



PROJECT SPECIFICATION:

MARLBOROUGH KAIKŌURA TRAIL TRUST

PICTON-KAIKŌURA TRAIL

Revision 1
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NZ Cycle Trail Guide August 2019

The Whale Trail

1. Contract works

1.1 Introduction

This Project Specification describes the Principal's requirements for the construction and completion of the Contract Works.

The contractor shall be responsible for the construction and completion in line with and so to meet all requirements of this Project Specification.

This Project specification will be used over the extent of the Contract from the Picton Elevation to Kaikoura.

1.2 Overall scope of works

The overall scope of the works is to construct:

A cycle trail (to be used by cyclists and pedestrians) between the Picton Elevation and Kaikoura

The Specific Contract Works will be broken down to individual construction sections and these will be set out in Section 1 Specific Site Location & works in the P& G.

1.3 Description of the contract works

The contract construction work includes the following:

- a) Formation of a general 2.2m wide cycling trail including vegetation clearance, water tabling, grading and compaction, fencing, importing of fill and installation of culverts as necessary.
- b) This width may vary in certain circumstances between 1.5m and 2.5m.
- c) Supply and compact 100mm depth of domestic grade AP30 to achieve a finished surface suitable for cycling.
- d) Supply and compact additional hardfill material so the track is constructed on a suitably compacted base.
- e) Associated establishment, site clearance, removal and other work necessary to complete cycling trail.

The Contractor shall supply all labour, materials, plant and supervision necessary to complete the work in accordance with the Contract Documents.

2. Particular requirements

2.1 Project outline

This project covers the development of a new cycling and walking trail linking Picton to Kaikoura.

The track will be constructed on land owned or administered by KiwiRail, Marlborough District Council, New Zealand Transport Agency, Land Information NZ(LINZ) and private landowners.

The track is to be constructed to meet the New Zealand Cycle Trail Grade 2 standard.

Refer NZCT Cycle Trail Design Guide August 2019. ([PDF copy attached in Appendix D](#))

2.2 Access

Access to the work site has been negotiated with KiwiRail, MDC, NZTA and selected private landowners. These will be identified on the plans, and a list of owners and contact numbers will be supplied to the Contractor.

Where access over private land is agreed outside the selected landowners, the contractor shall confirm in writing agreement before any construction commences to the Construction Manager.

The Contractor will be responsible for repairing damage caused to any land used for access by the contractor and his subcontractors (if any) for the construction works.

The Contractor will not be permitted to operate vehicles or machinery on any section of the completed track formation unless prior written approval is provided by the Construction Manager.

2.3 NZ Cycle Trails requirements

A copy of the NZCT Cycle Trail Design Guide August 2019 is attached as Appendix D. Contractors should familiarise themselves with the requirements.

The Whale Trail is to be Grade 2 and draw your attention to:

It is most important that the trail's **Grade** does not increase more than one Grade over the course of the route. It is acceptable to have short sections of a trail one Grade more difficult than the intended Grade, but it is generally undesirable to have harder sections of trail as some riders are likely to be forced to walk these sections.

Gradient:

- 0-3.5 degrees for at least 95% of trail;
- between 3.5 and 5 degrees for no more than 100 metres at a time;
- between 5 and 6 degrees for no more than 10 m at a time.

| Degrees | Percent | Slope |
|---------|---------|-------|
| 0 | 0 | - |
| 1 | 1.7% | 1:60 |
| 2 | 3.5% | 1:30 |
| 3 | 5.2% | 1:20 |
| 4 | 7.0% | 1:15 |
| 5 | 8.7% | 1:11 |

Radius of turn: 4 m minimum with at least 5 m desirable to outside of turn

Surface: Compacted/stabilised base course, under a maximum top course aggregate of maximum AP30 mm. The surface should be smooth and easy to ride in all weather conditions.

2.4 Resource consents

The Contractor shall comply with all conditions of Resource Consents relating to track formation and structures. Copies of relevant consents are attached in Appendix B.

If inspections or monitoring is required by the Local Authority, it shall be the Contractor's responsibility to ensure that the Council is kept informed and given sufficient notice as to when inspections are needed

2.5 Building consents plans

The Contractor shall comply with all conditions of Building Consents relating to structures.

If inspections are required by the Council building inspectors, it shall be the Contractor's responsibility to ensure that the Council is kept informed and given sufficient notice as to when inspections are needed.

The Principal shall obtain all building consents unless otherwise noted. Copies of relevant consents are attached in Appendix C.

2.6 Producer Statements

The Contractor shall, on completion of the works, provide the Construction Manager with a Producer Statement-Construction (PS3) The issuing of a Certificate of Practical Completion is subject to the receipt of the PS3.

2.7 Hardfill

The Principal has identified that a major cost for the trail is in the sourcing of suitable pavement material. There are sections where additional hardfill will be required under the finished surface. Contractors shall give consideration to local quarries and/or borrow pits to source the materials.

Where practical the Principal has identified potential quarry sites and borrow pits on private land for use on the trail. Rates for this have been negotiated and will be provided to the Contractor and allowed for in any rates.

To confirm suitability where an alternate aggregate is proposed that meets the AP 30 basecourse requirement, a minimum 3 cu.m should be supplied and compacted for the Construction Manager before any material is laid.

2.8 Fencing

There is extensive fencing along the full length of the Trail and particularly in the KiwiRail corridor. The Principal will look to secure an agreed rate with suppliers for fencing materials, so they are available at the appropriate time. The Contractor will then collect the materials from the nominated supplier.

Fencing types and details are set out under Section 9 of this specification.

2.9 Materials brought onto site

All aggregate brought onto the site for the purpose of track surfacing or any materials brought in as fill, are to be from a weed free source and are to be inspected and approved by the Construction Manager before commencement.

Materials are to be stockpiled in approved places and all remnants removed from the site on the completion of the project, except where the Construction Manager has approved surplus materials that may be left in stockpiles on the site.

2.10 Working in or close to the Railway Corridor

There are sections of construction that are located in the KiwiRail Corridor.

For works in the vicinity of the rail tracks KiwiRail require special permits to be uplifted and will require Contractor management and workers to ensure they have the appropriate Rail Safety Inductions.

The Trust will work with KiwiRail on the Work permits and processes required for working in the corridor, and then with the successful contractors.

The Contractor shall familiarise themselves with all KiwiRail requirements and ensure they comply at all times.

2.11 Working in the NZTA Corridor

There are sections of construction that are located in the NZTA Road corridor.

For works in the Road corridor NZTA requires the contractor to open a CAR and submit a TMP for any works before construction commences.

The Contractor shall familiarise themselves with all NZTA requirements and include ongoing traffic management for the duration of the works.

2.12 Working within the Road Reserve

There are sections of construction that are located in the MDC Road Reserve.

For works in the Road corridor Marlborough Roads requires the contractor to open a CAR and submit a TMP for any works before construction commences.

The Contractor shall familiarise themselves with all local requirements and include ongoing traffic management for the duration of the works.

2.13 Working on Marlborough District Council land

There are sections of construction that are located on MDC land. The areas will be identified on the drawings and in Section 1 Site Location under P&G.

Particular requirements that relate to these areas will be detailed in the P & G section at the time of tender.

2.14 Working on private property

There are sections of construction that are located over private land. The names and contacts for these owners will be provided in Section 1 Site Location under P&G.

Any hazards that relate specifically to the land owners will also be noted there.

2.15 Minor bridge installations

There are various minor bridges between 6m-20m along the route. These bridges will be tended as part of the trail works. It is anticipated that some or all of the sections will be pre-fabricated off site and trucked in.

Timing for the bridges will be worked with the trail build.

2.16 Major bridges

There are major bridge structures, to be designed and built by others over the extent of the route. These will be supervised by the designing Consulting Engineer.

2.17 Signage

There will be two types of signage on the trail namely regulatory and information. Regulatory will deal with the safety aspects of the trail. Regulatory Signage types and details can be seen on the standard detail sheet.

It has been allowed that Contractors will place poles as required for signage, with the actual signs being installed by others unless specifically required in the schedule of quantities.

2.18 Landscaping & planting

Screen planting and landscaping will be carried out by others after the physical works have been completed.

2.19 Removal of waste materials

All timber cut-offs, surplus materials and any waste is to be removed from the site at the completion of the work

Waste is defined as all foreign material on the site. This includes but is not limited to spilt concrete, nails, wood, plastic and metal off-cuts. Waste or rubbish being held at the site prior to removal is to be stored in such a fashion that it cannot be blown about by the wind. No tyres are permitted.

2.20 Reinstatement of area & grassing

The Contractor shall reinstate all land affected by the works, including the re-establishment of working areas, to a condition at least equal to that at the commencement of the works. Grass seed shall be spread on all areas of spoil where appropriate.

3. Preliminary and general

3.1 Specific site location & works

The location of the Site is:
TBC

The works are for:
The construction of the trail

Specific requirements:

The works are to be on a stopbank there can be no change to the height or location. The contractor must abide by the MDC H & S requirements and those of the Whale Trail. The site is within the flood hazard 1& 2 overlay of the Marlborough Environmental Plan.

The land ownership over this section is:

| Owner | Chainage | Contact |
|------------|------------|------------|
| <i>TBC</i> | <i>TBC</i> | <i>TBC</i> |

The Contractor shall be responsible for the provision of suitable access to and through the Site, and shall make all arrangements necessary with adjacent property owners and with Local and Statutory Authorities.

The Contractor shall limit the areas occupied whether with plant, storage, earthworks or by entering upon land.

3.2 Temporary shelters and conveniences

The Contractor shall erect, maintain and, at the completion of the works remove any necessary shelters for Contractor's staff and workmen.

3.3 Setting out

The route will be marked by the trail designer at the time of tender.

3.4 Inferred work

Where construction requirements are standard industry best practice and/or obviously inferred, this work shall be included in the contract works even though only generalised in this specification.

3.5 Materials and labour

The Contractor shall supply the whole of the materials, plant and labour necessary for the contract. Work shall be carried out according to best practice, by skilled and experienced personnel to the standards hereinafter specified.

The Contractor is to arrange his own access for plant and materials and all necessary transportation of plant and materials to the site.

3.6 Design variations

The Contractor shall obtain written authorisation for each and every variation before it is made.

Variations to the design of the works shall not be made without the written approval of the Construction Manager.

3.7 Standards & specifications

Each section of the Specification shall be read in conjunction with the standards listed herein and related documents. In the event of this Specification being at variance with a standard, the Contractor shall notify the Construction Manager for clarification before any relevant work proceeds.

The overarching standard is that required to construct a cycling trail meeting the requirements of New Zealand Cycle Trail Grade 2. (see Appendix D)

3.8 Basis of payment

A schedule will be provided for each section.

Payment will be made at the scheduled rate in accordance with this specification.

Where applicable both scheduled rates and the day works rates will be used as the basis of valuing variations.

Day works labour and plant will be paid at the scheduled unit rate on the basis of time recorded, certified and approved by the Construction manager.

3.9 Inspection requirements

Inspections of the work will be carried out by the Construction Manager or their Representative.

The Contractor shall provide at least 24 hours notice to the Construction Manager for all work requiring inspection. This includes inspection of foundations before concreting or backfilling.

3.10 Statements to the media

The contractor shall not make statements to the media regarding policy, site works or contractual matters. All enquires shall be directed to the Construction Manager.

3.11 Refuelling

Refuelling of small power tools and diesel plant will be permitted within the site.

The Contractor shall exercise due care and responsibility to minimise the potential for leakage or spillage of fuels or lubricants or any other substance that could be spilled.

Spillages

shall be cleaned up immediately. If soil at the site is contaminated by a spillage the affected soil shall be removed.

All spillages shall be reported to the Construction Manager. Bulk fuels and oils are not to be stored on the site. Oil changes are not permitted on vehicles or machinery on the site. No machine shall be permitted to work on site with an oil leak.

All machines brought on to site must be weed and mud free prior to moving onto public land.

3.12 Health and Safety (H&S)

The Contractor must implement processes that meet or exceed the requirements of the Health & Safety at Work Act 2015.

Health and Safety plan

Prior to commencement of work the Contractor shall provide a Site-specific H & S Plan. The plan shall cover the safety of both Contractor's staff and any other people or vehicles that may be on the site or pass through or adjacent to the site during the period of the Contract works. The Contractor shall implement, actively manage and adhere to the plan at all times.

Without limiting the Contractor's obligation to identify and manage all safety issues the Safety Plan should cover as a minimum, the following:

- Specific hazards and methods of dealing with them
- A process of identification and management of new and existing hazards
- A copy of the accident reporting process
- A copy of the training or competency records as required
- Staff with overall responsibility for health and safety
- Procedures for dealing with public movements on or around the project site.
- Procedures for managing emergencies

The Contractor shall update and/or modify the H & S plan and its management on an on-going basis.

a) Site hazards

The following hazards are identified but the list is not exhaustive, and the Contractor shall satisfy itself of all hazards on the site and include these within its Health and Safety Plan.

Site hazards include:

- Underground services
- Overhead power lines
- Working in the road corridor
- Working on or near the KiwiRail corridor
- Water hazards- creeks, streams, rivers, swampy areas
- Access to the work site
- Motor vehicles on adjacent private roads
- Aircraft on the Picton taxi way
- Farm animals

b) Health and safety compliance

The Contractor shall take all practicable steps to ensure the safety of its employees while at work, and to ensure that no action or inaction of its employees while at work harms any other person.

The Contractor's Health and Safety systems shall also ensure that all practicable steps are taken to ensure the safety of others.

3.13 Public safety

Without limiting the Contractors Health & Safety obligations the Contractor shall take all practicable measures to ensure the safety of the public, vehicles, and livestock in and around any work site, including as a minimum the following:

- provide fences, barriers, signs, lights and other devices as necessary to manage the safe movement of traffic, persons and livestock
- fill, cover, enclose and light all holes, ponds or excavations that could cause a safety risk
- enclose the contract works by suitably secure fencing whenever necessary to ensure public safety
- if agreed with the Construction Manager as being necessary for public safety, close off the site and/or adjacent areas to the public. Where any closure requires public notification, work with the Construction Manager to arrange such notification and meet any legal timing requirements.

3.14 Requirements of authorities

The work is to be carried out in accordance with the Contract Documents and the requirements of Territorial Authorities having jurisdiction over the area in which the work is located and utility operators having jurisdiction over utilities in or around the site. The

Contractor shall ascertain and become familiar with any such requirements prior to commencing work.

The Contractor shall obtain and uplift such permits/consents as may be required by Local or other Authorities and allow for the payment of all such fees or levies in the tender rates.

Authorities or utility operators may require inspections of the work at various stages of construction to ensure their requirements are being satisfied. The Contractor shall establish which inspections are required and shall arrange for the inspections to take place. Failure to arrange inspections may result in work being rejected.

Should the Authorities or utility operators request modifications to the Work specified in the Contract Documents, the Contractor shall notify the Construction Manager before proceeding. Where the Contractor considers such modifications may constitute an extra payment under the terms of the Contract, any claim will be considered only when the modifications have been approved by the Construction Manager, prior to their being undertaken.

The approval of the work by the Authorities and utility operators will be required before the issue of the Certificate of Practical Completion.

3.15 Underground services

The locations and extent of underground and above ground services where shown on the Drawings are provided for the information of the Contractor, but no guarantee is given as to the correctness or completeness of this information. The Contractor shall notify all applicable Network Utility Operators (NUO's), search all records and have field markouts of all services undertaken by the relevant NUO, to best available accuracy standards, at least one week in advance of the work, and shall be responsible for their protection, and for the cost of repair or replacement of any services damaged by neglect of this requirement.

Any work required on an existing live utility service shall be undertaken by the relevant Network Utility Operator (NUO) or its approved contractors. The Contractor shall be responsible for coordinating and attending upon any such NUO works.

The Contractor shall ensure that any existing utility surface openings are kept clean and undamaged for the project duration.

4. Sediment control and environmental management during construction

4.1 Scope

This Specification covers the precautions to be taken by the Contractor to control erosion and sediment effects and minimise related damage or environmental deterioration to the Works, surrounding property, or receiving environment during the period of the Contract including the Defects period when required by the Contract Documents.

The Contractor shall supply all system design, plant, labour, materials and supervision necessary to ensure the satisfactory construction, operation and maintenance of the environmental protection systems throughout the contract period and beyond as necessary until the construction works and any drainage changes are stabilised to a standard where risk of adverse effects from the works are minimal.

4.2 Techniques for managing adverse effects

Although the Contractor shall retain responsibility for the design and implementation of environmental protection during the works a number of basic management principles shall be followed. In particular:

- c) Silt fences shall be constructed at all site outfall drains and flow paths at 100m maximum intervals along the drains.
- d) Areas being earthworked or otherwise disturbed at any one time shall be kept to a minimum.
- e) Light soil or sand areas may require coating with mulch or similar to avoid wind blown nuisance.
- f) Catch drains or similar interception methods shall be used where feasible to intercept stormwater from disturbed areas.
- g) Where works are immediately adjacent to live waterways measures shall be taken to separate the live waterway from the works if at all possible and to cut off any silt or debris from being suspended into the waterway.
- h) Hay bales, detention ponds and other techniques shall be used as necessary to limit erosion and collect water borne soil in a way that manages adverse downstream effects on streams and natural water bodies.

In all cases the requirements of any applicable Resource Consents shall be met.

4.3 Management of protection systems

Prior to, during, and following rain the Contractor shall arrange for attendance by plant, labour and supervision to ensure safe operation of protection systems, including isolation bunds, settlement ponds, catch drains, detritus fences and outlets and the like.

Detention and interception facilities shall be cleared and maintained regularly to insure they perform in accordance with their design throughout the contract period and beyond as necessary. Silt, debris, etc, removed from interception and settlement works shall be spread to dry in areas approved by the Construction Manager and disposed of as directed, either as material for use in the construction of earth fill or by removal to dumps away from the site.

4.4 Modification to protection systems

If at any time during the contract the performance of the environmental protection systems, or ongoing review of them, indicates that they need to be extended or modified the design modification and construction shall be undertaken by the Contractor at no extra cost to the Principal.

4.5 Environmental or property damage

Where environmental or property damage occurs to any party as a result of works being undertaken or not undertaken by the Contractor such damage shall be repaired by the Contractor to the satisfaction of the property owner or authority involved, without additional payment.

5. Track construction

5.1 Alignment

In general the track alignment will be marked on site with flagging tape. Markers are generally spaced at <50m intervals.

The Contractor is responsible for constructing the track following these markers. These markers are generally positioned at finished eye level through any bush or vegetation. In the event that markers are not clear, the Contractor shall notify the Construction Manager prior to progressing with construction work.

If the Contractor wishes to deviate the track formation more than two metres either side of the design line, specific approval shall be obtained from the Construction Manager for each and every deviation.

Deviation from the design line up to two metres either side may be made to avoid living trees, archaeological features, fallen logs, rocks or adverse ground conditions. Approval from the Construction Manager is not required in such instance.

The Contractor shall be responsible for ensuring the maximum track gradient requirements in this specification are not exceeded on the track. If the Contractor believes this cannot be achieved on the design line or within two metres of this then he shall advise the Construction Manager.

The constructed formation shall follow the most practical line to achieve the design grades and to create an enjoyable riding experience appropriate to a Grade 2 NZCT Trail.

5.2 Earthworks, width & grade

All organic material shall be removed from the track formation area prior to commencing any formation earthworks. Where possible, leaf litter and topsoil shall be retained adjacent to the track for spreading over exposed earthworks on completion of the formation.

Tree roots up to 100mm diameter shall be removed where necessary to enable formation excavation.

Where the track is constructed on a cross slope of less than 3 horizontal to 1 vertical, the track bench may be constructed using a combination of cut and fill formation or fill formation as

shown on the drawings. Excavated material from the formation may be used to fill the outer edge of the track bench provided it is compacted in place with suitable equipment.

Where the track is constructed on a cross slope of greater than 3 horizontal to 1 vertical, a full cut formation (full bench) detail shall be used as shown on the typical detail. Cut slope batters may be constructed up to 4 vertical to 1.0 horizontal in soil and may be vertical in solid rock and dense silts and gravels. Cut batters shall not exceed 2.5m in vertical height. If cut batters greater than 2.5m are considered by the Contractor to be necessary, the Construction Manager shall be notified.

The track formation shall be shaped to achieve the required track width and to ensure the track longitudinal grade is within the required maximum limits.

Gradient:

- 0-3.5 degrees for at least 95% of trail;
- between 3.5 and 5 degrees for no more than 100 metres at a time;
- between 5 and 6 degrees for no more than 10 m at a time.

The required 'usable cycling surface' width shall be 2.2m unless otherwise specified by the Construction Manager. This shall take into account horizontal clearances required from cut/fill batter slopes, handrails, trees etc as detailed in Section 3.5 of NZCT CycleTrail Design Guide August 2019.

Final shaping of the track surface shall take place after the installation of culverts.

5.3 Filling and compaction

There should be no vegetation or other organic matter in fill material that forms part of the track formation.

Fill material shall be placed in layers not exceeding 300mm loose depth and shall be compacted using appropriate mechanical equipment. Where the slope exceeds 3 horizontal to 1 vertical a bench shall be formed to enable fill material to key into the existing ground and facilitate compaction.

Fill material shall not be used where the moisture content is at or above the plastic limit as densification cannot be achieved. Such material shall be placed outside the track formation.

Fill slopes shall be left in a smooth and tidy condition. It shall be the contractor's responsibility to make good any batter slumping or subsidence which occurs during the operation of this contract and including during the defects liability period.

Where fill is intended to be placed onto soft or swampy ground, the Construction Manager may advise the Contactor to lay geotextile material to separate the fill material. Geotextile shall be laid in accordance with manufacturers recommendations

5.4 Drainage

Rolling grade dips (grade reversals) shall be formed in the track surface to divert surface water on sloping sections of track at $\leq 30\text{m}$ spacing's where water tables are not installed. Grade reversals shall be 2-3m in length and be of a smooth profile to ensure a smooth ride for cyclists.

Water tables in accordance with the typical details shall be installed on each section of track formation prior to proceed into the next section. This shall apply to wet areas only or as directed by the Construction Manager.

Water tables shall have a grade of $>1\%$ towards the discharge point. A discharge point shall be provided anywhere there is a sag point in the track.

Water table discharge points shall be installed at the following spacing's or as directed by the Construction Manager:

- 35m where the track grade is $\leq 1:20$ (3°)
- 15m where the track grade is between 1:10 and 1:20 (3° - 6°)

Water table discharge may consist of a rolling grade dip (grad reversal with a minimum sag radius of 5m) leading to lower ground (also known as a ford) or a minimum 250mm smooth walled culvert under the track to direct water to lower ground on the down slope side of the track.

Culvert pipes shall be installed with a minimum 3% fall to the outlet and a minimum of 150mm cover to the finished track surface.

The inlet to culverts installed for the discharge of water tables shall have a 200mm x 200mm x 250mm minimum deep sump at the culvert inlet which has an invert level at least 100mm below the culvert pipe invert. A 300mm long stop bank shall be provided after the sump pit to force water into the pipe.

Culverts shall be of sufficient length to pass under the track and extend beyond any fill.

The outlets of culvert pipes shall discharge at ground level without a free fall from the end of the pipe. Where the outlet slope is on steep loose material, a rock apron shall be provided to prevent scour.

Culverts shall be Iplex Nexus brand coloured black of minimum 225mm internal diameter or similar as approved by the Construction Manager.

Rock fords may be used in place of culvert pipes where suitable material is available. Such fords shall be finished as smooth as practical to achieve a good riding surface and well bedded into place to resist movement from feet and cycle tyres.

5.5 Shaping

Prior to placement of track surfacing aggregate, the track subgrade shall be shaped as follows:

- Crowned surface having a 3% fall to each side from the centreline for straight sections in flat country.
- Single cross fall formation with a 3% fall to the downhill side for straight sections in hilly country or where side drains are not provided.
- Single cross fall formation with a 3% fall to the inside of corners for winding sections.

5.6 Surfacing

Prior to placement of track surfacing, the strength and density of the track sub-grade shall, wherever possible, be improved by the use of suitable compaction equipment such as vibrating rollers or plate compactors.

Suitable surfacing material shall be a well graded AP30 type aggregate having a maximum particle size of 30mm and be supplied from a weed free source. The stone particles shall be durable with at least 50% crushed faces. Rounded particle river gravels or beach gravels are not acceptable as a track surfacing aggregate unless these materials have been crushed and additional fines have been added.

The track surfacing aggregate shall have a range of particle size distribution including between 5-8% by weight portion of clay content to facilitate binding the surface.

A sample of aggregate shall be provided to the Construction Manager for approval prior to placement.

The track surface layer shall have a minimum compacted depth of 100mm. This layer shall be placed and compacted in a single layer or where additional material is added after compaction the original layer shall be scarified prior to placement of the additional aggregate.

The aggregate shall be placed in such a way as to minimize segregation of the particle sizes. Shovels, beam rakes or excavator buckets should be used to move material if required.

The aggregate surface shall be compacted after placement with a plate compactor or other vibrating equipment to achieve a well bound surface suitable for cycling.

To achieve optimum compaction, water may be sprayed onto the aggregate surface. Compaction will be deemed complete when a well bound pavement surface is achieved which is free of voids and loose stone.

The completed track surface shall be free from loose stones and surface undulations to achieve a smooth comfortable riding experience.

6. Environmental

6.1 Archaeological

If any archaeological evidence in the form of mining relics, stacked stone tailings, water races, sluicing, shell, bone, charcoal, greenstone, hangi stone, or artefact is uncovered during any construction, work must cease in that particular area and the Construction Manager must be notified immediately.

Work in the vicinity of sites where archaeological evidence is uncovered shall not recommence until the Construction Manager gives approval. Delays due to unexpected finds may be a variation at the applicable rates.

The contractor shall implement all mitigation measures approved in any archaeological authority obtained from the Historic Places Trust relating to track works. If this is not practical, they shall advise the Construction Manager prior to any works covered by such Authority.

6.2 Iwi

If any artefact and/or any historical, cultural or archaeological material of Māori origin, or likely to have significance to Māori, is found or uncovered during the undertaking of this work, the following must be complied with:

- a) Work shall cease immediately, the area secured and any uncovered material must remain untouched;
- b) Advice of the discovery must be given within 24 hours to enable appropriate cultural procedures / tikanga to be administered:
 - I. The office of Te Rūnanga a Rangitāne o Wairau:
Landline: (03) 578-6180
Email: taiao@rangitane.org.nz
Physical address: Level 5, Rangitane House, 2 Main St, Blenheim

and

 - II. Heritage New Zealand Pouhere Taonga
Landline: (04) 472-4341

- c) No work shall recommence until both:
- I. Agreement has been reached with Te Rūnanga a Rangitāne o Wairau; and
 - II. If required, an Authority has been issued by Heritage New Zealand if the find involves an archaeological site.

Note:

The people of Te Rūnanga a Rangitāne o Wairau are mana whenua over the subject area.

All archaeological sites are protected under the Heritage New Zealand Pouhere Taonga Act 2014. It is an offence under the Act to modify, damage or destroy any archaeological site, whether the site is recorded or not. Application must be made to Heritage New Zealand for an Authority to modify, damage or destroy an archaeological site.

6.3 National Environmental Standards (NES)

The NES that relates to the Standards for assessing and managing contaminants in soil to protect human health. It ensures that land affected by contaminants in soil is appropriately identified and assessed before it is developed - and if necessary, the land is remediated, or the contaminants contained to make the land safe for human use.

Regarding potentially contaminated land in the KR corridor

Where possible it would be wise to re-use any material removed from KiwiRail land for land profiling and beautification within the general area it's been removed from (within the KiwiRail boundary). Where removal from site is required it would be wise to routinely inspect during excavation and where uncertainty of its origin/quality arises then complete contamination testing.

6.4 Vegetation

The survey line marked will identify all vegetation requiring removal. Mature trees will be affected in some areas due to legal access constraints but in general the track alignment should consider options around mature trees and any significant fauna.

Any tree exceeding 300mm diameter, that needs removal will be identified prior to the start of any works; any tree exceeding 300mm diameter must have the approval of the Construction Manager before it can be removed.

The completed track must have a cleared vegetation line of 2.5m vertical and a horizontal line of 1.0m either side of the track edge. All stumps created in the course of the construction are to be removed unless indicated by the Construction Manager. All slash, branches and removed stumps must be moved to a position near but out of public view.

Where slash cannot be stockpiled out of view of the track, then all slash up to 125mm diameter shall be chipped on site. All other larger items shall be limbed and neatly stockpiled adjoining the formation on the landward site where possible, or as directed by the Construction Manager.

6.5 Work on public conservation land

The Contractor shall comply with the terms of the DOC agreement at all times when operating on Public Conservation Land.

7. Retaining Structures

7.1 Gabion installation

Gabion baskets unless otherwise specified shall be 2m long by 1m high and 1m wide and made from 2.7mm pvc coated wire.

Gabion baskets shall be installed in accordance with the manufacturers recommendations and industry best practice including appropriate backfill, inter-connections and tying and geotextile separation (filter cloth) to prevent backfill migration.

All areas requiring gabion wall installation shall be marked on site by the Construction Manager prior to installation and agreed with the contractor.

Where gabions are laid more than 1m in height, subsequent layers shall be offset 300 mm.

8. Timber Structures

8.1 Relevant Standards

- NZS 3601 Metric dimensions of Timber
- NZS 3602 Timber & Wood based products for use in Buildings
- NZS 3603 Timber structures
- NZS 3604 Light framed Timber framed buildings
- NZS 3605 Timber Pile & poles for use in buildings
- NZS 3640 Timber Treatment Specifications
- NZS 1328 Glue laminated Structural timber

8.2 Scope & general

This section of the contract work shall consist of all carpentry including the associated jointing brackets, cleats, bolts, nails etc as shown on the drawings or specified herein or otherwise.

This includes, but is not exclusive to the construction of boardwalks, barriers and retaining walls.

All timber shall be sound, well seasoned and maintain figured dimensions.

All timber shall be rough sawn sizes unless specifically noted otherwise.

Timber shall comply with Table 1



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8.3 Timber Treatment

Treatment shall be as noted in the table 1 below. Treatment shall comply with the current requirements of the Timber Preservation Council. All treated timber shall be branded with the appropriate woodmark. It is preferred that timbers be treated at least 2 months prior to installation.

Cut faces of timber sections greater than 50mm thick shall be treated with Metalex or similar field applied preservative treatment.

Table 1: Timber Specification and Treatment

| Structure & Application | Species | Grade | Treatment |
|--|---------------|------------|-----------|
| Round Piles | Pinus Radiata | NZS 3605 | H5 |
| Retaining wall boards, Boardwalk end boards and bearers and other sawn timber in contact with the ground or within 150mm of the ground | Pinus Radiata | G8 or VSG8 | H5 |
| Boardwalk joists, bracing, decking and blocking: Barrier balusters and rails | Pinus Radiata | G8 or VSG8 | H3.2 |
| Glulam Beams | Pinus Radiata | GL10 | H3.2 |

8.4 Fixtures & Fittings

Bolts and washers shall be hot dip galvanised engineers bolts of the diameters and sizes shown on the drawings unless specified otherwise.

Bolts may consist of hot dip galvanised or stainless steel threaded rod cut to length on site.

All hot dip galvanised rod cut ends shall be treated with 'dry galv' corrosion protection. All galvanised bolts in contact with treated timber shall be protected using general purpose grease in pre-greased holes

Thread protrusion past the nut shall be a minimum of one thread pitch after tightening.

All nails shall be 100mm x 4.0mm FH galvanised steel unless specified otherwise.

The contact faces of washers shall be coated with grease.

Washers shall be fitted to both ends of bolts and shall comply with the following minimum standards:

| Bolt Size | Washer (mm) |
|-----------|---------------|
| M12 | 50 x 50 x 5.0 |
| M16 | 65 x 65 x 5.0 |

8.5 Protection Up To Installation

All materials shall be protected against physical damage.

8.6 Standards of Workmanship

All work shall be in accordance with industry best practice

Details not shown on the drawings shall be formed according to the principles of NZS 3604 or referred to the Engineer.

All structural members are to be fixed true to line.

8.7 Foundations & Concrete Work

All Concrete used for the embedment of posts shall have a 20mm maximum aggregate size and be a mix designed to have a minimum 28 day compressive strength of 20MPa.

All concrete shall comply with NZS 3104 or NZS 3108 including specification and techniques setout herein.

The contractor shall be responsible for locating any services on site. Any damage to underground services shall be repaired at the Contractors expense.

Excavations for foundations are to be built to the dimensions and details shown allowing for working room as required.

Where holes are dug or augured for foundations, the Contractor is responsible for ensuring the stability of the hole to ensure the hole maintains its required dimensions before pouring concrete. The costs of any stability work will be deemed to be included in the Contractors tender price.

8.8 Glue Laminated Structural Members

All beams shall comply with NZS 1328 GL10 grade.

Material for the members shall be Radiata Pine with a moisture content not exceeding 18%.

All members shall be made for Category 3: Exterior Exposed. The adhesive used shall be resorcinol glue.

End joints should be randomly spaced throughout the depth of a member to avoid concentration of joints.

Finish shall be 'standard' in accordance with NZS 3606 unless specified otherwise.

9. Fencing

9.1 General

All fences must be fit for purpose, and built to a high standard

All fencing using standard posts will require to have posts placed on the humps and in the hollows of the fence line so post to standard ratio will vary.

It is good practice to use metalex with all cut surfaces that may come into contact with the ground

If any H5 posts are used treatment with CAA oxide is preferable to CCA salt treatment which is likely to corrode galvanized products that come into contact with the post

9.2 Material specifications

Note: The specifications listed are a minimum requirement

- Posts H4 treated
- Strainer posts - minimum 2.4m * 175
- 2.7 m strainers will need to be used where the ground is soft or unstable
- Stays minimum 2.4m * 125mm
- Stay blocks 200*50 H4, 500 mm long
- Posts 1.8 m - Rounds 125mm, ½ rounds 150 – 175 mm, ¼ rounds 125mm
- Standard / waratah- Galvanized 1.8m
- Permanent Wire strainers
- 2.5 mm High tensile wire (HT)
- 3.15 mm High tensile wire (HT)
- Barbed wire – 2.5mm barbs spaced 75-120mm
- Staples barbed 50*4mm
- Staples barbed 30*3.15mm (batons only)

9.3 Specifications

- Tie downs – Galvanized Standard / waratah driven in at 45° with 150mm driven through standard hole into post.
- Fence line angles Less than 15° = breast block
- Fence line angles greater than 15° = Stay or Tie back
- Box stays wired up using 3* 2.5 mm HT wire or 2*3.15 mm HT wire

9.4 Fence type (Post spacings)

All posts with netting

Posts spaced up to 4.2m apart with top and bottom wire above and below netting. Top wire should be electric (where available) or barbed if horses or cattle may come into contact with the fence.

All posts plain wire (no batons)

Posts spaced 3.5 – 3.6m apart with 8 or 9 wires (2.5 mm HT) with no battens.

All posts plain wire (batons)

Posts spaced up to 4.2m apart with 8 or 9 wires (2.5 mm HT) with 4 batons between posts.

Posts and Standards

Posts spaced 9 m apart with 2* standard posts spaced 3m apart between each post, with 8 or 9 wires (2.5 mm HT)

Posts, standards, and netting

Posts up to 10.8 m apart with 2 standards between spaced at 3.6m, with top and bottom wire above and below netting. Top wire should be electric (where available) or barbed if horses or cattle may come into contact with the fence.

2 wire electric

Post spaced up to 6m apart



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