

Technical Specification

Tunnel Beach Carpark

LANDSCAPE SPECIFICATION

at Dunedin

Prepared for Dunedin City Council

By Beca Limited (Beca)

6 July 2022

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Revision History

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TABLE OF CONTENTS

C5000 – LANDSCAPE GENERAL	1
C5000.1 SCOPE	1
C5000.2 MEETINGS.....	1
C5000.3 STANDARDS	2
C5000.4 EXISTING SERVICES	2
C5000.5 QUALIFICATIONS	2
C5001 – SITE PREPARATION	3
C5001.1 LOCATION OF PLANTING AREAS.....	3
C5001.2 TIMING	3
C5001.3 PROTECTION	3
C5001.4 TREE MANAGEMENT	3
C5001.5 SITE CLEARANCE	3
C5001.6 SPRAYING TO REMOVE EXISTING GRASS AND WEEDS	4
C5001.7 EARTHWORKS.....	4
C5001.8 TOPSOIL	5
C5002 – LANDSCAPE PLANTING	10
C5002.1 EXTENT OF WORK	10
C5002.2 MANUFACTURER'S DOCUMENTS.....	10
C5002.3 SUPPLY OF MATERIALS.....	11
C5002.4 SUBSTITUTIONS.....	12
C5002.5 PLANTING INSTALLATION.....	12
C5002.6 PERFORMANCE CRITERIA	14
C5002.7 CLEAN UP AND MAKE GOOD	15
C5002.8 PRACTICAL COMPLETION	15
C5003 – STREET FURNITURE	16
C5003.1 DESCRIPTION.....	16
C5003.2 NO SUBSTITUTIONS	16
C5003.3 QUALIFICATIONS	16
C5003.4 GRAFFITI GUARD	16
C5003.5 WARRANTIES	16
C5003.6 INSPECTIONS	17
C5003.7 DELIVERY, STORAGE AND HANDLING	17
C5003.8 INSTALLATION.....	17
C5003.10 SELECTION	18
C5006 - CARPENTRY AND TIMBER STRUCTURES	19
C5006.1 DESCRIPTION.....	19
C5006.2 Specification Standards	19
C5006.3 related sections	19
C5006.4 qualifications.....	19
C5006.5 MATERIALS	20
C5006.6 CONSTRUCTION	21

C5000 – LANDSCAPE GENERAL

C5000.1 SCOPE

The landscape planting scope includes site preparation, planting and maintenance of the proposed amenity, screening and re-vegetation planting within the site extents. The specification should be read in conjunction with the landscape drawings and schedules.

3336298-AL-000	COVER SHEET AND DRAWING LIST
3336298-AL-001	KEY NOTES
3336298-AL-010	SHEET LAYOUT PLAN 1 OF 1
3336298-AL-011	LANDSCAPE PLANTING PLAN SHEET 1 OF 3
3336298-AL-012	LANDSCAPE PLANTING PLAN SHEET 2 OF 3
3336298-AL-013	LANDSCAPE PLANTING PLAN SHEET 3 OF 3
3336298-AL-020	STAIRS SHEET 1 OF 3
3336298-AL-021	STAIRS SHEET 2 OF 3
3336298-AL-021	STAIRS SHEET 3 OF 3
3336298-AL-030	DETAILS HARD SURFACES SHEET 1 OF 1
3336298-AL-031	STREET FURNITURE DETAILS SHEET 1 OF 3
3336298-AL-032	STREET FURNITURE DETAILS SHEET 2 OF 3
3336298-AL-033	STREET FURNITURE DETAILS SHEET 3 OF 3
3336298-AL-034	DETAILS MISCELLANEOUS SHEET 1 OF 1
3336298-AL-040	DETAILS TYPICAL PLANTING SHEET 1 OF 2
3336298-AL-041	DETAILS TYPICAL PLANTING SHEET 2 OF 2
3336298-AL-050	PLANTING SCHEDULE

Key assumptions made in preparation of this specification include:

- (i) There will be no irrigation design implemented for maintaining the plants. The Contractor will be responsible for watering during the implementation and Defects Notification Period phases of the contract with responsibility thereafter passing to the Principal.
- (ii) The Defects Notification Period will be for **24 months** from completion of all planting areas within the site extents.

C5000.2 MEETINGS

In addition to other contract meetings, at a minimum the following meetings will be required for the project.

- (i) Pre-start work meeting to discuss and identify landscape planting areas, vegetation to be retained and protected as identified on plans 3336298-AL-011 to 013.
- (ii) Meeting with DCC arborist and Engineer to review contractors methodologies for working in and around the dripline of existing trees.
- (iii) Top-soil inspection in accordance with section 5001.9 below.
- (iv) Plant material inspection - the Contractor shall contact the Engineer with a minimum of 5 working days' notice to arrange an inspection of the plant materials prior to implementation.
- (v) Prior to landscape planting - the Contractor shall contact the Engineer with a minimum of 5 working days' notice to arrange a site meeting to confirm set out

of the landscape planting on site. Contractor to lay out 10m² sample areas for each of the planting typologies for Engineers approval prior to planting

- (vi) Post installation inspection to check that plants, trees and grass have been installed to an appropriate standard.

C5000.3 STANDARDS

The Contractor shall comply with the following standards;

NZS 4404: 2010 Land development and subdivision infrastructure

NZS 4454: 2005 Composts, soil conditioners and mulches

NZS8409: 2004 Code of Practice for the Management of Agrichemicals incorporating Amendment No.1

BS 3998: 2010 Tree work. Recommendations

C5000.4 EXISTING SERVICES

It is the Contractor's responsibility to protect existing services during planting operations. The Contractor is responsible for being acquainted with the location of existing underground and above ground services, notwithstanding information which has been provided by the Engineer or other parties. Any damage made to services caused by the Contractor or his subcontractors in the course or consequence of the contract operations shall be made good at the expense of the Contractor.

C5000.5 QUALIFICATIONS

The Contractor is to supply experienced competent workers, familiar with amenity and revegetation planting and tree planting and the materials and techniques specified. Evidence of experience and competence, or membership of Landscape New Zealand (LNZ), shall be provided on request.

The Contractor shall carry out the work in an expeditious manner and to a high-quality standard.

C5001 – SITE PREPARATION

C5001.1 LOCATION OF PLANTING AREAS

The final location of the area to be prepared for landscape planting shall be confirmed with the Engineer prior to construction beginning at the pre-start work meeting.

Refer to the Drawings (3336298-AL-011 to 3336298-AL-013) for the extent of landscape works and planting areas.

C5001.2 TIMING

Preparation of the area subject to landscape works shall follow on from the construction of the earthworks detailed in the Civil documentation.

The Contractor shall liaise with the Engineer regarding the completion of the earthworks and the timing of the subsequent landscape works coincide with the completion (or partial completion) of the earthworks. The Contractor may begin preparing the site and undertaking the landscape planting works as outlined in this specification following confirmation from the Engineer.

Refer to C5002.5.3 'Timing' section for ideal planting season.

C5001.3 PROTECTION

The Contractor shall locate and mark with painted or taped stakes any survey pegs or marks, valves, manholes, fences, etc.

The Engineer will identify any vegetation within the landscape areas to be retained and protected during the Contract Works at the initial Site meeting as identified on sheet 3336298-AL-012. Vegetation marked for protection to have fences erected for the duration of the contract. Fences to be min. standard set out in NZS4404:2010, refer to Part 7, clause 7.3.3.

Dazzle spray to be marked onto the planting to be removed.

C5001.4 TREE MANAGEMENT

All enquiries related to tree work or works within the vicinity of trees must be directed to the Engineer.

All works near trees shall be carried out in accordance with NZS4404:2010, refer to Part 7, clause 7.3.3 for more information.

C5001.5 SITE CLEARANCE

Given the majority of the landscape works area is subject to earthworks/excavation required to construct the proposed works, extensive site clearance prior to commencement of landscape planting is not anticipated. Where clearance by the Contractor is required it shall be carried out as described below:

- (i) The whole of the site subject to the landscape works shall be cleared of tree & shrub vegetation and rubbish by the Contractor (other than vegetation to be protected and noting separate clearance work as outlined above).
- (ii) All non-perishable solid items (concrete etc) within 0.5 metres of the intended planting area shall be excavated and removed. No clearance shall be done except where necessary to enable the Contract Works to be carried out as specified. For the Landscape works including spreading of topsoil and minor sub-soil contouring, the size and weight of the Contractor's Plant shall be limited following major earthworks to ensure appropriate protection is provided to the existing vegetation and ground surfaces.
- (iii) No landscape planting shall be carried out in any area until clearance has been completed and all debris removed in that area and approved by the Engineer.
- (iv) All coarse vegetation, rubbish and perishable matter shall be cleared from the areas subject to the works as per NZS4404:2010 Part 7, clause 7.4.3 and shall be removed from the Site becoming the property of the Contractor on leaving the Site.

C5001.6 SPRAYING TO REMOVE EXISTING GRASS AND WEEDS

Where required the Contractor shall use an approved non residual herbicide. This must be approved by the Engineer prior to application. Blanket spray the entire area subject to mass planting with spot spraying to be undertaken for each of the specified tree locations. The use of spray is to remove grass and weeds that will compete for water and nutrients with the new plantings.

Spraying shall achieve a 100% weed kill. The Contractor shall provide for a second application of spray to the landscape area should the first application not achieve 100% weed kill after 3 weeks.

Do not apply herbicide to wet ground or when rain is forecast within 48 hours of application. Re-spraying may be required if rain occurs within 24 hours of application.

Planting shall only take place after 2-4 weeks of spraying once the spray has achieved the required weed kill.

Spraying with herbicides shall follow all required health and safety standards, District and Regional Council required conditions and standards including the requirements of the Hazardous Substances and New Organisms (HSNO) Act 1996, NZS8409:2004

Precautions must be taken to prevent herbicide damage to trees and vegetation that are to be retained.

C5001.7 EARTHWORKS

All Earthworks, topsoil stripping and placement of topsoil to be carried out in accordance with the following standard:

NZS4404:2010 Part 7, clause 7.4.2

C5001.8 TOPSOIL

Topsoil is defined as “the top layer of soil characterised by the presence of organic matter”. In order to be retained for use on site, topsoil shall meet certain specific characteristics.

Imported topsoil shall be carefully managed to avoid any contamination, weed seeds or undesirable material being brought to site.

In some situation, soil mixes may be used rather than topsoil. Any soil mix shall be a proven alternative to topsoil. The required proportions of each constituent part of the soil mix shall be consistent throughout the soil mixes.

Site won topsoil

The Contractor shall inspect the site together with the Engineer to assess the condition of the existing topsoil and define soil testing locations.

The Contractor shall provide for soil testing, and submit a report from the soil testing laboratory including topsoil analysis of physical and chemical properties. This shall be interpreted by a soil scientist and recommendations made to achieve a planting medium suited to the plant species proposed. Any remedial measures would generally seek to address compacted soils, poor or low fertility, levels of contamination.

In the event that the Contractor fails to accept the advice of the soil tests, and plants subsequently die due to the topsoil conditions, the Contractor shall be responsible for the remediation of the soil and replacement of those plants.

Topsoil analysis

Topsoil, whether existing site topsoil or topsoil proposed for use on the site, shall be tested.

The Contractor shall provide a report from the soil testing laboratory and topsoil analysis of physical and chemical properties as below:

Samples for analysis shall be representative of the soil being offered and 10 equal samples shall be taken and well mixed. From this mixture, 1kg of soil shall be placed in a plastic bag, labelled with name and details of origin and sent to the analyst with a request for the following information:

- (i) Soil reaction
- (ii) Electrical conductivity
- (iii) Mechanical analysis (texture)
- (iv) Stone content
- (v) Nutrient levels of nitrogen, available phosphorus, available potassium and available magnesium.
- (vi) Organic matter content.
- (vii) Recommendations for correction of nutrient deficiencies
- (viii) Note: In some situations, testing for toxic or hazardous substances may be required.

Laboratory testing shall be accompanied by recommendations from a soil scientist for measures to remedy soils to sustain planting.

Topsoil characteristics

The characteristics of the existing site topsoil to be retained and imported topsoil shall be tested at a New Zealand Laboratory to ascertain that it is of sufficient quality.

Provided for information:

Laboratories can provide information for sample collection and carryout testing.

New Zealand Laboratory Services Ltd
www.nzlabs.co.nz
0800 NZLABS (0800 695 227)

OR

Hill Laboratories
www.hill-labs.co.nz
07 858 2000

Following receipt of soil test results, the results are to be interpreted by a soil analyst where adjustment is required.

The contractor shall confirm in writing to the Engineer that:

The topsoil has been tested and found to be satisfactory for use/re-use on site.

OR -

The topsoil, once tested, was found to be deficient and what the recommendations of the soil analyst are to remediate the soil to meet specification.

OR -

The soil is not recommended for use on site.

The characteristics required for topsoil are outlined in the following table.

Topsoil Characteristics		
Texture	Sand (0.005mm - 2.00mm)	maximum 75% minimum 20%
	Silt (0.002mm - 0.05mm)	maximum 20% minimum 5%
	Clay (<0.002mm)	maximum 30% minimum 5%
Stone Content	Stones (2.00mm - 50.00mm max)	Stone content to be not more than 35% by dry weight; of this the fraction 2.00mm - 5.00mm must not exceed 20% by dry weight.
Organic Matter		Organic matter is to be not less than 4% by weight.
Soil Reaction		pH to be between 5.5 and 7.8
Nitrogen		Nitrogen (N) shall be within optimum levels for grass/pasture growth.
Phosphorus		Extractable phosphorus shall be within optimum levels for grass/ pasture growth.

Potassium		Extractable potassium (K) shall be within the optimum levels for grass/ pasture growth.
Magnesium		Extractable magnesium (Mg) shall be within the optimum levels for grass/ pasture growth.
Calcium		Calcium (Ca) shall be within the optimum levels for grass/ pasture growth.
Sodium		Sodium (Na) shall be within the optimum levels for grass/ pasture growth.
Sulphur		Sulphur (S) shall be within the optimum levels for grass/ pasture growth.
Contamination		Soil shall be free of roots, perennial weeds, sticks, subsoil, toxic chemicals and foreign matter.
Structure		Topsoil shall have a clearly defined crumb structure and not be waterlogged or over compacted.

Topsoil source and samples

The Contractor shall advise the Engineer of the supply source and existing use of the topsoil. If requested, the Contractor shall take the Engineer to view the topsoil at source.

The Contractor shall obtain a sample load of not less than 5m³ (or similar approved sample) for inspection by the Engineer. The accepted sample is to be retained on site for comparison with the subsequent loads. Prior to inspection by the engineer the sample must have been analysed in accordance with the requirements of the topsoil analysis clause.

Refer to 3336298-AL-040-041 for landscape build-up details.

Stockpiling and storage

The stockpiling and storage of bulk materials (topsoil and mulch) shall be in accordance with the NZS4404:2010 Part 7, clause 7.4.2.

The Contractor shall develop a topsoil stockpiling and handling methodology as an integral part of the Earthworks operation, to achieve good growing conditions and long-term healthy establishment of plant material. This methodology shall be submitted to the Engineer for approval prior to topsoil works being undertaken. Following approval, this methodology will then be implemented by the Contractor for the duration of the Contract. As a minimum the methodology for approval shall include the following specifications and requirements:

- (i) Topsoil may be stored in the open for up to 3 months provided stockpiles are less than 2.5m in height. Topsoil may be stored for longer periods if under cover and air-dry with a stockpile height of less than 2.5m.
- (ii) Topsoil shall not be handled in any way when its moisture content is above field capacity. Topsoil that has had its structure modified by milling, crushing, sieving through a mesh finer than 30mm, or any comparable processing, is unacceptable. Topsoil that has been rotary hoed more than twice since it was 'mined' is unacceptable.
- (iii) Establishing soil quality based on soil tests. A basic soil test shall include as a minimum: organic matter content, pH, phosphorus, extractable cations, cation exchange capacity and total base saturation.
- (iv) Following soil tests, the Contractor is to seek advice, from a suitably qualified professional, measures to ameliorate and improve the soil to make it suitable for planting, using wherever possible, organic means. The Contractor shall provide a detailed programme for this soil enhancement work, for approval, prior to implementation.

Topsoil care

Topsoil compaction should be avoided, measures include:

The use of the lightest possible vehicles and machinery when spreading topsoil and/or trafficking planting areas which have been top soiled;

- (i) Ensure all machinery used is fit for purpose; and
- (ii) Avoid trafficking completed topsoil areas and limit passes.

Unsuitable materials

The Contractor shall ensure that all planting is undertaken on suitable material which will sustain the proposed plant species. Unsuitable materials would include:

- (i) Soil that is too weak to provide support for new planting;

- (ii) Soil containing rubbish or contaminated materials; and
- (iii) Soil containing pest plant material.
- (iv) The Contractor may supply a methodology to remediate unsuitable materials, including how the presence of pest plants will be managed. This shall be approved by the Designer prior to commencement.

Should dormant seed or plant pest seed be present or identified onsite the Contractor shall supply a methodology to control any infestation. This shall be approved by the Engineer prior to commencement.

Failure to identify unsuitable material or plant pest emergence would not alleviate the Contractor of its responsibilities to control these issues or any infestation.

Refer NZS4404:2010 Part 7, clause 7.4.2 for more information.

C5002 – LANDSCAPE PLANTING

C5002.1 EXTENT OF WORK

This section relates to the planting of trees, shrubs and groundcovers for the entire site and includes details on the supply and installation of all materials, planting preparation, planting and plant protection, etc.

C5002.2 MANUFACTURER'S DOCUMENTS

The following sub-sections note certain branded products which may be utilised; alternatives may be utilised, following prior approval from the Engineer. All materials shall be utilised in compliance with manufacturer's documentation:

.1 Root barrier

Arboregreen root barrier 900mm depth

<https://www.arboregreen.com.au/product/813-rootstop-recycled-root-barrier-900mm-deep-x-30m-roll?categoryId=6>

.2 Soil conditioner

Dalton's Compost Plus

<https://www.daltons.co.nz/daltons-compost-plus>

.3 Mulch

Dalton's Mega Mulch

<https://www.daltonlandscape.co.nz/shop/Soil+Compost+Bark++Mulch/Daltons+Mega+Mulch-2.html>

.4 Fertiliser tablets

GROTAB™ slow release fertiliser tablet

<https://www.grotab.com/>

.5 KBC combi guard

300mm KBC Combi Guard including KBC Eco Wool Mat shall be installed around all Pb2 and Pb3 grade plants, to manufacturer's recommendations.

<https://www.advancelandscape.co.nz/site/advancelandscape/combiguard%20sell%20sheet.pdf>

In all cases, the product specified above may be substituted with equal or approved equivalent products. Any substitutions to be approved by Engineer.

C5002.3 SUPPLY OF MATERIALS

Refer to NZS4404:2010 Part 7, clause 7.3.7

.1 Trees, shrubs and plants

Plants shall be eco-sourced from the Dunedin region at the grades specified in the plant schedules included on Drawings (3336298-AL-050).

All landscape plants shall be healthy and vigorous, free of pests and diseases, with well-developed root systems, well branched and symmetrically shaped with compact branch structure. The root system shall be healthy, in balance with the amount of foliage growth, and contain fibrous and feeding rootlets adequate to fill the container without being root bound. All root bound landscape plants or those with badly spiralling root systems will be rejected. All root balls and containers shall be free of all weeds. All root masses shall retain their shape and hold together (including soil) when removed from their containers.

All landscape plants shall be well 'hardened off' prior to supply.

Landscape plant material supplied shall be clearly labelled stating the plant's Latin name and the grower's own tag for minimum of 20% of each species.

.2 Inspections

Plants shall be sourced and supplied by the Contractor at the grades specified on the Drawings and in the plant schedule. All plants shall be inspected by the Engineer prior to planting, for variety, size and match to specification. The Contractor shall provide at least 5 days' advance notice of required inspection of plants – at nursery – by the Engineer. The Engineer reserves the right to reject any that fail to satisfy the above conditions. The Contractor shall replace any plant not approved by the Engineer. Approval from this inspection shall not preclude rejection of plants for defects which may appear later during the progress of the work.

.3 Fertiliser

Fertiliser shall be applied at time of planting where required and shall be a 'complete' tablet form slow release fertiliser such as GroTab™ or approved equivalent by Engineer with a minimum release period of 18 months.

.4 Bark mulch

The mulch used for planting areas including tree pits shall be 'Daltons Mega Mulch' or approved equivalent to be installed to landscape details. A sample of the mulch shall be submitted for review by the Engineer prior to installation.

Refer to NZS4404:2010 Part 7, clause 7.4.5.1 for further information.

.5 Soil conditioner

The soil conditioner used for planting areas including tree pits shall be 'Dalton's Compost Plus' or approved equivalent pasteurised composted soil conditioner complying with the requirements of NZS 4454: 2005 "Composts, soil conditioners and mulches". A sample of the soil conditioner shall be submitted for review by the Engineer prior to installation.

.6 Tree stakes and ties

- (i) Tree stakes shall be 1800x50x50mm H4 treated radiata pointed stakes. Two stakes shall be used for all PB28 grade trees.
- (ii) Tree ties to be hessian webbing 50mm tie or rubber inner tube fixed with galvanised staples, tied at minimum of 750mm from base of tree.

.7 Root barrier

Root barrier shall be 'Arborgreen root barrier 900mm depth x 3000m lengths' or prior approved equivalent. A sample of the root barrier shall be submitted for review by the Engineer prior to installation.

C5002.4 SUBSTITUTIONS

Upon submission of evidence that certain materials are not available at the time of contract, the Contractor may be permitted to substitute other materials. All substitutions shall be of the nearest equivalent to the original specified and shall be subject to approval of the Engineer and Engineer prior to installation / planting.

C5002.5 PLANTING INSTALLATION

.1 Transportation and Delivery

The Contractor shall be responsible for arranging transport to site from the nursery and accepting delivery of these plants, and be satisfied that they comply with the Specification, are in good condition and confirm there has been no change following previous approval when inspected at the nursery as per C5002.3.2. Plant material shall only be delivered to the site when it can be immediately placed in its final location from the delivery vehicle. Plant trees, plants and shrubs as soon as possible and no later than 3 days after delivery, keeping the root ball moist. The Contractor is responsible for ensuring that protection is given to all trees and their root systems to preclude failure due to moisture stress, exposure or physical damage during transportation. The Contractor is responsible for the security of the plants while they are on Site.

.2 Planting Area

Ensure that areas for planting are clean, ready to be worked and clear of any continuing work by other trades. Do not start planting until work area is ready as outlined in Section C5001- Site Preparation.

.3 Timing

The Contractor shall programme the planting season between 01 April to 30 September. Planting outside the specified planting season shall not occur without the Engineer's approval.

Conditions shall be assessed, and the Contractor shall liaise with the Engineer when proposing to plant; particularly in prolonged dry or wet weather conditions.

.4 Set-out

The Contractor shall position and space out shrubs in locations and quantities shown on the drawings and associated planting notes. Refer to Drawings 3336298-AL-011 to 013 and 3336298-AL-041 as well as planting schedule 3336298-AL-050)

Set-out shall be confirmed on site by the Engineer prior to commencing planting. The Contractor shall provide at least 5 days advance notice of planting dates to allow the Engineer to be present to check the set out on site before planting. Organise planting to avoid undue compaction of planting areas. Re-cultivate any heavily compacted areas prior to planting. The Contractor shall report the existence of any buried services or debris restricting the accurate placement of plants to the Engineer for instruction.

.5 Preparation of planting holes

Each plant hole shall be deeply cultivated. The hole shall be nominally twice the rootball width and 1.5 times the depth of the rootball and sufficiently large to allow the plant to be planted with its roots well spread out and hanging downwards. Roots should not be bent or distorted in any way. Scarify the sides and base of planting holes with a trenching spade or cross bar. Slow-release fertiliser tablets shall be placed at the base of each planting hole prior to planting. For applications rates, refer to section C5002.5.7.

Allow for 50mm of backfilling of 50% excavated topsoil and 50% soil conditioner for all containerised plants.

The Contractor shall be responsible for ensuring planting holes have adequate drainage. The Contractor shall allow for the addition of soil conditioning material in instances where the existing soil requires it in order to achieve successful landscape plant establishment and growth.

Refer to drawings 3336298-AL-040-041 for planting and tree pit build up and back filling.

.6 Planting – Shrubs/groundcover

The Contractor shall plant shrubs in accordance with good horticultural practice to ensure the continued survival and good health of the plants. Ensure that container-grown plants are thoroughly soaked before planting. Planting holes for shrubs shall be nominally twice the root ball width and 1.5 times the depth of the root ball and sufficiently large to allow the plant to be placed with its roots well spread out and hanging downwards. Remove plant from container / planter bag (ensure any circulating roots are teased out straight and removed).

Place Grotab fertiliser tablet at the rates specified in section C5002.7 below.

Keeping root ball intact, place each plant plumb with the top of the root ball at the top of the plant mix and upright. Plants shall be planted to the same height in the soil as they were when nursery grown. The planting hole shall be progressively backfilled to fill all voids and consolidated so no air pockets are present, and the tree is firmly held. The soil shall then be firmed with the base of the palm or heeled firmly round the root collar as appropriate for plant grade.

300mm KBC Combi Guard including KBC Eco Wool Mat shall be installed around all Pb2 and Pb3 grade plants, to manufacturer's recommendations.

Thoroughly water in immediately after planting; ensuring the water has penetrated to the full depth of the root ball (initial watering is also important to settle the soil around the plants). Planting is to be carried out in suitable weather and all plants re-firmed if lifted by frost during the Contract period.

.7 Backfill Fertiliser

Apply GroTab fertiliser tablets into each planting hole and tree pit at the following rates:

Nursery grade	Tablet Quantities per hole
PB2	1
PB3	1
PB18	2

PB28	2
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Documents demonstrating supply and incorporation of fertiliser shall be provided to the Engineer on request.

.8 Bark mulch

The Contractor shall supply and spread mulch as per NZS4404:2010 Part 7, clause 7.4.5.1. To be applied in minimum 1m diameter to base of all PB18 and PB28 grade trees. Refer detail 04 on Drawing 3336298-AL-040 to 041 for typical details.

.9 Planting – Trees

Plant trees as per NZS4404:2010 Part 7, clause 7.4.6 and in accordance with good horticultural practice to ensure the plants' continued survival and good health.

Ensure that root balls are thoroughly soaked before planting. Excavate a tree pit as shown Drawing 3336298-AL-040.

Root barrier to be installed where tree is within 1m of underground service or within 2m of an adjacent service; final locations to be confirmed by Engineer. Backfill material shall consist of 50% unscreened topsoil and 50% soil conditioner (organic compost or approved similar). Thoroughly water in immediately after planting, ensuring the water has penetrated to the full depth of the root ball (initial watering is also important to settle the soil around the plants).

Use two stakes for PB28 grade trees at equal spacing from stem of the tree and outside of the root ball. Secure with 40mm cycle inner tube or hessian strip to be tied in a figure eight then wrapped around itself to bind securely. Position to be one-third of the height of the tree or at a maximum of 800mm high.

Use one bamboo stake for PB18 grade trees at consistent spacing. Secure with adjustable advanced landscapes 'speedi ties'. Position to be one-third of the height of the tree or at a maximum of 700mm high. Care to be taken when working around Lancewood branches.

300mm KBC Combi Guard including KBC Eco Wool Mat shall be installed around all Pb2 and Pb3 grade plants, to manufacturer's recommendations.

Planting is to be carried out in suitable weather (not during or after a heavy rain event) and all plants re-firmed if lifted by frost during the contract period.

.10 Watering during implementation

Watering shall be carried out during implementation as required to ensure the establishment and healthy growth of the plants watering will be in the form of hand watering and/or temporary sprinklers during plant implementation phase and during dry spells thereafter during Defects Notification Period. The aim is to water deeply. Water should be applied at low pressure, and care should be taken to avoid the displacement of soil or mulch during watering. Refer to NZS4404:2010 Part 7, clause 7.3.10

C5002.6 PERFORMANCE CRITERIA

The performance of the Contractor will be measured by the following criteria:

- (i) That the correct species, quality, grades and numbers of plants have been supplied.

- (ii) That plant delivery procedures meet specification C5002.5. 1. Transport and delivery.
- (iii) That planting layout is arranged as specified.
- (iv) That planting is adequate to ensure good plant health and growth.
- (v) That application of plant staking, mulch and tree guards are implemented to Specification.
- (vi) That effective depth watering is being achieved.
- (vii) All plants to have success rate of 95%
- (viii) All trees to have success rate of 100%

C5002.7 CLEAN UP AND MAKE GOOD

Clean up around planted area and fencing. Remove surplus materials from the Site. Any disturbance or damage to areas outside of the landscape planted areas shall be made good to match previous conditions.

C5002.8 PRACTICAL COMPLETION

Following the Contractor's application for a certificate of Practical Completion, a joint inspection of the works by the Contractor, the Principal and the Engineer will be required.

Prior to Practical Completion being awarded, the Contractor shall submit a completed DCC Asset form.

The Contractor shall be responsible for maintaining the works until a Practical Completion Certificate is awarded.

The Contractor shall not be required to maintain the Planting during the Defect Liability Period.

C5003 – STREET FURNITURE

C5003.1 DESCRIPTION

The work specified in this Section relates to the supply and installation of the following exterior fixtures:

- (i) Bench Seat (TBS1)
- (ii) Cycle Rack (CYC1)

C5003.2 NO SUBSTITUTIONS

Substitutions are not permitted to any specified components and products.

C5003.3 QUALIFICATIONS

Work is to be carried out by tradesperson experienced, competent and familiar with the materials and installation requirements specified.

C5003.4 GRAFFITI GUARD

All street furniture (metal and timber) to be protected with graffiti guard. Product to be approved by Engineer prior to application.

C5003.5 WARRANTIES

.1 Warranty – Manufacturer / Supplier

Provide a material manufacturer/supplier warranty:

1 year: For street furniture

2 years: For powder coat finishes

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of Practical Completion of the Contract Works.

.2 Warranty – Installer

Provide an installer warranty:

1 year: For street furniture.

- Commence the warranty from the date of Practical Completion of the Contract Works.

C5003.6 INSPECTIONS

Carry out inspections of the following:

- Furniture items delivered to site before installation.
- Locations or footings prepared to receive furniture or fixtures before installation.

C5003.7 DELIVERY, STORAGE AND HANDLING

Take delivery of materials and goods and protect from damage. Protect finished surfaces, edges and corners from damage. Move/handle goods in accordance with manufacturers' requirements. Reject and replace goods that are damaged or will not provide the required finish.

C5003.8 INSTALLATION

.1 Sample

Sample to be provided for approval prior to installation.

.2 Concrete work

Concrete work to NZS 3124: 1987. Excavate footings at required positions and of size specified by on Drawing 3336298-AL-031

.3 Street furniture

Mount street furniture onto footings in accordance with manufacturer's recommendations and Drawings 3336298-AL-031 & 033. Erect all posts or poles vertically. Assemble items to manufacturer's requirements. Erect/locate furniture items level (i.e. not sloping with grade of footpath).

C5003.9 COMPLETION

.1 In situ touch-up

In situ touch-up only after receiving written authority from the Engineer.

.2 Routine Cleaning

Carry out routine trade cleaning of this part of the work including periodic removal all debris, unused and temporary materials and elements from the Site.

.3 Defective or damaged work

Defective seats or bike racks will require the contractor to rectify prior to practical completion.

.4 Routine Cleaning

Replace damaged or marked elements where repair is not possible or will not be acceptable. Leave work to the standard required for following procedures.

.5 Protection

Protect adjacent structure and finishes and make good any damage.

C5003.10 SELECTION

.1 Bench seat (TBS1)

Location: Refer to Drawings 3336298-AL-013

Details: Refer to Drawing 3336298-AL-033

Manufacturer: AE TILLEY

Model: SF2210 Plaza Platform 2000mmX1830mm (std. size)

Timber: All timber components to be treated with Resene Woodsman wood oil stain – natural colour (x2 coats minimum)

Sample required: Yes

.2 Cycle Rack (CY1)

Location: Refer to Drawings 3336298-AL-013

Details: Refer to Drawing 3336298-AL-031

Manufacturer: Urban Effects

Model: Citistyle semi hoop

Finish: HDG steel hoop in ground mounted - Powder coated black

Sample required: Yes

C5006 - CARPENTRY AND TIMBER STRUCTURES

C5006.1 DESCRIPTION

The work specified in this Section relates to the labour, supply, fabrication and installation of all carpentry and joinery including all associated joints, bolts, nails and fixings as shown on the drawings for:

- The construction of the timber stairs
- The construction of the timber wheel stops
- The construction of timber edging and pegs

C5006.2 SPECIFICATION STANDARDS

This Specification shall be read in conjunction with the following Standards, which are deemed to form a part of this Specification. In the event of this Specification being at variance with any provision of these Standards, the requirements of this Specification take precedence over the provision of the Standards. Reference to any Standard shall include any amendments thereto and any Standard in substitution therefore. All Materials and workmanship shall comply with these Standards unless expressly noted otherwise.

NZS 3621	Commercial Timbers, Standard Names
NZS 360	Metric Dimensions of Timber
NZS 3631	NZ Timbers, Nation Grading Rules
NZS 1618	Timber Connections
NZS 3604	Timber Construction Requirements
MP 3600	Treatment Specifications
AS/NZS 3661.1	Slip Resistance of pedestrian surfaces - Requirements

C5006.3 RELATED SECTIONS

Refer to:

C50003 Street Furniture

C5006.4 QUALIFICATIONS

Workers to be experienced, competent trades people familiar with the materials and techniques specified.

C5006.5 MATERIALS

.1 Timber

All timber shall be protected from the weather by the use of covers.

The species, grade, sizes, finish and treatment timber products shall be suitable for the intended purpose and comply with the requirements of this specification and relevant standards at the time of installation.

All materials shall be the best of their kind, dry and seasoned and be suitable for the purpose of its use. Timber shall be free of shakes, loose knots and gum streaks. Substandard or warped timbers shall be removed from the site as directed by the Engineer and no payment will be made for these timbers.

All fixing should be minimum hot dipped galvanised or stainless steel where indicated in contract drawings.

All timber in proprietary street furniture shall be of a high standard and shall comply with the standards set out in the specification and relevant statutory standards.

.2 Treatment

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 treatment.

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

.3 Screws

Screws and bolts shall be in straight rows and evenly spaced. Avoid hammer marks to exposed surfaces. Use of nail guns is not permitted for any surface.

.4 Nails

All nails shall be minimum hot dipped galvanised steel or stainless steel as indicated on the drawings.

Nails and bolts shall be in straight rows and evenly spaced. Ends and joins shall be cut square evenly. Neatly punch all nails 3mm past flush. Avoid hammer marks to exposed surfaces.

.5 Bolts, Washers and Miscellaneous Brackets and Fittings

Brackets and fittings shall be as shown in the following table:

Location	Bolt type	Protection
BRANZ Corrosion Zones 1 to 4	Stainless steel 316	GP Grease. Bolts installed into the pre-greased holes and contact faces of brackets and washers greased

Bolts and washers shall be engineer's bolts of the diameters and sizes shown fitted with square washers of the same material. Minimum bolt diameter shall be 12mm.

Washers shall comply with the following minimum standards

Size	Washer
M12	50 x 50 x 5.0mm
M12	50 x 50 x 3.0mm

The ends of cut galvanised threaded rod shall be protected with zinc corrosion protection. Thread protrusion past the nut shall be a minimum of one thread pitch after tightening.

All bolts shall be greased through the timber section.

All exposed bolts, nuts and washers shall comply with New Zealand Playground standard NZS 5828:2004

.6 Proprietary Fixings

All proprietary fixings including nail plates, joist hangers and the like shall be either as specified, or if not specified, correctly sized for the timber members connected. Supply and fix the appropriate nails, bolts etc. according to the drawings or manufacturer's manual.

"Knuckle" nail plates shall not be used.

No on-site disturbance or drilling of galvanised coatings on fittings shall be accepted.

.7 Concrete Footings

Concrete shall be 25MPa (unless otherwise specified) certified concrete. The Contractor shall obtain delivery docket and all strength documentation from the supplier and may be required to supply them at the Engineer's request.

C5006.6 CONSTRUCTION

Comply with SNZ HB 8630:2004 except as varied in this specification.

Comply with NZS 3604 except as varied in this specification.

Comply with NZMP 3640:2003 except as varied in this specification.

Workmanship to be in accordance with and to current NZ Trade Certificates in carpentry, joinery and timber machining best practice.

All timber shall be fixed, framed, nailed, screwed, bolted and fitted together in accordance with the best modern trade practices, plumb and true to line and face. All work shall be accurately set out, neatly executed and finished.

All work shall be carried out under the supervision of competent and experienced tradesmen in accordance with the best and latest trade practices and the requirements of NZS 3604. Details not shown on the drawings shall be formed according to the principles of NZS 3604.

