is no reasonable option for reducing the risk to visitor safety.	Guardrails, barriers, chains or handwires may be used at locations where a significant hazard to visitors exists but only where no reasonable alternative such as rerouting the track exists. Existing guardrails, barriers, chains or handwires are only to be replaced at the end of their life if a significant hazard exists.	Guardrails and barriers shall not be used on routes. Handwires and chains may be used where a significant hazard exists.
Viewing platforms	Viewing platforms may be provided in appropriate places along the path	Viewing platforms may be provided in appropriate places along the track	Viewing platforms may be provided in appropriate places along the track	Viewing platforms are not generally provided on these tracks	Viewing platforms are not generally provided	Viewing platforms are not provided

Shelters			Shelters may be provided in appropriate locations along the track where: (a) The total walking time from the start of the track without shelter exceeds three hours; and (b) There are significant numbers of users walking or using the whole track; and (c) There is a significant level of exposure to adverse weather conditions on the most distant parts of the track - Where shelters are provided, toilets should also be provided at those locations that are or may become popular eating stops.	Shelters may be provided in appropriate locations along the track where: (a) The total walking time from the start of the track or between huts without shelter exceeds four hours; and (b) There are significant numbers of visitors using the track; and (c) There is exposure to adverse weather conditions on the most distant parts of the track - Where shelters are provided, toilets should also be provided at those locations that are or may become popular eating stops.	Shelters may be provided in appropriate locations along the track where: (a) The total walking time from the start of the track return (if on a day tramping track) without shelter, or from the start of the track or between huts without shelter exceeds four to five hours; and (b) There are significant numbers of relatively inexperienced visitors using the track; and (c) There is exposure to adverse weather conditions on the most distant parts of the track - Where shelters are provided, toilets should also be provided at those locations that are or may become popular stops, provided the visitor numbers warrant it.	Shelters are not provided.
Stiles, turnstiles and kissing gates	On paths catering for people with mobility difficulties, no stiles, turnstiles or kissing gates are to be used.	On tracks catering for people with mobility difficulties, no stiles, turnstiles or kissing gates are to be used.	May be used	May be used	May be used	May be used
Seats and picnic tables	May be provided.	May be provided in appropriate places along the track.	May be provided in appropriate places along the track	Seats and picnic tables are not generally provided.	Seats and picnic tables are not generally provided.	Seats and picnic tables are not provided.

Table 5 – Comparison of Track Specifications (continued)

Track category	Path 1 (UR)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
Vegetation Clearance	Vegetation must be cleared from the total width of the path formation, and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface. Windfalls blocking the path are to be cleared within 48 hours of notification. All cut vegetation is to be removed from the path surface and disposed of out of sight of path users.	Vegetation must be cleared from the total width of the track formation up to a maximum of 1 m either side of the centre of the track, and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface. Windfalls blocking the track are to be cleared within 48 hours of notification. All cut vegetation is to be removed from the track surface and where practicable, out of view of the track.	Vegetation must be cleared from the total width of the track formation up to a maximum of 1 m either side of the centre of the track, and to a height of 2.5 m, giving visitors a clear passage and an unimpeded view of the surface. Significant tree limbs and trunks may intrude into or above the track provided these do not obstruct users or place them at risk. Windfalls blocking the track are to be cleared (or the track diverted) within 14 days of notification. All cut woody vegetation is to be removed from the track surface and if practicable, out of view of the track. Where the track is an actively managed historic site, vegetation control may be managed so as to protect the historic integrity of the track.	Vegetation must be cleared from the total width of the track formation up to a maximum of 0.5 m either side of the centre of the track, to ensure that there is a clear passage and clear view of the track walking surface, the way ahead and the next marker/pole. Windfalls blocking the track are to be cleared or the track diverted within 7 days of notification during the peak season (Great Walks) or 14 days during the peak season (Easy Tramping Tracks). All cut woody vegetation is to be removed from the track surface and where practicable, out of view of the track. Where the track is an actively managed historic site, vegetation control may be managed so as to protect the historic integrity of the track.	Vegetation must be cleared to ensure there is a clear passage and a clear view of track markers, poles or cairns. Where a formed or benched track is required vegetation is to be cleared to ensure a clear view of the track surface and the way ahead. Where the track is an actively managed historic site, vegetation control may be managed so as to protect the historic integrity of the track.	Vegetation and windfalls are to be cleared to enable adequate vision of markers or the route.

Signage	Paths shall be clearly signposted with directional signs at entrances and at all junctions. An orientation/track information sign should be provided at path entrances where more than one walking option exists. Where sprays or chemicals have been or are to be used temporary signs will be erected as a warning to track users. Paths catering for people with mobility difficulties shall be clearly labelled as such by use of appropriate symbols and words at path entrances and at junctions with any tracks that are not paths.	Tracks shall be clearly signposted with directional signs (that include both walking times and distances) at all track entrances and track junctions. Significant points of interest along or at the end of the track will be signposted. An orientation/track information sign should be provided at track entrances where more than one walking option exists. Where sprays or chemicals have been or are to be used temporary signs will be erected as a warning to track users. At locations where there is a significant change from Short Walk to another standard of track, signs will be provided with appropriate symbols and words to describe the change. Tracks catering for people with mobility difficulties shall be clearly labelled as such by use of appropriate symbols and words at track entrances and at junctions with other tracks.	Tracks shall be clearly signposted with directional signs (that include both walking times and distances) at all track entrances and track junctions. Significant points of interest along the track will be signposted. An orientation/track information sign should be provided at track entrances where more than one walking option exists. Where sprays or chemicals have been or are to be used temporary signs will be erected as a warning to track users. At locations where there is a significant change from this standard to another standard of track, appropriate symbols and words to describe the change will be used on the relevant sign. Permanent hazard warning signs are only to be installed where there is no other practicable option.	Direction signs are to be placed at all track entrances, and at junctions or crossing points where there is a significant risk of getting lost. Direction signs are to show walking times and may show distances. Where sprays or chemicals have been or are to be used temporary signs will be erected as a warning to track users.	Direction signs should be installed at junctions with Tramping Tracks, Easy Tramping Tracks and Great Walks. Direction signs will show walking times and may show distances.
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Table 5 – Comparison of Track Specifications (continued)

Table 5 – Comparison of Track Specifications (continued)						
Track category	Path 1 (UP)	Short Walk 2 (SST)	Walking Track 3 (DV)	Great Walk/Easy Tramping Track 4 (BCC)	Tramping Track 5 (BCA)	Route 6 (RS)
Track condition Information	The presence of any poor path condition is to be brought to the attention of visitors at visitor information centres and/or at path entrances.	The presence of any poor track condition is to be brought to the attention of visitors at visitor information centres and/or at track entrances.	Visitors will be informed of the presence of any temporary poor track condition, such as recent slips, or permanent track information, such as unbridged streams, at visitor information centres and/or at track entrances.	The presence of any difficult track section, such as unbridged streams, or temporary poor track condition, such as recent slips, will be brought to the attention of visitors at visitor information centres, track entrances, and/or huts.	Track condition information regarding, for example, an unbridged stream or steep, unstable slips, is to be made available at track entrances or through off-site means.	Route condition information (eg about unbridged rivers) may be provided through off-site means. Unmarked routes that are defined by use, and that get significant use may be shown on maps and route guides.
Historic Tracks			Historic walking tracks include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile and alignment of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.	Historic tramping tracks include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile and alignment of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.	Historic tramping tracks include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile and alignment of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.	Historic routes include old railways, tramways, roads, trails used by Māori, water race tracks, graded horse tracks and other tracks that are of either high historic heritage value and/or actively managed historic tracks. The heritage value of such tracks must be taken into account in track upgrading and maintenance. The profile and alignment of these tracks may require a different maintenance regime and different repair solutions. In general any deviation from the original track alignment and grade is to be avoided.

Tracks for cyclists/mountain-bikers and pedestrians	Variations to the above specifications are: No steps to be used. No walk over stiles to be used. Vegetation clearance, especially on corners, will be sufficient to allow good visibility (a 10 m minimum sight distance) for cyclists and walkers. The track shall be clearly labelled as a track for pedestrians and cyclists by use of appropriate symbols and words at track entrances and at junctions with any tracks on which cycles are not permitted. Where there is a long section of track at the minimum width of 0.75 m, passing bays (min. width 1 m and min. length 3 m) will be developed in practical and appropriate places. The track surface is to be well compacted so that tyres do not unduly degrade the surface. Open culverts are to be no greater than 150 mm in width. Wooden culverts and water cutout boards must not protrude more than 30 mm above the surface of the track	Variations to the above specifications are: No more than 5 % of the total length of track may have steps - Walk over stiles should not be used Vegetation clearance, especially on corners, will be sufficient to allow good visibility (a 10 m minimum sight distance) for cyclists/mountain-bikers and walkers The track shall be clearly labelled as a track for pedestrians and cyclists/mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which cycles are not permitted Where there is a long section of track at the minimum width of 0.75 m, passing bays (min. width 1 m and min. length 3 m) will be developed in practical and appropriate places The track surface is to be well compacted so that tyres do not unduly degrade the surface. Open culverts are to be no greater than 200 mm wide. Wooden culverts and water cutout boards must not protrude more than 50 mm above the surface of the track. The minimum walking surface width is 0.75 m.	Variations to the above specifications are: No more than 10 % of the total length of track may have steps. Vegetation clearance, especially on corners, will be sufficient to allow good visibility (a 10 m minimum sight distance) for mountain-bikers and pedestrians. The track shall be clearly labelled as a track for pedestrians and mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which mountain-bikes are not permitted. Where there is a long section of track at the minimum width of 0.6 m, passing bays (min. width 1 m and min. length 3 m) will be developed in practical and appropriate places. The track surface is to be well compacted so that tyres do not unduly degrade the surface. Open culverts are to be no greater than 200 mm in width. Wooden culverts and water cutout boards must not protrude more than 50 mm above the surface of the track. The minimum walking surface width is 0.6 m.	Variations to the above specifications are: Vegetation clearance, especially on corners, will be sufficient to allow good visibility for mountain-bikers and pedestrians. The track shall be clearly labelled as a track for pedestrians and mountain-bikers by use of appropriate symbols and words at track entrances and at junctions with any tracks on which mountain-bikes are not permitted. The minimum rideable surface width is 0.3 m.	None
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(1) Path

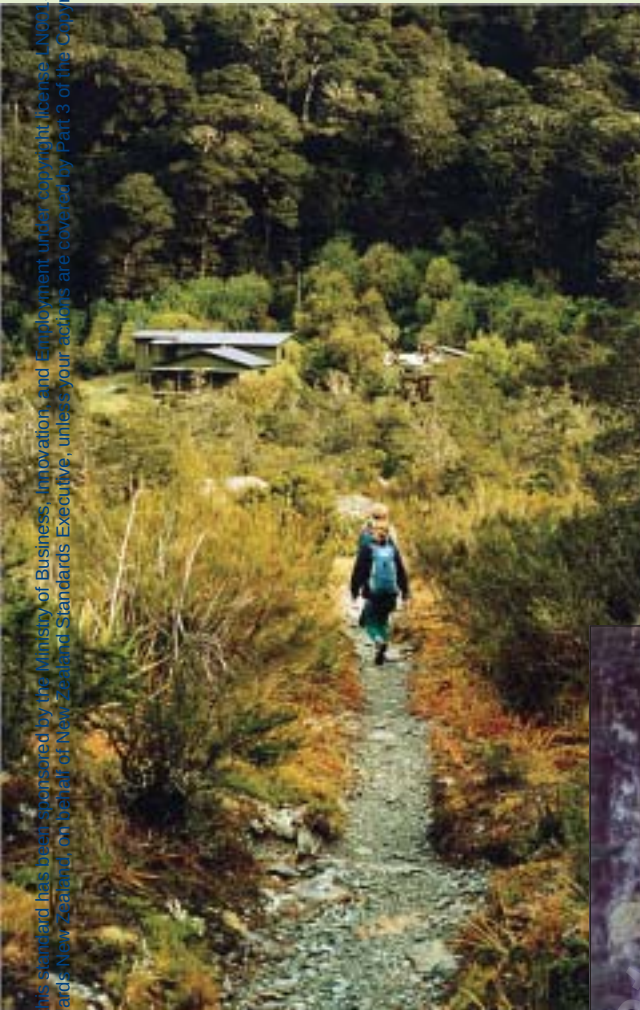


(2) Short Walk



(3) Walking track

Figure 11 – Illustration of track categories



(4) Great Walk/Easy Tramping Track



(5) Tramping Track



(6) Route

3 Design of Outdoor Visitor Structures

3.1 Structure

A typical example of an outdoor visitor structure is given in figure 12.

3.1.1 General

The design of outdoor visitor structures shall comply with the requirements for loads arising from gravity, wind, earthquake and snow. Design criteria shall comply with NZS 4203 unless otherwise stated.

For the purpose of deriving loads to be applied to outdoor visitor structures, the assumed life of these structures shall be 50 years (irrespective of the intended life selected according to 3.11.2 in this Handbook).

C3.1.1

This part of the Handbook is primarily aimed at engineers and technical people familiar with existing Standards such as NZS 3604 and NZS 4203.

Outdoor visitor structures are basic structures that are generally provided for the use of a wide range of visitors. They are either designed to be part of the track structures, or to assist and promote visitor enjoyment of outdoor areas.

Outdoor visitor structures are defined in Part 1 of this Handbook, and include boardwalks, pedestrian bridges, viewing platforms and other similar, open, non-habitable buildings with no services.

This part of the Handbook is intended to be further developed to provide for approval as a means of compliance with Clause B1 of the NZBC for application to outdoor visitor structures. It provides means of compliance that are appropriate to the:

- (a) Environment in which the structure is built;*
- (b) Intended use of the structure (activities undertaken and experience sought by visitor groups); and*
- (c) Users of the structure (needs of each visitor/user group).*

3.2 Classification

Outdoor visitor structures shall be classified as Category IV as specified in NZS 4203.

3.3 Serviceability Limit State

3.3.1 Application of NZS 4203

All of the members of a structure, except where the structure is a cable structure, shall satisfy the serviceability limit state requirements of NZS 4203 where:

- (a) The site in which the structure is located is classified as an Urban Resident (user group 1) or Short Stop Traveller (user group 2) site; and
- (b) The fall surface under the structure is classified as hazardous as defined in table 21.

In all other cases the serviceability limit state provisions of NZS 4203 do not apply.

3.3.2 Short-term load factor

The short-term load factor, ψ_s , for the serviceability limit state shall be 1.0. The deflection limit shall be span/200.

3.4 Ultimate Limit State

The structure as a whole and all its members shall be designed to support the combinations of factored loads and forces in compliance with NZS 4203 as modified in this section.

3.4.1 Reduction of basic live load

Basic live loads shall be modified by multiplying them by the visitor group factor (K_{vg}) given in table 6 and the consequence of failure factor (K_{ff}) given in table 7.

Table 6 – Visitor group factor		
User group	Visitor group	K_{vg}
1,2	UR, SST	1.0
3,4	DV and BCC	0.9
5,6	BCA and RS	0.8

When considering the overall stability of the structure against overturning K_{vg} shall be taken as 1.0.



Figure 12 – Bridge over Heaphy River

Table 7 – Consequence of failure factor	
Effective fall height (m)	K_{ff}
< 1.5	0.8
1.5 – 3.0	0.9
> 3.0	1.0

3.4.2 Reduction factors for concentrated loads

Except for the calculation of total design live load on restricted load structures, concentrated loads shall not be modified by the reduction factors K_{vg} and K_{ff} .

3.4.3 Area reduction factor

The area reduction factor, Ψ_a , shall be taken as 1.0.

3.4.4 Live load combination factor

Where provided for in these combinations, the live load combination factor, for the ultimate limit state, Ψ_u , shall be 0.0.

3.5 Basic Live Load

When considering the overall stability of the structure against overturning K_{vg} shall be taken as 1.0. The concentrated live loads, Q_b , shall be applied to individual members over the actual area of application where known. Where the area of the application is not known, the local point load shall be distributed over an area not greater than 150 mm x 150 mm for decking and applied in the position giving the most adverse effect.

3.5.1 Structures other than restricted load structures

The basic live load for the ultimate limit state, Q_b , shall be taken from table 8. The design distributed loads, uniform line loads and concentrated live loads shall be considered separately.

Table 8 – Basic live loads			
Spatial occupancy	Distributed load (kPa)	Line load (kN/m)	Concentrated load (kN)
Viewing platforms	5.0	N/A	1.8
Access structures including stairs	4.0	N/A	1.8
Ladders	N/A	1.0 ⁽¹⁾	1.8
Structures used by light maintenance vehicles	As above	N/A	6 x 1.2 ⁽²⁾
NOTE –			
(1) Applied vertically, measured per metre run of ladder.			
(2) Consider point loads axle and wheel spacings for vehicles and trailers. To be calculated from actual data but if no data is available, default to the following value. Three axle loads at 1.5 m centres longitudinally each consisting of two point loads of 1.2 kN spaced 500 mm apart.			

3.5.2 Restricted load structures

The basic live loads for the ultimate limit state are described in 3.5.2 (a) and 3.5.2.(b). The concentrated point load shall be taken as 1.8 kN.

- (a) The total design live load for the ultimate load state, on restricted load structures, Q_r , shall be taken from table 8. This shall be distributed over the corresponding area, A_r , listed in table 9 and positioned to give the most adverse design condition.
- (b) The design per person total design live load and the concentrated point load shall be considered separately. Ten persons shall be the maximum number of persons designated for a restricted load structure.

Table 9 – Basic live loads for restricted load structures		
Max. number of persons	Total imposed load (kN)	Loaded area, A_r (m ²)
Single person	3.6	0.25
Two persons	4.8	0.50
Five persons	9.0	1.25
10 persons	12.0	2.50

C3.5.2

Values of Q_b for restricted load structures are based on the per person load of 1.2 kN per person increased by an overload factor which varies from 3.0 for a single person down to 1.0 for 10 persons.

It is considered that mountain-bike use will not give rise to loads greater than those set out in table 8.

3.5.3 Factored live load for ultimate limit state

The factored live load for the ultimate limit state, Q , for distributed loads shall be:

$Q = \Psi_a \times Q_b \times K_{vg} \times K_{ff}$ Equation 1

Where Ψ_a in accordance with 0; and

The factored live load for the ultimate limit state, Q , for concentrated loads shall be:

$Q = Q_b$

3.6 Ultimate Limit State for Barriers

3.6.1 Basic live load on barriers

The basic live load, Q_b , acting on barriers shall be in accordance with table 10.

Table 10 – Basic live loads for barriers					
	Top Rail			Infill	
Type of structure	Visitor group (User group)	Horizontal (kN/m)	Vertical (kN/m)	Horizontal (kPa)	Any (kN)
Viewing	UR, SST (1, 2)	1.5	0.75	1.25	0.5
	DV, ON* (3)	1.5	0.75	1.25	0.5
	BCC, BCA & RS (4, 5, 6)	0.75	0.75	1.0	0.5
Access	UR, SST (1,2)	0.75	0.75	1.0	0.5
	DV, ON* (3)	0.36	0.36	0.75	0.25
	BCC, BCA & RS (4, 5, 6)	0.22	0.22	0.75	0.25
NOTE – Horizontal and vertical loads need not be assumed to act concurrently. * See 2.1.1 Note 4					

3.6.2 Reduction of basic live load on barriers

The design live load, Q , shall be calculated by multiplying the basic live load Q_b , by the consequence of failure factor, K_{ff} , given in table 7.

The minimum design live load on a top rail shall be 0.22 kN/m.

$$Q = Q_b \times K_{ff} \dots \dots \dots \text{Equation 2}$$

The loads for the top rail and any infill shall be applied separately.

Loads specified in this clause and those due to wind and earthquake need not be assumed to act concurrently either with the imposed live load or with each other.

3.7 Other Loading

3.7.1 Lateral loads

The minimum lateral load requirements applied to any structure, due to the movement of persons, shall be 10 % of the design live load applied at deck level.

$$Q_l = 0.1 \times Q \dots \dots \dots \text{Equation 3}$$

The combinations of factored loads and forces for the ultimate limit state shall include the following:

1.2G, Q and Q_l .

3.7.2 Provisions for earthquake

These provisions shall be in accordance with the requirements set out in part 4 of NZS 4203 except that the live load combination factor for the ultimate limit state, Ψ_u , shall be equal to 0.0.

C3.7.2

In most cases the lateral loads specified in 3.7.1 will govern.

3.8 Provisions for Snow and Ice Loads

The basic snow load, S_g , applied over the plan projection of the deck, shall be calculated from:

Where:

$S = C_c \times C_e \times C_r \times S_g$ Equation 4

S_g (the open ground snow load) shall be as given by NZS 4203 and the following values shall be applied for the corresponding parameters given below:

$C_c = 1.0$

$C_e = 1.2$

$C_r = 1.0$

The snow load S shall be distributed uniformly over the whole deck.

Where site history and structure characteristics indicate that containment of snow trapped between handrails, barriers and other built impediments is likely to occur, assessment of snow loading shall allow for this effect.

3.9 Foundations

Foundations shall be designed taking into account the serviceability limit state exemptions set out in 3.3.1 of this document.

C3.9

It is recognized that outdoor visitor structures are basic non-habitable buildings. They will sometimes be located on unstable ground and subject to natural hazards.

3.10 Material Standards

Outdoor visitor structures shall be designed in concrete, concrete masonry, steel or timber. Material properties shall be as given in the appropriate New Zealand Standard as listed in New Zealand Building Code verification method B1/VM1 of Approved Document B1.

Material properties for cable elements of cable structures shall conform to the specifications listed in table 11, or approved equivalent.

Table 11 – Material specifications for cable structures		
Subject	Standard	Name
Cables	AS 2841:1986	Galvanized steel wire strand
Adjusters	AS 2319:2001	Rigging screws and turnbuckles
	DIN 1480:1975	Turn buckles, forged (open type)
Shackles	AS 2741:2002	Shackles
	RR C 271B	US Federal Specification
Chain	AS 2321:2001	Short-link chain for lifting purposes
Rope Grips	FF C 450	US Federal Specification (only to be used for temporary connections)

The ideal strength of cable elements shall be the proof load of the element as taken from the above Standards. Where, in these Standards a proof load is not specified, the ideal strength of a cable element shall be taken to be as twice the working load limit.

The strength reduction factor ϕ to be applied to the ideal strength of cable elements to derive their dependable strength shall be 0.9.

3.11 Durability

3.11.1 General

This section provides guidelines for the assessment of intended life of a structure and specific provisions for the durability of outdoor visitor structures having an intended life of 25 years.

C3.11.1

It is intended that this part of the Handbook be further developed to provide for approval as a means of compliance with Clause B2 of the NZBC for application to outdoor visitor structures. It provides means of compliance that are appropriate to the:

- (a) Environment in which the structure is built;*
- (b) Intended use of the structure (activities undertaken and experience sought by visitor groups); and*
- (c) Users of the structure (needs of each visitor/user group).*

NOTE – Clauses for which specific solutions are not provided shall comply with the New Zealand Building Code as set out in the New Zealand Handbook and Approved Documents or shall be the subject of an Alternative Solution.

3.11.2 Intended life of the structure

The intended life of the structure shall be assessed taking into account the environment in which it is to be built and the use to which it is to be applied. The intended life of a structure shall be specified in the building consent application.

3.12 Environment Classifications

3.12.1 Marine wetting environment

Marine wetting environment shall include any location below 2.0 m above High Water Ordinary Spring Tide level.

3.12.2 Marine spray environment

Marine spray environment shall generally include any location that is within a horizontal distance of 500 m of the sea including harbours, or 100 m from tidal estuaries and sheltered inlets. The sea spray zone also includes all offshore islands.

3.12.3 Corrosion zones

Corrosion zones shall be those set out in the corrosion zone map in NZS 3604.

3.12.4 Timber hazard environments

Timber hazard environments shall be as given in table 12.

3.13 Durability of Building Elements

All building elements except signs shall be designed to have a durability to achieve the intended life of the structure. Signs shall be designed to have a minimum durability of six years in accordance with F1 and F4 of the New Zealand Building Code.

3.13.1 *Assessment of intended life*

The intended life of an outdoor visitor structure shall be 25 years unless a shorter or longer intended life is considered appropriate. In assessing the intended length of life of a structure the following shall be taken into account:

- (a) For shorter intended life
 - (i) Likelihood of the structure being inundated by natural events such as flooding, avalanche or riverbed movement
 - (ii) Aggressive corrosive environment such as marine, coastal or volcanic where a 25-year durability cannot be achieved
 - (iii) Future likely change of use;
- (b) For longer intended life
 - (i) Importance of the structure for life safety, to the community and/or for access to other structures
 - (ii) Benign corrosive environment where durability in excess of 25 years can be achieved without substantial cost penalty.

3.14 Design for Inspection and Maintenance

Structures shall be designed to allow for access for inspection of components and will provide for the removal of elements for inspection and/or replacement of elements without major dismantling.

3.15 Building Elements Having a Durability of 25 Years

Building elements complying with the following clauses shall be deemed to have a durability of 25 years in the conditions described. (This does not exclude the use of other materials that have proven durability equal to or exceeding 25 years.)

3.15.1 *Timber components*

3.15.1.1

Sawn timber shall comply with NZS 3602.

3.15.1.2

Timber poles shall comply with NZS 3605.

3.15.1.3

Timber treatment shall comply with NZS 3640.

3.15.1.4

Timber components shall comply with table 12.

Table 12 – Timber components			
Location	Species	Grade or standard reference	Treatment
Poles not in contact with ground	Pinus Radiata	NZS 3605	H4
Round or sawn piles and poles in contact with ground	Pinus Radiata	NZS 3605	H5
Round or sawn piles and poles fresh water inundated	Pinus Radiata	NZS 3605	H5
Round or sawn piles and poles sea water inundated	Pinus Radiata	NZS 3605	H6
Sawn timber not in contact with ground in high rainfall and corrosive areas	Pinus Radiata	Structural	H4
Sawn timber not in contact with ground	Pinus Radiata	Structural	H3.2
Sawn timber in contact with ground	Pinus Radiata	Structural	H5
Sawn timber fresh water inundated	Pinus Radiata	Structural	H5
Sawn timber sea water inundated	Pinus Radiata	Structural	H6

3.15.2 Timber fixings

Timber fixings shall comply with the requirements of table 13.

Table 13 – Protection of timber fixings		
Environment	Fixing material	Protection of bolts
Marine Wetting	Type 316 Stainless Steel	None
Marine Spray	Type 316 Stainless Steel	None
Acidic Bush (soil pH < 5)	Hot Dipped Galvanized or Type 304 Stainless Steel	GP Grease in Pre Greased Holes (Galv. Bolts only)
CORROSION ZONE 1	Hot Dipped Galvanized or Type 304	GP Grease in Pre Greased Holes
CORROSION ZONE 2	Hot Dipped Galvanized	GP Grease in Pre Greased Holes
CORROSION ZONE 3	Hot Dipped Galvanized	GP Grease in Pre Greased Holes
CORROSION ZONE 4 (Volcanic Regions)	Hot Dipped Galvanized	GP Grease in Pre Greased Holes

3.15.3 Concrete components

Concrete shall comply with NZS 3109 and concrete masonry shall comply with NZS 4210.

3.15.4 Steel components

Steel components shall be surface treated according to the requirements of table 14, subject to cosmetic requirements.

Table 14 – Protection of steel components

Zone	Type of coating system	Recommended corrosion protection system options
Marine Wetting	Paint	LP1, LP2, LP3, LP4, LP5, LP6
	Galvanized	GZLP
	Metal Spray	MSALP, MSZLP
Marine Spray	Paint	LP1, LP2, LP3, LP4, LP5, LP6
	Galvanized	GZLP
	Metal Spray	MSALP, MSZLP
Acidic Bush (Soil pH <5)	Paint	LP1, LP2, LP3, LP4, LP5, LP6
	Galvanized	GZLP
	Metal Spray	MSALP, MSZLP
Corrosion Zone 1 (Coastal Fringe)	Paint	LP1, LP2, LP3, LP4, LP5, LP6
	Galvanized	GZLP
	Metal Spray	MSALP, MSZLP
Corrosion Zone 2 (Natural hazard, No severe areas)	Paint	LP1, LP2, LP3, LP4, LP6
	Galvanized	GZ
	Metal Spray	MSA, MSZ
Corrosion Zone 3 (Very low natural corrosivity)	Paint	LP1, LP2, LP3, LP4, LP6
	Galvanized	GZ
	Metal Spray	MSA, MSZ
Corrosion Zone 4 (Geothermal Activity)	Paint	LP1, LP2, LP4, LP5, LP6
	Galvanized	GZLP
	Metal Spray	MSALP, MSZLP
NOTE – (1) Protection system abbreviations are used as in AS/NZS 2312. (2) Refer to AS/NZS 2312 tables 7.5, 7.6, 7.7 for details of protection systems. (3) Brief details of protection systems are as follows: LP1 Inorganic zinc with high build intermediate and top coats (265 to 325 microns) LP2 Inorganic zinc with high build top coats (240 to 275 microns) LP3 Inorganic zinc silicate AS/NZS 3750.15 (100 to 150 microns) LP4 Inorganic zinc with high build epoxy intermediate coat and acrylic latex top coat (225 to 275 microns) LP5 Ultra high-build two pack (1000 to 3000 microns) LP6 Inorganic zinc silicate with high build epoxy intermediate coat and two pack top coat (260 to 335 microns) GZ Hot dip galvanized GZLP Hot dip galvanized with prime coat and top coat MSA Aluminium metal spray MSALP Aluminium metal spray with seal coat and top coat (135 microns) MSZ Zinc metal spray MSZLP Zinc metal spray with seal coat and top coat (135 microns)		

3.16 Cable Elements

3.16.1 General

Cables shall be of a marine grade. Hardware shall be hot dip galvanized complying with AS 2741.

Additional corrosion protection of petrolatum-based priming and wrapping anti corrosion systems (such as Denso products) shall be applied (as specified by the manufacturer), to the exterior of hardware items in accordance with table 15.

Table 15 – Protection of cable structure hardware				
Environment	Rope grips	Shackles	Terminations	Adjusters
Marine Wetting	Y	Y	Y	Y
Marine Spray	Y	Y	Y	Y
Acidic Bush (pH < 5.0)	Y	Y	Y	Y
CORROSION ZONE 1	Y	N	N	Y
CORROSION ZONE 2	Y	N	N	Y
CORROSION ZONE 3	Y	N	N	Optional
CORROSION ZONE 4	Y	Y	Y	Y
NOTE – Y = Yes, additional corrosion protection required; N = No additional corrosion protection required.				

3.16.2 Rigging screws and adjusters

Rigging screws shall be filled with a petroleum wax based spray or brush applied anti-corrosion product before assembly, regardless of the corrosion environment.

Except in marine or volcanic corrosion environments the threads of all adjusters shall be protected up to the initial 3-monthly inspections and adjustment with the petrolatum-based priming and wrapping (such as Denso products) anti corrosion system. Following final adjustment, the primer and mastic shall be reinstated, and the whole of the adjusters protected with petrolatum-based priming and wrapping tape.

In marine or volcanic corrosion environments the whole of adjusters shall be protected with the Denso Multi Purpose Primer, Denso Mastic, and Denso Tape following initial adjustment. The protective system shall be fully reinstated following each subsequent adjustment or inspection.

3.16.3 Inspection and maintenance

Outdoor visitor structures shall be inspected on a two-yearly cycle by a person competent to undertake the inspection.

High-risk structures shall be inspected on a six-yearly cycle by a competent structural engineer, as shown in table 16.

All defects shall be reported and shall be actioned within six months of being reported.

Table 16 – Re-inspection by engineer every six years			
Fall Surface	Visitor group (User group)	Structure type	Fall height (m)
Hazardous	Any	All	All
All	Any	Vehicle bridges, cable structures, jetties, wharves, gantries / galleries, playground equipment, helicopter platforms	All
All	UR, SST, DV & ON (1, 2 & 3)	All	≥ 1.5
All	BCC, BCA & RS (4, 5 & 6)	Viewing platforms	≥ 1.5
All		Pedestrian bridges, boardwalks, ladders, staircases, ramps Total length ≥ 2.0m	≥ 2.0
All		Handrail / guide wire / cable, safety fence / barrier, historic structures, retaining walls, stiles, other structures	≥ 2.0

3.17 Access and Structures for People with Disabilities

This section provides information and requirements for the provision of accessible facilities. Further information regarding the provision of accessible facilities can be found in NZS 4121.

Where structures can be approached by persons with disabilities, the structure shall be treated as an outbuilding. Those structures that cannot be approached by persons with disabilities, without assistance, shall be treated as ancillary buildings as in NZS 4121.

3.17.1 Urban Resident and Short Stop Traveller (User Group 1 and 2) sites

All structures designed for UR (user group 1) and SST (user group 2) sites shall be accessible.

C3.17.1

Outdoor visitor structures for UR and SSTs (user groups 1 and 2) will be located in those areas that are readily accessible by motor vehicle. These structures may, either when the structure is built or in the future when the track is upgraded, be approached and used independently by people with disabilities.

These requirements are slightly reduced from the requirements in NZBC Clause D1 for people with disabilities in terms of stair gradients and use of open risers. This allows people with disabilities visiting a UR or SST (user group 1 or 2) site to have a similar sense of challenge in the outdoor environment as able-bodied people.

The use of closed risers is avoided because closed risers would create a hazard by collecting debris that would otherwise wash off or be blown off open risers.

3.17.2 Day visitor (user group 3) sites

If outdoor visitor structures on day visitor (user group 3) sites can be approached unaided by persons using wheelchairs, they shall be designed to be accessible.

C3.17.2

Outdoor visitor structures for day visitors (user group 3) are located in those areas which are both readily accessible by motor vehicle and up to half a day's foot travel from a road end. Therefore only those structures that are close to the road end and are able to be approached and used independently by people with disabilities on a track designed for UR or SSTs (user groups 1 or 2) shall be designed to be accessible. An assessment needs to be made for each day visitor (user group 3) structure.

3.17.3 Other sites

Outdoor visitor structures on BCC, BCA and RS (user group 4, 5 and 6) sites are not required to be accessible.

C3.17.3

These structures will not be accessible by motor vehicle and generally will be at least half a day's foot travel from a road end, or topography will prevent people with disabilities from reaching the structure. It is expected that distance and topography will prevent any structures being able to be visited by people with disabilities.

3.18 Structure Geometry

Requirements for UR and SST (user group 1 and 2) tracks shall apply to DV (user group 3) structures at road ends that are accessible.

3.18.1 Access widths

Minimum access widths are given in table 17. Structures such as suspension bridges or pole bridges may have widths less than those specified in table 17 for reasons of construction.

Table 17 – Minimum access widths		
User group	Visitor group	Minimum access width (m)
1 and 2	UR and SST	1.2
3	DV	0.75
4	BCC	0.6
5	BCA	0.6
6	RS	N/A

3.18.2 Kerbs

Kerbing that is a minimum of 75 mm high shall be provided for all edges from which there is a fall greater than 25 mm for all UR, SST and DV (user group 1, 2 and 3) structures required to be accessible.

3.18.3 Sloping structures

The maximum structure gradients shall be as in table 18.

Table 18 – Maximum structure gradients				
User group	Visitor group	Maximum structure slope	Maximum structure slope in degrees	Maximum rise between landings
1 and 2	UR and SST	1 in 12	4.8	0.75m
3	DV	1 in 10	5.7	No limit
4	BCC	1 in 6	9.5	No limit
5	BCA	1 in 3	18.4	No limit
6	RS	N/A	—	No limit

Additional requirements shall be as listed below:

- (a) Structures with a greater slope than 1 in 8 shall have footholds complying with NZBC Clause D1/AS1, table 4 for no loads carried.
- (b) Structures subjected to icing and other traction hazards such as leaf litter shall have slopes less than 1 in 8.
- (c) UR and SST (user group 1 and 2) sites that are not accessible due to site conditions (other than steps) may have slopes of 1 in 10.

3.18.4 Stairways

The geometrical standards and maximum rise between landings for stairs shall be as in table 19.

Table 19 – Stairway classification				
User group	Visitor group	Geometric requirements	Max. rise between landings (m)	Max. gradient
1, 2 and 3 (Accessible)	UR, SST and DV (Accessible)	Common and main private stairways as per NZBC table 6	2.5	37°
3 and 4	DV and BCC	Secondary private stairways as per NZBC table 6	4.0	41°
5 and 6	BCA and RS	Service, minor private stairways as per NZBC table 6	8.0	47°

The maximum gradient of a stair shall be 47° in accordance with NZBC Clause D1/AS1.

3.18.5 Ladders

3.18.5.1

Step type ladders complying with NZBC Clause D1/AS1 5.2 shall be provided where the required gradient is between 60° and 70°.

3.18.5.2

Rung type ladders complying with NZBC Clause D1/AS1 5.3 shall be provided where the required gradient is between 70° and 90°. In both cases, the rise of individual ladders shall not exceed 6.0 m.

C3.18.5.2

Ladder enclosures as per NZBC Clause D1/AS1 5.1.2 are impractical in the backcountry, because of the need to carry packs.

3.18.6 Handrails

Handrails shall be provided to stairs and step type ladders in accordance with NZBC Clause D1/AS1 6.0.

C3.18.6

Timber of 100 x 50 mm does not provide an acceptable handrail as it is too large to be graspable.

3.18.7 Slip resistance

Slip resistance on timber decking shall be provided by:

- (a) Galvanized 'chicken' netting wire continuously and securely stapled to the deck, or any other system that complies with verification method D1/VM1.
- (b) UV stable polymer grid stretched and stapled.

3.19 Provision of Barriers

3.19.1 General

Barriers shall comply with Acceptable Solution F4/AS1 of the Approved Documents of the NZBC and the NZBC, with variations as given below.

The provision of barriers may be the subject of an application for a waiver applied for from an individual territorial authority. Similarly a decision may be required to determine if a limit on application (First Schedule to the Building Regulations 1992, Clause F4.3.1) is applicable.

Solutions for which a waiver is applied for shall be based on this section.

3.19.2 Requirement for barriers

People may be able to fall from openings in the perimeter or deck of a structure, or from a sudden change of level within or associated with a structure. The circumstances when a barrier is required and the type of barrier applicable shall be as stipulated in 3.21.

Barriers may be deemed necessary from consideration of circumstances other than fall height such as:

- (a) High wind;
- (b) Extremes of snow; and
- (c) Ice or slippery conditions.

C3.19.2

The type of barrier provided is dependent on the type of hazard and the visitor/user group. A considered decision should be made taking all factors into account.

Specific use characteristics at a particular location may override the general requirements of the track classification. For example, road end use of a tramping track (BCA/user group 5) may dictate that a classification of a road end pedestrian bridge be SST (user group 2).

3.20 Effective fall heights

The effective fall height, H_e , shall be calculated by adding the impact surface adjustment value, H_{fs} , prescribed in table 20, to the measured fall height, H_f , (see figure 13 for diagrammatic description explaining the relationships between H_s , H_f & L_f).

$H_e = H_f + H_{fs}$ Equation 5

Where H_s is the structure height at the position being assessed.

H_{fs} may be negative, thus reducing the effective fall height.

Table 20 – Fall height calculations	
$H_s \leq 1.5 \text{ m}$	$L_f = 1.5 \text{ m}$
$1.5 < H_s \leq 2.0 \text{ m}$	$L_f = H_s$
$H_s > 2.0 \text{ m}$	$L_f = 2.0$

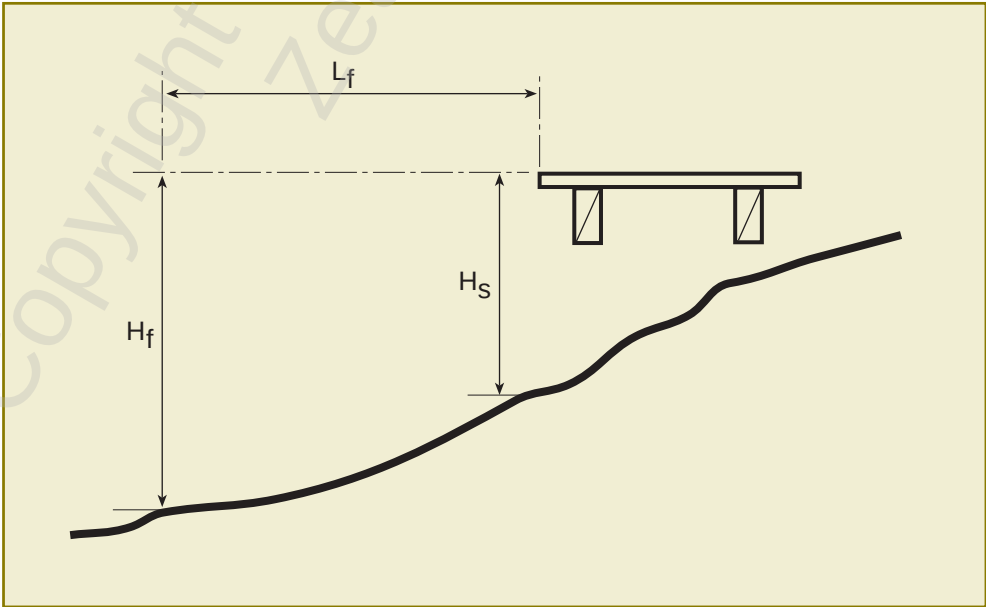


Figure 13 – Relationships of H values for fall height calculations

3.20.1 Assessment of fall impact surface

An assessment of the fall impact surface shall be made for the likelihood of serious harm being caused to the user from a fall, in accordance with table 21.

Table 21 – Fall surface assessment			
Fall surface category	Description of surface	H _{fs} (m)	Examples of surfaces within category
Benign	A surface presenting features that will tend to reduce the effect of impact	–0.5	(a) Deep moss (b) Soft vegetation (c) Shallow still water deep enough to cushion a fall (d) Swamp
Favourable	A surface presenting features that neither reduce nor amplify the effect of impact	0	(a) Gravel (b) Sand (c) Deep water with reasonable means of exit (d) Grass
Unfavourable	A surface presenting features that will tend to amplify the effect of impact	+0.5	(a) Jagged stones (b) Concrete pavement (c) Deep water without reasonable means of exit (d) Sharp vegetation
Hazardous	A surface presenting features that will result in serious harm regardless of the effect of fall to the initial impact point	+3.0	(a) Swiftly flowing water without means of exit (b) Boiling mud or water (c) Extended falls arising from rolling or sliding, following initial impact, on terrain whose slope exceeds 35°. Mitigating factors such as vegetation likely to arrest rolling shall be taken into account when assessing extended falls

3.21 Barrier types

3.21.1 The minimum requirements of suitable barrier types and the corresponding minimum requirements for these barrier types shall be in accordance with table 22.

Table 22 – Barrier types for given effective fall height in relation to visitor group						
Visitor Group/User Group	Structure type					
	Viewing		Access barriers – One side only		Access barriers – Both sides	
	H _e (m)	Type	H _e (m)	Type	H _e (m)	Type
UR and SST (1 and 2)	>1.0	A	N/A	N/A	1.5–3.0	B
					>3.0	A
DV (3)	>1.0	B	1.5–3.0	B	>3.0	B
BCC (4)	1.0–5.0	C	2.0–5.0	C	>5.0	C
	>5.0	B				
BCA and RS (5 and 6)	>1.0	C	>3.0	C	N/A	N/A

3.21.2 An A type barrier shall be provided where fall height (H_e) exceeds 1 m and the area is likely to be frequented by children under the age of six years.

C3.21.2

A guideline to the definition of 'frequented by children' may be gleaned from the following BIA determination.

BIA Determination 2001/9 dealt with a stair in an apartment building. The Authority decided that the stair was not an area frequented by children under the age of 6. Paragraph 6.1.5 said that the Authority takes the view that 'likely to be frequented by' means 'it could well be that such children will be there habitually. It is not enough that they could be there from time to time. If a location is frequented by children (under 6) then anyone visiting that location at an appropriate time could well expect children to be present on many if not most occasions'.

3.22 Barrier construction

3.22.1 Type A Barriers

If openings are present, they shall be small enough to prevent a sphere of 100 mm diameter or greater passing through.

Barrier components that are between 150 mm and 760 mm above the deck (or stair nosing) shall be constructed to prevent toe-holds from being obtained.

The triangular opening formed by the riser, tread and bottom rail at the open side of a stairway shall be constructed so that passage by a 150 mm diameter sphere is prevented.

3.22.2 Type B Barrier

Openings in type B barriers shall have maximum dimensions of either:

- (a) 200 mm horizontally between vertical balusters, or
- (b) 300 mm vertically (between intermediate rails) with any openings less than 150 mm between the deck and first horizontal rail.

3.22.3 Type C Barrier

Any openings in type C barriers shall have a maximum dimension of 500 mm vertically (between intermediate rails). There is no maximum dimension between vertical sections.

3.23 Signage

3.23.1 Light maintenance vehicles

Staff (and others) using a structure to carry a light maintenance vehicle (as described in table 8) may be subject to hazards. Any such potential hazard shall be identified using a sign that displays 'Light maintenance vehicle loads allowed for expressed in kg'.

The loading tablet shall be adjacent to the existing structure number and able to be seen from deck level by staff where possible. The tablet shall not be obvious to the public but obvious to staff aware of where to look for it. The tablet shall be on the true left where applicable with data stamped indelibly into the surface.

3.23.2 Restricted load structures

Restricted load structures shall display a sign at each end of the structure stating the maximum number of persons allowed on the structure at one time.

3.23.3 Signs required

Signs other than those detailed in this section, but required by other clauses of the NZBC shall comply with F8/AS1 of the NZBC.

Appendix A
Visitor/User Group and Track Requirements

(Informative)

Visitor groups (user groups) define the type of track or structure that will be used, by identifying the types of activities that are undertaken, and the level of acceptance of the type of track or structure. DOC uses the phrase ‘visitor group’ to broadly define the characteristics of the users of the facilities and places it manages. Other agencies may wish to use these visitor group names, but some may find it more helpful to use the user group numbers, or their own identifier, to distinguish track users.

The visitor groups/user groups identified and their corresponding track requirements are listed in the table below.

Table A1 – Visitor group and track requirements			
User group	DOC visitor group	Definition	Track requirements
1	Urban Resident (UR) ACC term not used by DOC	Visitors to urban parks usually in an urban setting. The majority of these visitors are usually local residents including unsupervised children, elderly people, people with disabilities and a wide range of fitness and physical ability. This group may visit for the recreational experience or to access other sites.	Paths (mostly in urban settings) Easy tracks catering for all ages and most walking abilities. Usually high standard of track surface and structures. Low risk tracks. Most will be accessible to people with disabilities.
2	Short Stop Traveller (SST)	Visitors, including both local and international, travelling either the main tourist highways and access roads or visiting places in their local area. They utilize the natural edge along these roads or in these local areas for visits of up to one hour return. The least mobile are commonly young families (parents with toddlers), younger age school parties, elderly people and, in some cases, people with disabilities.	Short Walks Tracks that take no longer than 1 hour return to walk. Easy tracks catering for all ages and most walking abilities. All watercourses bridged or culverted. Good track surface Low risk track.

Table A1 – Visitor groups and track requirements (continued)

User group	DOC visitor group	Definition	Track requirements
3	Day Visitor (DV)	Visitors, including both domestic and international, and local community visitors seeking an experience in a natural setting with a sense of space. This is normally associated with a road-end situation or scenic attraction with recreational opportunities for up to a full day's duration. The least mobile are commonly families with young children, school parties and elderly people.	Walking Tracks Tracks from a few minutes to a full day return. Relatively easy day walks. Tracks of a high standard that enable use by relatively inexperienced visitors with a low level of backcountry skill. Low level of risk with all but the smallest watercourses bridged or culverted and a reasonable track surface.
4	Back Country Comfort Seeker (BCC)	Visitors seeking a low risk, relatively comfortable experience in the backcountry. People who are generally inexperienced in a backcountry setting with a wide age range. They require easy access and want comfortable overnight accommodation. The least mobile are likely to be families and school parties with older children and teenagers, visitors who require guides and first-time trampers.	Easy Tramping Tracks and Great Walks Well constructed tramping tracks with a track surface and bridges across rivers and major streams. Low risk backcountry experience with facilities to ensure a relatively comfortable visit.
5	Backcountry Adventurer (BCA)	Visitors, usually New Zealanders, with a reasonable level of back-country skills and experience. They require only a basic track and access is largely on foot except where air or boat access is permitted.	Tramping Tracks These tracks generally follow the lie of the land and are commonly not formed. Includes day visits but ranging further into the back-country and not requiring the standard of tracks for day visitors. Tracks have bridges at key river crossings. Visitors accept a degree of risk and discomfort.

Table A1 – Visitor groups and track requirements (continued)

User group	DOC visitor group	Definition	Track requirements
6	Remoteness Seekers (RS)	Visitors, usually New Zealanders, with a high level of backcountry skills and experience seeking a wilderness experience with limited interaction with other parties. Access is largely on foot except where air or boat access is permitted, and activities are carried out with a high degree of self-reliance.	Route The route follows the lie of the land and is not formed. Few facilities
7	Overnighters (ON)	A group that includes both domestic and international visitors and local community visitors seeking an overnight experience in a predominantly natural setting. The setting is normally associated with road end or boat accessible sites. These visitors require high quality structures and services similar to those provided for Day Visitors. The overnights group generally accepts conditions encountered on a track. For the purposes of this document this group has similar characteristics to DV, and the DV track requirements will apply to them.	Overnighters generally accept the specifications for walking tracks.

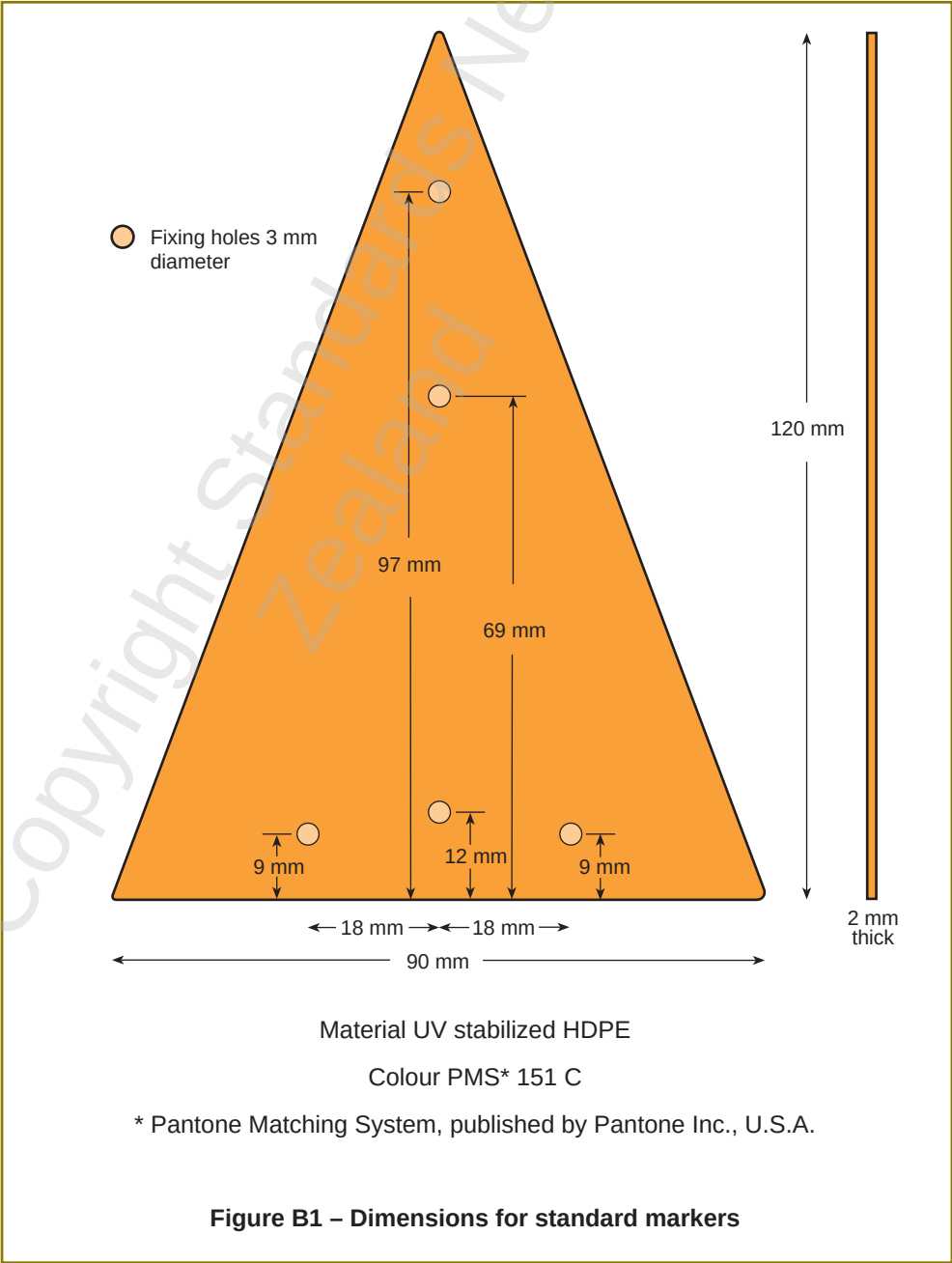
Appendix B
Track Marker Specifications

(Normative)

All track and route markers (other than poles or cairns) shall comply with the following requirements.

B1 Standard orange marker

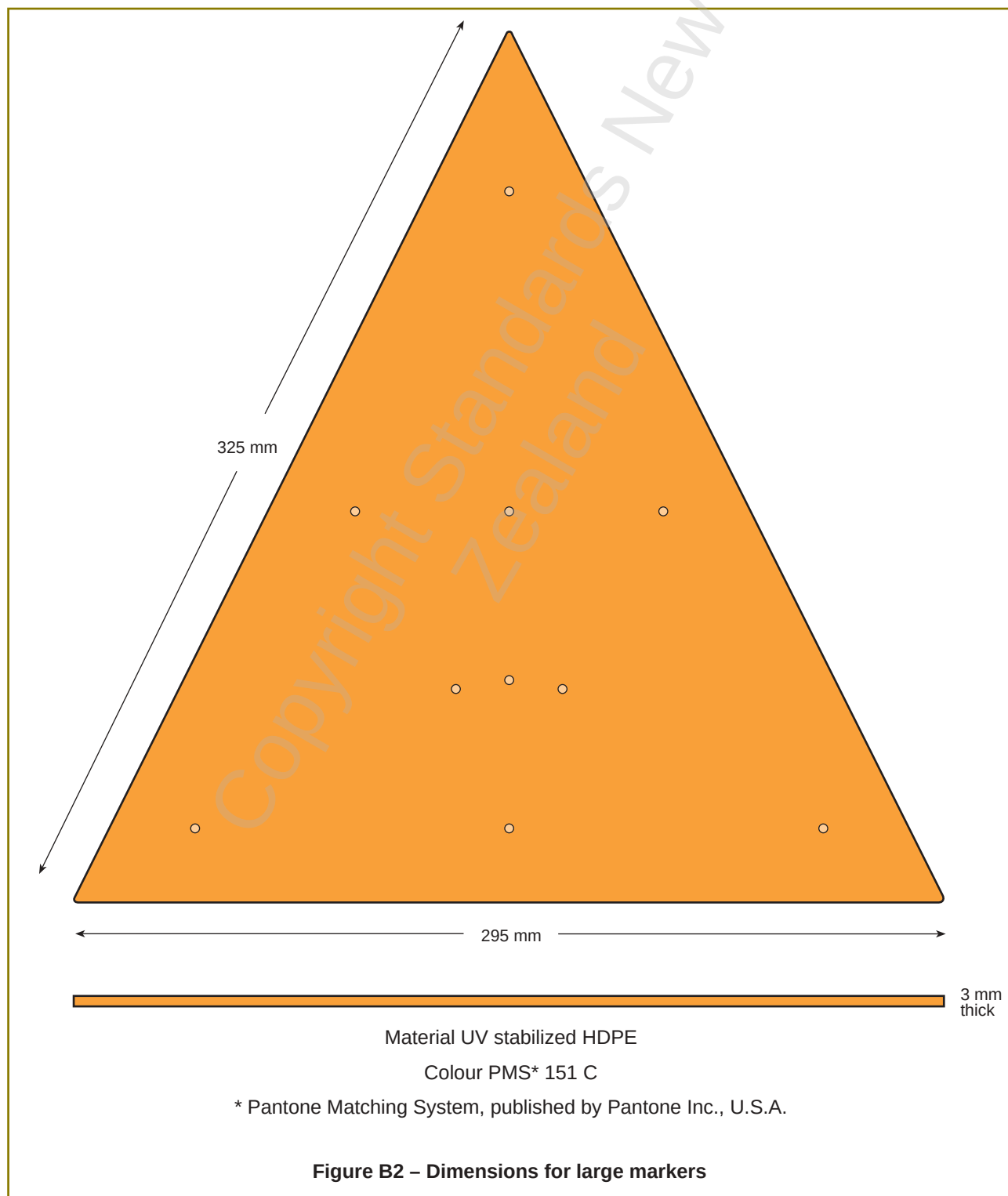
The standard orange marker set out in figure B1 shall be fixed with the apex upright for straight and winding sections of track. For indication of significant changes in direction, the apex shall point in the direction to be followed.



B2 Large orange marker

The large orange marker in figure B2 shall be used to mark the start of the track:

- (a) at the end of clearings in the bush;
- (b) where there is access onto or off a beach;
- (c) where an unmarked open section of track (e.g. that follows an open riverbed) enters the bush or scrub; or
- (d) where the track starts again across an unbridged stream or river.



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