

Appendix G

Eastern Busway 1 Landscape Specification Issue For Construction

Eastern Busway 1 – Panmure to Pakuranga – Technical Specifications

LANDSCAPE WORKS

Prepared for Auckland Transport (AT)

By Beca Limited (Beca)

10 December 2018



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Revision History

Revision N°	Prepared By	Description	Date
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DOCUMENT ACCEPTANCE

Action	Name	Signed	Date
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Eastern Busway 1

1.0 GENERAL

1.1 SCOPE

The project site consists of Lagoon Drive and Pakuranga Road in Panmure/Pakuranga, East Auckland as shown on drawing no. 3311120-AR-0001.

This specification deals with site preparation, planting and plant maintenance, street furniture and surface finishes for the Eastern Busway 1 Project. The intent is to establish a high level of amenity through quality planting, seating and surface finishes alongside the widened busway and road carriageway.

1.2 DRAWINGS

The landscape and urban design drawings are included and form part of the contract documents. The landscape and urban design drawing numbers are 3311120-AR-0001 to 1201 and 3233073-LA-0100 to 0601.

1.3 INTERPRETATION/ FAMILIARISATION

Should the Contractor be in doubt as to the interpretation of any aspect of this specification, related documents, or aspects of the implementation of works they shall seek clarification from the Engineer prior to proceeding. Failure to do shall render the Contractor solely responsible for rectifying any errors at no additional cost to the Principal.

The Contractor shall fully familiarise themselves with the Site and satisfy themselves as to the nature of Site access, the planting conditions and any other conditions required to ensure successful execution of the works and establishment of plants.

The Contractor is responsible for the proper execution of the works according to the true intent and the meaning of the drawings, specification and schedule.

1.4 MEETINGS

The Contractor shall contact the Engineer to arrange an initial pre-start meeting with the Engineer to discuss the work programme, health and safety plan, quality controls, existing site conditions (including soil bed).

In regard to other meetings, the Contractor shall contact the Engineer with:

- a minimum of 5 days' notice to arrange an inspection of the plant materials for variety, size and match to specification prior to implementation.
- a minimum of 5 days' notice to arrange a meeting to confirm set out of the planting on site.

- a minimum of 5 days' notice to arrange a meeting to confirm the approval of concrete test panel inspection.
- a minimum of 10 days' notice to review and approve any custom furniture fixtures finishes and equipment including all shop drawings.

Council will arrange with the contractor for annual inspections of all new plantings to ensure the plants are healthy and are being maintained to the Council's standards.

The contractor shall give the Engineer with a minimum 1 month notice prior to the final handover to the Council for future care and maintenance of the landscaping, a site walkover shall be arranged with the Council. Contractor and Engineer to inspect the new planting areas, and to document any areas of plant health and maintenance that need to be rectified prior to hand over.

1.5 STANDARDS

The Contractor shall comply with all relevant New Zealand Standards, District and Regional Council Standards and in particular:

- New Zealand Building Code
- D1 Access Routes
- Auckland Transport Code of Practice (ATCOP)
- Auckland Transport Technical Design Manual (TDM)
- Local Authority Standard Specifications relevant to the Landscape works of the particular contracts
- NZS8409:1999 Code of practice for the management of Agrichemicals incorporating Amendment No.9
- NZS 4454: Standard for Composts, Soil Conditioners and Mulches
- NZBC F4/AS1 Safety from falling
- NZBC F5/AS1 Construction and demolition hazards
- NZS 3109 Concrete construction
- NZS 3114 Specification for concrete surface finishes
- NZS 3404:1997 Steel structures standard
- NZS 3602: Timber and wood-based products for use in building
- NZS 4210: Masonry construction: Materials and workmanship
- AS/NZS 2312.1 Guide to the protection of structural steel against exterior atmospheric corrosion by the use of protective coatings - Paint Coatings
- Building Act 2004
- Building Regulations 1992
- Health and Safety at Work Act 2015
- Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
- Health and Safety at Work (Hazardous Substances) Regulations 2017
- Health and Safety in Employment Regulations 1995 (reprint 4 April 2016)
- Heritage New Zealand Pouhere Taonga Act 2014
- Resource Management Act 1991
- WorkSafe NZ
- Guidelines for the provision of facilities and general safety in the construction industry
- Good Practice Guidelines - Excavation Safety
- NZS 5103 Code of Practice for the Design, Installation, and Operation of Sprinkler Irrigation Systems.
- AS/NZS 3500.1 Plumbing and drainage - Water services
- Irrigation Code of Practice and Irrigation Design Standards (Irrigation NZ Inc)

1.6 EXISTING SERVICES

It is the Contractors responsibility to protect existing services, pavements and structures (including drains) during landscaping operations. The Contractor is responsible for being acquainted with the location of existing underground and above ground services. 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.

If service conflicts are identified the Contractor shall notify the Engineer who will instruct on plant layout adjustments to avoid services and meet clearance requirements. This shall apply to the mature form and size of plant species.

Refer to ATCOP Section 14.3.6 for further guidance.

1.7 QUALIFICATIONS

The Contractor is to supply experienced competent workers, familiar with the materials, techniques and the standards and building requirements specified. Evidence of experience and competence shall be provided on request.

The Contractor shall carry out the work in an expeditious manner and using best trade practice. The Contractor shall make adequate preparation for starting work on the site and/or portions of the site on the appointed dates.

1.8 HEALTH AND SAFETY

The Health and Safety in Employment Act requires AT to adequately manage risks associated with landscaping, construction and maintenance. This includes:

- Landscaping on steep slopes
- Landscaping that requires work close to traffic
- Landscaping involving the use of pesticides
- Tree work

A Traffic Management plan is required when working in and around the road corridor. Contractors shall confirm the need a Works Access Permit (WAP) and Corridor Access Request (CAR) with the Engineer.

2.0 SITE PREPARATION

2.1 LOCATION OF PLANTING AREA

The finalised planting areas to be prepared for planting shall be confirmed with the Engineer prior to planting beginning.

2.2 PROTECTION

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

The Contractor shall make arrangements to ensure that planting on neighbouring sites are protected from damage during the course of the planting and (defects liability) contract. Any damage or disturbance caused by the Contractor shall be made good at the Contractors expense.

The Contractor shall ensure that any grass or paved areas immediately outside of the construction zone are protected from mechanical damage. Any damage or disturbance caused by the Contractor shall be made good at the Contractor's expense.

Any spillage of materials, onto roads etc, shall be immediately cleared up by the Contractor.

2.3 SITE CLEARANCE

The Contractor shall notify the Engineer upon discovery of major roots (greater than 50mm) and non-perishable solid items (concrete etc. other than the pump chambers) within the intended planting area. Upon instruction the Contractor shall arrange for removal of any impediments to the planting programme.

The burning or burying of rubbish and vegetation on Site is forbidden. The Contractor shall ensure that disposal of plant material minimises weed spread and takes account of bio security requirements in operation in the area.

Any spillage of materials, onto roads etc, shall be immediately cleared up by the Contractor.

Remove existing excess clay and erroneous material from cleared and new garden beds and dispose of off-site. This shall include, where applicable, all necessary excavation and trimming to allow for the spreading of topsoil to specified depths. Surplus excavated material is to be carted from the site as directed by the Engineer.

2.4 ANTIQUITIES AND ITEMS OF VALUE

Report the finding of any fossils, antiquities and other items of value, to the Contract Administrator. All to remain undisturbed until approval is given for removal.

Pre-1900, items or evidence of human activity on the site, come under the Heritage New Zealand Pouhere Taonga Act 2014. If such items or evidence is discovered work must stop immediately and the Contract Administrator must be notified immediately. The site may be classified as an Archaeological Site under the Act, and the Contract Administrator or Owner must contact the Heritage New Zealand for authority to proceed.

Post-1900 items remain the property of the owner, pre-1900 items may remain the property of the owner or the Crown subject to what is found.

Contact Matt Felgate (Project Archaeologist) for known archaeological information relating to this site.

2.5 GROUND PREPARATION

2.5.1 Amenity planting beds

'Amenity Planting' refers to all planting other than tree planting and raingardens, and includes the following plant types identified in the drawings

- AP – Amenity Planting
- AS – Oioi Planting
- BP1 – Berm Planting Mix 1
- BP2 – Berm Planting Mix 2
- CM – Coastal Planting Mix
- MP – Median Planting Mix
- B1 – Bush Mix 1
- B2 – Bush Mix 2
- LG – Mikoikoi Planting
- DN – Turutu Planting
- DL – Amenity Planting Mix 1
- DLP- Amenity Planting Mix 2
- CH - Shrub Mix
- MA - Soil Nail Base Mix
- RP – Revegetation Mix

During preparatory work the Contractor must notify the Engineer of any areas which have drainage issues which may affect plant establishment so that a suitable solution can be implemented. Failure to do so will result in the Contractor having to carry out necessary remedial works, reparation, and drainage works at their own cost.

Prior to spreading of topsoil mix, in areas designated for garden beds, the clay base shall be scarified/ ripped to loosen compaction and ensure there are no hard pans. Minimum depth of ripping shall be 200mm.

2.5.2 Rain Gardens

Refer to Civil and Storm water Documentation for rain garden ground preparation and construction detail.

2.6 TOPSOIL SUPPLY

2.6.1 Imported Topsoil – Amenity Planting (excludes rain gardens)

Imported Topsoil Product type: 'Ultrasoil' Supplied by 'Living Earth' or approved similar.

Imported first class topsoil shall consist of:

- a) 'Ultrasoil' 80%
- b) 'Living Earth Organic Compost' 20%

Topsoil shall be sourced from an original surface layer of grassland or cultivated land. Soil arising from reclaimed land, industrial sites, or which has been used for the disposal of any industrial, domestic or agricultural wastes shall not be used.

Topsoil shall be well aerated, as evidenced by an absence of mottling and grey / blue colours. There shall be no traces of a sewage-like smell.

The clay content shall not exceed 25% by dry weight. The soil shall have organic matter content between 7% and 20% by dry weight. Topsoil containing recognisable remains of fresh plant or organic material (under composed or partly decomposed) is unacceptable.

The topsoil shall be loose and friable, breaking down by hand to aggregates of 1-10mm in diameter. Samples of such soils shall exhibit a stability ratio of more than 50% and a mean weight diameter of more than 0.75mm under standard wet sieving conditions (as determined by NZSTI structural stability assessment test). Topsoil shall have a soil pH of between 5.5 and 7.5.

The Engineer reserves the right to reject topsoil he/she considers does not meet the required standard.

2.6.2 Rain Garden Soil Mix

Rain garden soil mix to be 'Living Earth Rain Garden Mix' spread and lightly compacted in 300mm deep layers.

2.6.3 Soil Conditioner

The soil conditioner used for planting shall be 'Living Earth Organic Compost'. A sample of the soil conditioner shall be submitted for review by the Engineer prior to installation.

No soil conditioner to be used in swales and rain gardens.

2.7 TOPSOIL SPREADING TO PLANTING AREAS

The contractor shall install topsoil to planting areas where required to achieve finished surface levels, and to ensure specified topsoil depths are achieved. The topsoil shall not be over compacted.

Topsoil/rain garden soil mix shall be spread to the following minimum consolidated depths:

Garden/Planting Beds	500mm
Rain Gardens / Swales	600mm
Specimen trees	1000mm

In all planting areas topsoil shall be rolled gently and harrowed to make a suitable bed for shrub planting. Care shall be taken in spreading to minimise overworking and tracking of machinery which may lead to over compaction. Any spillage of materials onto roads and pavements shall be immediately cleared up by the Contractor.

3.0 PLANTING

3.1 SUPPLY OF MATERIALS

3.1.1 Trees and Plants

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 best nursery stock, healthy and vigorous with well-developed root systems, hardened off, 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 plants or those with badly spiralling root systems will be rejected. All plants shall be tagged with the grower's own tag.

All native planting shall be locally sourced eco-seed from nurseries within the appropriate regional district with similar climate and environment to the site.

Where several specimens of the same species are to be selected, evenness of shape and size is required within the size range specified.

All plants may be inspected by the Engineer prior to planting, for variety, health, size and match to specification. Engineer reserves the right to reject any that fail to satisfy the above conditions. Approval from this inspection shall not preclude rejection of plants for defects which may appear later during the progress of the work.

3.1.2 Fertiliser

The fertiliser shall be: Nitrophoska 270 day slow release tablet fertilizer or prior approved equivalent. Soluble fertilisers shall not be used. . Incorporate fertiliser evenly mixed through the backfill material at the rates specified below.

PLANT SIZE	APPLICATION RATE
PB3 (2Ltr)	15g
PB5 (3Ltr)	40g
160Ltr	300g
*Do not use fertiliser in rain garden or swale planting	

No fertiliser is to be used in rain gardens.

3.1.3 Mulch - Amenity Planting (excludes rain gardens)

The mulch used shall be 'Living Earth More Than Mulch'. The bark mulch shall be clean and free of sawdust, dirt, phytotoxins, pathogens and weed species including chip from willow, poplar or any other adventive weed species. A sample of the mulch shall be submitted for review by the Engineer for approval prior to installation.

3.1.4 Rain Garden Mulch

The rain garden mulch shall be standard landscape type shredded wood mulch or chips, well-aged and free of weed seeds, soil and roots. Spread to a thickness of 70mm. A sample of the mulch shall be submitted for review by the Engineer for approval prior to installation.

Steep (>1:5) batters will require a geofabric slope reinforcement such as BIOMAC® C or an approved similar

3.1.5 Substitutions

Upon submission of evidence that certain materials, including plant materials, are not available at the time of contract, the Contractor shall be permitted to substitute other materials and plants, with an equitable adjustment of price. All substitutions shall be of the nearest equivalent species and variety to the original specified and shall be subject to approval of the Engineer.

3.2 AMENITY RAIN GARDEN AND SWALE PLANTING INSTALLATION

3.2.1 Transportation and Delivery

The Contractor shall be responsible for arranging transport to site from the nursery and accepting delivery of these plants, and for satisfying himself or herself that they comply with the specification and are in good condition. Plant material shall only be delivered to the site when it can be immediately placed in its final location from the delivery vehicle. Plants must be planted as soon as possible and no later than 3 days after delivery, keeping the rootball 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.

3.2.2 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 'Site Preparation' above.

3.2.3 Planting Time

The Contractor shall programme planting time to best provide for the growth and establishment of the plant material. This is generally between 1 April and 30 September. Planting may occur outside this time with the approval of the Engineer. The Engineer reserves the right to halt the work should they consider the working conditions or weather unsuitable.

3.2.4 Planting Set-out

The Contractor shall position and space shrubs and groundcovers in locations and quantities shown on the drawings, specifically 3311120-AR-1201 to 1202 and 3233073-LA-0510 to 0513 and associated planting notes.

The Engineer shall instruct the Landscape Architect to confirm the set out on site prior to commencing planting. The Engineer may require minor refinement to the design with adjustments to plant placements. The Contractor shall co-operate with this.

The Contractor shall provide at least 5 days advance notice, to the Engineer, of planting dates to allow the Landscape Architect 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.

3.2.5 Preparation of Planting Holes

The Contractor shall be responsible for ensuring planting holes have adequate drainage. The Contractor shall advise the Engineer immediately if he or she considers the existing soil conditions to be adverse to successful plant establishment and growth.

Refer to the Landscape Details for Typical Planting requirements.

3.2.6 Shrub Planting

Plant shrubs in accordance with good horticultural practice to ensure the continued survival and good health of the plants. Ensure that root ball of plants are thoroughly soaked before planting.

Remove plant from container / planter bag (ensure any circulating roots are teased out straight and removed).

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. Backfill material using fingers to evenly firm without compaction, before finally firming the plant and soil with the base of the palm of the hand or by heeling.

The planting hole shall be progressively backfilled with the hole with approved topsoil to fill all voids and consolidated so no air pockets are present and the plant 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.

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 (Avoid excessively dry or wet (water logged) soils) and all plants re-firmed if lifted by frost during the contract period.

3.2.7 Specimen Trees Planting

As for shrub planting above – with the addition of the following:

Excavate tree pits as shown in the drawings. The tree pits shall be sized accordingly:

Nursery Grade	Minimum pit depth	Minimum pit width
160Ltr	1000mm	1500mm

The sides and base of the tree pits shall be scarified. The lower third of the planting pit shall be filled with topsoil mixture including basal material that has been lightly compacted by foot.

Plant trees into tree pits as shown in the landscape drawings. Keeping root ball intact, place each tree flush with the top of the root ball at the top of the plant mix and upright. Trees shall be planted to the same height in the soil as they were when nursery grown.

The planting hole shall be progressively backfilled with approved topsoil material to fill all voids and consolidated so no air pockets are present and the tree is firmly held. The soil shall then be heeled firmly round the root collar.

Topsoil material shall consist of 80% site topsoil and 20% soil conditioner. Incorporate fertiliser evenly mixed through the topsoil material at the rates specified in this document. Thoroughly water in immediately after planting, ensuring the water has penetrated to the full depth of the root ball.

Tie trees to tree stakes as shown in the landscape drawings. The stakes shall be vertical and matching heights.

Ties shall be hessian, nominally 25mm wide when stretched (or approved elastic equivalent). Ties shall be made in a neat, firm tying pattern as shown in the drawings. Use double ties for each tree.

Planting is to be carried out in suitable weather - avoid excessively dry or wet (water logged) soils) and all plants re-firmed if lifted by frost during the contract period and all plants re-firmed if lifted by frost during the contract period.

3.3 MULCHING

The contractor shall supply and spread mulch around each plant. Mulch shall be laid at a minimum even depth of 100mm (and 75mm for rain gardens). Ensure that the mulch is applied on bare moist soil and is graded away from the stem of the plants (to avoid rotting of stem of plant). Ensure that other materials including soil are not mixed with the mulch during the work.

The mulch shall be well wetted down following installation to aid in wind stabilisation. In the first six weeks following installation prior to or during periods of high wind the mulch shall be redistributed evenly over the planting area and re-wetted.

3.4 IRRIGATION SYSTEMS

Approval from AC Parks Department and AT is required prior to the installation of any permanent or semi-permanent irrigation system. Where irrigation is approved, a duct for a water connection must be provided to amenity or garden planting areas.

All proposals for the installation of any irrigation system must be approved by AC Parks Department and AT. The type of water connection is to be agreed for each location. Either simple hose connection or permanent water supply feed.

The contractor shall submit drawings and schedules showing the layout and details of the system, to NZS and AS/NZS 3500.1, 7, Irrigation and Lawn Watering Systems, including micro-irrigation stake layout, sensor locations and controller cabinets, in hard copy paper and electronic format for approval.

3.5 CLEAN UP AND MAKE GOOD

Clean up around the planted area. Remove surplus materials from the site. Any disturbance or damage to lawn or plants outside of the planted areas shall be made good to match previous condition.

3.6 BEFORE PRACTICAL COMPLETION

Maintenance of the works up to Practical Completion is the responsibility of the contractor. This will include repair of any accidental or deliberate damage, vandalism, mulching plant beds, making good plant losses for whatever causes, and carrying out maintenance items as described elsewhere in the specification.

The contractor will be expected to maintain the site to a high degree of tidiness and cleanliness, and to make good any damage immediately throughout the contract period.

3.7 PERFORMANCE CRITERIA

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

- That the correct species, quality, grades and numbers of plants have been supplied.
- That plant delivery procedures are adequate to ensure all the conditions are met.
- That planting layout is arranged as specified.
- That planting is adequate to ensure good plant health and growth
- That application of plant staking, mulch and watering is implemented to specification.

4.0 DEFECTS LIABILITY AND MAINTENANCE OF SOFT LANDSCAPING

4.1 GENERAL

This section of the Specification covers the correction of defects relating to soft landscape works (including watering) installed by the Contractor for a 12-month Period of Defects Liability (PDL). Soft landscaping works include all plants, grass, mulch and planting ancillaries.

Maintenance shall include watering, weeding (releasing), cultivating, control of insects, fungus and other diseases by means of spraying with an approved insecticide or fungicide, pruning, and other horticultural operations necessary for the proper growth of the plants and for keeping the contract area in good appearance. The Contractor shall be pro-active in the reporting and treatment of anything affecting the wellbeing of the plants, in particular significant adverse conditions, dieback or browning of leaves, branches or any other signs. Plants dead or dying through the PDL shall be replaced at the contractors' expense

The Contractor shall use herbicides and pesticides in accordance with the specification, ATCOP standards and best practice.

4.2 DEFECTS LIABILITY

The prescribed contract Period of Defects Liability (PDL) is to be 12 months from the date of Practical Completion of the soft landscape work. The Contractor shall remedy all defects relating to the soft landscaping works prior to issue of the Defects Liability Certificate.

Defects relating to soft landscaping works include the replacement of dead or dying plants. The contractor's responsibility relating to defects liability of soft landscaping includes the need to water, control pests and diseases to maintain the plants to ensure the plantings and grass establish and grow.

4.3 AREA TO BE MAINTAINED

The area to be maintained shall be those areas of the site that include both soft and hard landscape works, including street furniture, walls, rehabilitated areas of the existing grassed reserve, as defined on the landscape drawings.

4.4 HEALTH AND SAFETY

Repair of defects and maintenance of the works will be undertaken while the site is accessible to the public. The Contractor shall undertake all works to avoid potential harm and minimise inconvenience to the Client's staff and the public and avoid harm to the Contractor's staff.

All works will be undertaken in accordance with the requirements of the Health and Safety in Employment Act.

Where the public or Client's staff are likely to be at risk of harm or contact with paint, chemicals, excessive noise or dust, the Contractor shall isolate the works area with barriers, warning tape or signs (or a combination of these measures) to a degree commensurate with the hazards and to the approval of the Engineer.

Where the works will affect access by vehicles or pedestrians, the Contractor shall supply all materials, labour and equipment to undertake appropriate measures to warn, divert or provide alternative access as necessary, and to the approval of the Engineer. Blocking of access will not be permitted unless other alternative access is impracticable and is expressly approved by the Engineer.

Barriers, warning tape, signs and works to provide alternative access shall be removed and any damage caused by those measures made good within 48 hours of the completion of the remedial or maintenance works.

4.5 MAINTENANCE PROGRAMME

Within seven working days of issue of Practical Completion the Contractor shall produce a programme of works for the 12-month Period of Defects Liability (PDL) showing the monitoring and maintenance operations to be carried out each week, for approval by the Engineer. Management and maintenance of the landscape works shall be undertaken on a monthly basis.

All new plantings of specimen trees shall have a minimum maintenance period of at least 36 months and will include the requirement to provide quarterly maintenance reports to council. Should any plantings die or not be

in an acceptable standard during the 36-month maintenance period the requiring authority shall be responsible for remediation and where directed by council replacement of dead, dying or poorly maintained.

A maintenance schedule is to be agreed with AC Parks

4.6 EARTHWORKS

Any settlement or slipping shall be made good. All surfaces shall be reinstated to original condition with the thickness of pavement / topsoil originally specified etc. Topsoil used for levelling shall be uncontaminated, dry, screened, imported topsoil meeting the requirements for imported topsoil as specified.

4.7 MULCHING

Maintain mulch depth between 75mm - 100mm for amenity planting and 70mm for rain gardens for the Period of Defects Liability (PDL).

Ensure that the mulch is graded away from the stem of the plant (to avoid rotting of stem of plant). Ensure that mulch is graded away from paths, and lawns in a way that avoids mulch spill.

4.8 WEED CONTROL

The intent is to ensure that all works undertaken are carried out in accord with best practices and industry standard. This code of practice should be read in conjunction with the following,

- NZTA C21
- Biosecurity Act (1993)
- Auckland Transport - Weed Control in Road Corridor Governing Principle
- Auckland Transport - Vegetation in Road Corridor Governing Principle
- Auckland Council - Regional Pest Management Strategy 2007- 2012 (RPMS)
- NZS 8409.2004 Management of Agrichemicals

The Contractor shall monitor and control weed growth within planted areas within the contract boundaries until the completion of the PDL.

It is essential that the Contractor adopts a methodology that does not injure or adversely affect plants. This may incorporate a combination of knapsack weed spraying and hand weeding. The Contractor shall be responsible for the cost of any rectification of damaged trees and shrubs caused by their weeding regime including the application of chemicals.

Physical removal shall be used in preference to chemical control.

The Contractor shall modify their maintenance regime in any particular area to accomplish the best outcome for the Site, for example increasing hand weeding and reducing spray applications or vice versa. Blanket chemical application shall not be undertaken. No spraying shall occur near waterways.

All dead sprayed weeds shall be removed within 2 weeks of spraying.

Weed control shall be frequent enough to prevent weed species flowering and seeding. Weed coverage shall not exceed 2.5% of any 10m² of mulched area. Weed growth shall not exceed 100mm in height or spread. Neither perennial grass weeds nor plant pests recognised by the local Regional Council shall be accepted at any size.

Any weed spraying must be undertaken with particular note of the requirements for weed control within specified areas identified on the No-Weed Spraying List. Chemical weed control is not permitted in many areas and such spraying may be done only with the permission of the relevant AT Engineer.

Following any construction activity the developer must reinstate all the disturbed areas with weed-free topsoil and quality grass seed. The areas reinstated must be machine mowable and maintained throughout the defects liability period of the contract.

- No chemical sprays are to be used outside schools or early childhood education centres on days that these institutions are in use.
- No chemical sprays are to be used near shops, bus stops and walkways after 7.00am.
- No chemical sprays are to be used if the wind speed is more than 10km/hour.
- Chemical spray must not be used from a moving vehicle where the vehicle is travelling against the flow of traffic (i.e. on the wrong side of the road)

4.9 PEST CONTROL

The Contractor is responsible for the monitoring and control of pests and diseases.

The Contractor shall make inspections to arrange eradication or treatment of infestations within five (5) days of inspection. Any health problem of infestation shall be reported to the Engineer.

All pest plants as itemized in the RPMS such as gorse, woolly nightshade, acacia, pampas grass, privet etc. should be identified. The strategy and methodology for pest plant control should be discussed with the Biosecurity team of Auckland Transport within 48 hours of identification.

The proposal for removal and disposal must be approved by the relevant AT Engineer. All such works should be recorded and reported to the relevant AT Engineer in conjunction with AC Parks. All maintained areas and bush or natural area fringes should be free of minor pest plant infestations. Some pest plants may require repeat applications to ensure eradication. Large woody weed debris must be removed from site. Stumps can be poisoned and left rather than being removed

Pesticide and / or animal repellent use shall be affected to the minimum level required for healthy plant growth to be maintained. All pesticides / repellents shall be approved for use by the Engineer. Pesticides used shall be selected for the lowest oral and epidermal toxicity rating possible and shall be types which pose a minimum risk to bees or other beneficial insects.

4.10 CHEMICALS

Any chemicals used must be applied in accordance with the manufacturer's recommendations. All chemicals used for vegetation control should be approved by the Environmental Risk

Management Authority as suitable for the purposes. The preferred herbicides are Glyphosate and Metsulfuron. Hormonal or arsenic weed killers must not be used. Other chemicals used must have the approval of the Engineer in consultation with AC Parks.

4.11 WATERING

The Contractor shall carry out watering during the PDL as required to ensure the survival of the plants in accordance with the specification outline above. It is anticipated the watering will be in the form of water cart application during plant establishment phase and during dry spells thereafter during the PDL. If water is available on site (mains supply), this may be used with the approval of the Engineer.

The aim is to water deeply, water penetration on each occasion shall be to a minimum depth of 200mm throughout the irrigated area. There shall be no over or under watering or damage to plants caused by scorching or puddling. Any damage caused by watering shall be repaired at the Contractor's expense.

4.12 REPLACEMENT PLANTING

The Contractor shall ensure a 100% plant establishment and survival rate is achieved during the 36-month Period of Defects Liability (PDL).

The Contractor shall replace at their own expense, replace any dead or unhealthy plant material through the PDL.

Any plant replacements shall be planted within the planting season and shall be maintained until the end of the existing PDL only. This specifically includes the possible replanting of plants damaged by wildlife. Replacement tree stock shall be locally sourced (Auckland Region) with the size, form and quality of the tree stock to the approval of the Council's Arborist prior to any planting commencing.

If there has been a high level of mortality of a particular species, it shall be replaced with another species as determined by the Engineer. The cost for plants or (landscaped areas) damaged (other than damage caused by the contractor), stolen or vandalised will be covered by Principal if immediately reported to the Engineer.

4.13 PRUNING

All weak, dead, diseased or damaged growth shall be removed and the Contractor shall carry out pruning to maintain the desired shape and size. Visible dieback is not acceptable. Pruning should be carried out in accordance with acceptable modern arboriculture practice.

Paths are to be kept clear of excess growth. Branches overhanging paths shall be removed. Plants shall be pruned so that they do not smother neighbouring plants.

4.14 MAINTENANCE INSPECTIONS

4.14.1 General

Regular maintenance quality control inspections will be undertaken to determine standard of maintenance.

4.14.2 Performance Criteria

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

- All planted areas shall be mulched in accordance with the specification;
- Planting is becoming well established. Plants are replaced to ensure plant establishment and survival rates percentages are achieved;
- Weeds and pests are monitored and controlled throughout the defects liability period according to the specification;
- Planted areas are litter and rubbish free; and
- Watering is provided as required to ensure healthy plant survival.

4.15 COMPLETION OF WORKS

At the end of the Period of Defects Liability an inspection will be undertaken by the Engineer to determine the adequacy of establishment and maintenance of planted areas in accordance with this specification. The Contractor shall be obliged to make good any defect identified by the Engineer.

5.0 INSITU CONCRETE – SURFACE FINISHES

5.1 DEFINITIONS

"Exposed aggregate" is where the aggregate on completion of the work is visible in the concrete surface, either rough or polished, to produce the desired finish.

5.2 DESCRIPTION

The work specified in this section relates to the standard of concrete finishes. Refer to the civil documentation for details below finished surface.

5.3 PROVIDE SAMPLE PANELS

Provide a minimum of two identical sample panels for each of the following specified finishes before commencing work. Panels to be 2000 x 2000mm and of similar thickness to the proposed construction.

- P01 Exposed aggregate concrete (refer to 5.7.1 SELECTIONS for details).
- P02 Light sandblast finish concrete (refer to 5.7.2 SELECTIONS for details).
- Low Insitu Wall (refer to 5.7.3 SELECTIONS for details).

Cast sample panels to the requirements of NZS 3114: clause 104.4, Sample reference panels in respect of casting, formwork, mix, compaction, curing, striking and including rebates. Supply also the information required by that same clause.

Keep inherent shade variations within the range of the grey scale in NZS 3114. Obtain written instructions regarding the colour established in the sample reference panel for matching.

The Engineer and Designer shall inspect the samples. After agreement with the Engineer and Designer that the sample panel is truly representative of the finish specified it then becomes the standard for that finish.

Samples need to be retained during construction phase for comparison.

5.4 SAMPLE SLIP RESISTANCE

Test sample to AS/NZS 3661.1 for slip resistance, to comply with NZBC D1/VM1 and NZBC D1/AS1, 2.0, Level access routes; 3.14 Slip resistance for ramps and 4.14 Stair treads.

- when in place on a level access route, to have a mean coefficient of friction (μ) not less than 0.4.
- when in place on a sloping access route, to have a coefficient of friction (μ) not less than $0.4 + 0.0125S$ (S = slope of surface expressed as a percentage).
- when in place on stair treads, to NZBC D1/AS1, Table 2.

Provide certificates and any other evidence that the surface complies with the standard of performance specified.

5.5 RUN OFF

Ensure run off of acids, other chemicals and cement products are contained within the site. They must not damage other surfaces, enter drains or pollute landscapes or water courses.

5.6 CONSTRUCTION – FINISHING

5.6.1 Conditions

The surface must be protected and maintained during the construction works to ensure a clean and undamaged surface at completion of works.

Ensure substrate is free of cracks prior to commencement of any concrete pours.

The final concrete shall form a plane surface. It therefore shall not have steps or irregularities caused by displacement of form joints and measured between peak and hollow over a 200mm straight edge or undulations over the surface and measured between rise and hollow over a 1500mm straight edge.

5.6.2 Exposed aggregate

The exposed aggregate finish shall match the method used for achieving the sample panel.

5.6.3 Sandblasting

General: Unless specified otherwise for particular pavement types, exposed surfaces of insitu and precast concrete elements, are to attain sandblasting after curing to expose the aggregate. Aggregate exposure in each case shall be uniform to match the sample held by the Engineer.

Conformance: Where applicable to pavement surfaces, the finished concrete surface shall meet NZ Standards requirements for non-slip pedestrian surfaces outlined in 5.4.

5.6.4 Sealer

Apply a penetrative (matt finish) concrete sealer to the manufacturer's recommendations.

Ensure the Sealer does not compromise the slip resistance required.

5.6.5 Tolerances

Unless otherwise specified, tolerances shall be in accordance with Table 2 of NZS 3124.

5.6.6 Defective Concrete Finishes

Concrete that is damaged from any cause, and concrete that is honey-combed, fractured or otherwise defective, and concrete which has surface depressions outside the tolerances specified, shall be cut out and replaced. Refer to Civil specification for further detail

5.7 SELECTIONS

5.7.1 P01 Exposed Aggregate Concrete

Oxide quantity:	12kg/m ³
Oxide colour:	Black
Aggregate:	10mm basalt chip
Adding method:	integral mix
Exposing method:	retarder and wash
Depth of exposure:	2mm

5.7.2 P02 Light Sandblast Finish Concrete

Oxide quantity:	4kg/m ³
Oxide colour:	Black
Aggregate:	10mm basalt chip
Adding method:	integral mix
Exposing method	6mm light sandblast
Depth of exposure:	1mm

5.7.3 **Sealer**

Location:	All concrete pavements
Product:	PFL Natural Sealer by Peter Fell Concrete
Application:	To manufacturers recommendation

6.0 **PRECAST CONCRETE**

6.1 **DESCRIPTION**

The work specified in this section relates to the standard of concrete finishes to precast units. Refer to Structural Engineers documentation for further details.

6.2 **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 the Standards, the requirements of this Specification take precedence over the provision of the Standard. Reference to any Standard shall include any amendments thereto and any Standard in substitution therefor. All Materials and workmanship shall comply with these Standards unless expressly noted otherwise.

NZS 3104:	Concrete Production
NZS 3112:	Methods of Test for Concrete
	Part 1: tests relating to fresh concrete
	Part 2: Tests relating to the determination of strength of concrete
NZS 3114:	Concrete surface finishes
NZS3121:	Water and aggregates for concrete
NZS3122:	Portland and blended cements
NZS 3124:	Concrete Construction for Minor Works
AS/NZS 4671:	Steel bars for reinforcement of concrete

6.3 MATERIALS

6.3.1 Concrete

All concrete except site concrete shall be manufactured by an approved ready-mix plant unless specifically approved otherwise in writing by the Engineer. Where site mixed concrete is approved, test samples shall be taken of each day's production if such production is less than 75m³ as detailed in clause 2.15.5.3.2 of NZS 3104. If daily production is less than 75m³ then one sample shall be taken and tested for compressive strength.

Slump shall be in accordance with Table 4 of NZS 3124. The nominal aggregate size shall be 10mm.

6.4 PROVIDE PROTOTYPES AND SHOP DRAWINGS

Refer to Section 11.0 for shop drawing and prototype requirements.

6.5 CONSTRUCTION

6.5.1 Surface Finishes

All exposed surfaces are to have an F5 finish.

Ensure sandblasting is uniform in depth and coverage, consistent with the approved sample in each case. Elements sandblasted that are inconsistent in quality or do not meet the approved sample shall be removed and replaced at the Contractors expense. Finish and Cleaning: Wash and hose down unit. Protect to prevent damage.

All surfaces that will be hidden to sight shall be F3.

6.5.2 Anti-Graffiti coating

Refer to section 11.0 STREET FURNITURE for details.

7.0 STEEL METALWORK

7.1 DESCRIPTION

The work specified in this Section relates to the fabrication and installation of steel items including:

- Street Furniture items – seat steel frame insert for U03
- BA1 Pedestrian Barrier
- BA2 Pedestrian Fence
- BA3 Pedestrian Barrier
- Pedestrian Handrails

7.2 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 the 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 therefor. All Materials and workmanship shall comply with these Standards unless expressly noted otherwise.

AS 1397	Sheet steel and strip - hot-dipped zinc-coated or aluminium/zinc- coated
AS/NZS 1554.1	Structural steel welding - Welding of steel structures
AS 1594	Hot-rolled steel flat products
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 4792	Hot-dip galvanized (zinc) coatings on ferrous hollow sections, applied by a continuous or special process
NZS/BS 1387	Screwed and socketed steel tubes and tubulars and for plain end steel tubes suitable for welding or for screwing to BS 21 pipe threads
NZS/BS 4848.2	Hot-rolled structural steel sections - Hollow sections
NZS/BS 4848.4	Hot-rolled structural steel sections - Equal and unequal angles
BS 4-1	Structural steel sections - Hot-rolled sections
BS 2630	Resistance projection welding of uncoated low carbon steel sheet and strip using embossed projections
BS 6265	Resistance seam welding of uncoated and coated low carbon steel
BS 6497	Powder organic coatings for application and stoving to hot-dip galvanized hot-rolled steel sections and pre-formed steel sheet

7.3 RELATED SECTIONS

Refer to:

- 8.0 Hot Dip Galvanising
- 10.0 Timber Structures
- 11.0 Street Furniture
- 12.0 Shop Drawings and Prototypes

7.4 SAMPLES OF FINISH

Submit samples on request of finish offered.

7.5 QUALIFICATIONS

All work in this section to be carried out by competent people qualified as welders and experienced in working with steel and the techniques specified.

7.6 SHOP DRAWINGS

Provide 1 set of shop drawings for review before manufacture showing:

- plans, elevations and sections
- methods of fixing
- methods of joint forming
- methods of fabrication and site assembly of large units.

Refer to Shop drawings and Prototypes section for further detail

7.7 PRODUCTS

7.7.1 Materials

STEEL CHANNELS to NZS 3679.

STEEL TUBES AND TUBULARS to NZS/BS 1387.

STEEL FLATS hot-rolled sheet and/or strip to AS 1594.

STEEL ANGLES to NZS 3679.

7.7.2 Components

BOLTS

Similar composition and mechanical properties to the parent metal, selecting type and size to suit the work and its location.

CLIPS

Form clips to detail of the same metal as the metal sheet to be fixed/secured. Specify the method of fixing the clips to the building element to suit the flashing and its location (e.g. cap, cover, ridge).

NAILS

Spiral rolled flat-head/clout type, with similar composition and mechanical properties to the parent metal. Select length and gauge to suit the work and its location.

SCREWS

Hexagonal head, self-drilling, with similar composition and mechanical properties to the parent metal and with the type of head, length, gauge and thread to suit the work and its location.

7.8 EXECUTION**7.8.1 Conditions****DO NOT DELIVER**

Do not deliver any elements to the site which cannot be unloaded immediately into suitable storage conditions.

AVOID DISTORTION

Avoid distortion of elements during transit, storage and handling.

PREVENT SURFACE DAMAGE

Prevent pre-finished surfaces rubbing together, and any contact with mud, plaster or cement. Keep protective coverings dry.

PREPARATION

Ensure location and substrate is ready to receive the elements and will allow work of the required standard.

7.8.2 Assembly**PROTECTION**

During fabrication protect all surfaces which will be visible in completed work.

COLD FORMING

Cold formed work to be free from warping, buckling and fractures. Form bends with a brake press or by cold rolling.

CORNERS

Unless specified otherwise, mitre junctions of identical sections.

HOLES

Form without distortion of surrounding metal.

MOVING PARTS

When assembled, all moving parts must move freely and without binding.

CLEANING

Remove all burrs and sharp arrises which would be visible after fixing, or a hazard to the user.

RIVETED JOINTS

Riveted joints to be drawn tightly together, with rivets closed to completely fill holes.

MECHANICAL JOINTS

Mechanical joints to be tight with no visible gaps.

MECHANICAL JOINTS, ELEMENTS

Mechanical joints of elements which will be located externally are to be bedded in mastic, including all mating surfaces, cleats and other fixings.

MECHANICAL JOINTS, CLEATS

Unless specified otherwise connect cleats to frames with countersunk screws where they will be visible after the component has been fixed and where raised heads would interfere with any moving part.

7.8.3 Assembly - Welding

PREPARATION

Remove grease, dirt, moisture and oxide from edges to be welded. Remove scale and residue from arc and power cutting by machining or hand grinding.

ACCURACY

Ensure accurate fit using clamps and jigs where practical. Use tack welds for temporary attachment where jiggling is not practical.

TACK WELDING

Use only for temporary attachment unless otherwise specified.

WELDS

Make joints with parent and weld metal fully fused throughout with no inclusions, holes, porosity or cracks.

SPATTER

Prevent weld spatter falling on surfaces of materials which will be self finished and/or visible in completed work.

RESIDUES

Ensure complete removal of flux residues and slag.

BUTT WELDS

Butt welds which will be visible in completed work to be finished smooth and flush with adjacent surfaces.

WELDING OF STEEL

Welding of steel to be by one of the following methods:

- gas welding
- metal-arc welding to AS/NZS 1554.1 for mild steel
- projection welding to BS 2630
- seam welding to BS 6265
- other methods subject to approval.

7.8.4 Application

INSTALLATION

Locate plugs accurately and use in accordance with the manufacturer's requirements. Fix plumb, level and true to line. Comply with the specified standards, the reviewed shop drawings and installation details, including brackets, bolts, fixings, grout, bedding compounds and sealants.

LOADING

Elements must not carry any structural load unless designed to do so. Do not use as strutting or support when in place.

7.8.5 Finishing

PREPARATION FOR COATINGS

Before applying coatings remove all welding slag, weld spatter, anti-splatter compounds, paints, grease, flux, rust, burrs and sharp arises. Make good all defects which would show after application of coating. Finish surfaces smooth.

GALVANISING

After fabrication completely remove all surface contaminants and hot-dip galvanise to AS/NZS 4680 and AS/NZS 4792.

ZINC SPRAYING

After fabrication completely remove all surface contaminants and hot-wire zinc spray followed with a 1 pot anti-corrosion etch primer.

PRIMING

After fabrication completely remove all surface contaminants and coat with a 2 pot anti-corrosion etch primer. Re-prime if the primer fails or more than 4 weeks elapses before the final coating system is applied.

Alkyd oil zinc chromate priming paint.

APPLY COATINGS

Prepare surfaces and apply the coating system strictly in accordance with the coating manufacturer's technical information. Coatings to BS 6497.

Two pot epoxy paint finishes will be applied to all steel work unless specifically stated in the drawings. Components are coated with primers and top coats of 2 part paint systems, consisting of a base and hardener.

Refer to Landscape Drawings for nominated colour finishes.

7.8.6 Completion

REPAIR WORK

In situ repair work of warranty polyester or fluoropolymer coated aluminium is only permitted after receiving written authority. All repair work to Dulux manufacturer's recommendations. Replace all damaged material.

PROTECTIVE COVERINGS DURING TRANSPORTATION AND INSTALLATION

Provide protective coverings and coatings where required to prevent marking of surfaces visible in the completed work and to protect aluminium joinery from following trades. Remove protection on completion.

ENSURE

Ensure all elements are free of marks or blemishes, with all moving parts working fully and freely.

REPLACE

Replace any damaged, cracked or marked elements.

LEAVE

Leave all work to the standard required for all following trades.

REMOVE

Remove all debris, unused materials and elements from the site.

7.9 SELECTIONS

Fabricated steel items

- Street Furniture items – seat steel frame insert for U03 (Unfinished)
- BA1 Pedestrian Barrier (Colour: Dulux Black)
- BA2 Pedestrian Fence (Colour: Dulux Black)
- BA3 Pedestrian Barrier (Colour: Dulux Black)
- Pedestrian Handrails (Colour: Dulux Black)

8.0 HOT DIP GALVANISING

8.1 DESCRIPTION

This section relates to hot dip galvanizing of structural steel framing, general steel articles and fabricated steel assemblies.

8.2 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 the 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 therefor. All Materials and workmanship shall comply with these Standards unless expressly noted otherwise.

AS/NZS 2312	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS/NZS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 1627.1	Metal finishing - Preparation and pretreatment of surfaces - Method selection guide - Removal of oil, grease and related contamination
AS 1627.2	Metal finishing - Preparation and pretreatment of surfaces - Method selection guide - Power tool cleaning

AS 1627.4	Metal finishing - Preparation and pre-treatment of surfaces - Method selection guide - Abrasive blast cleaning
AS 1627.9	Metal finishing - Preparation and pre-treatment of surfaces - Method selection guide - Pictorial surface preparation standards for painting steel surfaces
AS 1897	Electroplated coatings on threaded components (metric coarse series)
AS/NZS ISO 9001	Quality management systems - Requirements
OSH	Guidelines for the provision of facilities and general safety in the construction industry.

8.3 RELATED SECTIONS

Refer to Section 7.0 – Steel Metalwork for non-structural steelwork.

8.4 REQUIREMENTS

8.4.1 Qualifications

Galvanizers to be experienced, competent workers, qualified and familiar with the materials and techniques specified. Provide evidence of qualifications on request.

8.4.2 Vent holes

Galvanizer to provide appropriate vent holes and drains if required, to hollow sections and enclosed elements, to AS/NZS 4680.

8.4.3 Agree vent hole locations

Galvanizer to provide layout, for approval, of appropriate vent holes and drains to exposed, hollow sections and enclosed elements. Do not make vent holes until approved. Refer to SELECTIONS for elements requiring approval.

8.4.4 Temporary members

If necessary to minimise distortion during galvanizing, galvanizer to provide appropriate temporary support members.

8.5 PERFORMANCE

8.5.1 Quality assurance

Maintain quality assurance programmes to AS/NZS ISO 9001 for both galvanizing and other specialist coatings as necessary to assure that work is performed in accordance with this specification and the qualifying requirements of the contract documents.

8.6 MATERIALS

8.6.1 Galvanized coating

Zinc coating by the hot-dip process to the requirements of AS/NZS 4680.

8.6.2 Bolts, nuts and washers

Hot-dip galvanize to AS/NZS 4680, bolts, nuts and washers forming a permanent part of a structure subject to a protective coating.

8.7 EXECUTION

8.7.1 Generally

The galvanized coating on all steel articles shall conform to the requirements of AS/NZS 4680 and as specified.

8.7.2 Defects

Discard any material or fabricated items showing defects affecting its structural integrity.

8.7.3 Surface preparation

Grind off burrs, welding slag and sharp arrises and all other defects that could affect appearance.

8.8 GALVANISING

8.8.1 Steelwork being galvanized

Clean sections thoroughly and apply zinc coating by the hot-dip process to the requirements of AS/NZS 4680. Zinc coating thickness to be not less than the following:

Structural steelwork	Average coating	Minimum coating	Average Mass
≤ 1.5mm	45 microns	35 microns	320 g/m ²
> 1.5mm - ≤ 3mm	55 microns	45 microns	390 g/m ²
> 3mm - ≤ 6mm	70 microns	55 microns	500 g/m ²
> 6mm	85 microns	70 microns	600 g/m ²
Bolts and washers			

Bolts and washers (exposed or corrosive environment)	85 microns	70 microns	600 g/m ²
Bolts and washers (centrifuged and internal) < 8mm	35 microns	25 microns	250 g/m ²
Bolts and washers (centrifuged and/or internal) ≥ 8mm	55 microns	40 microns	390 g/m ²

Ensure that tolerances in screw cutting have made allowance for galvanizing. Degrease and sweep abrasive blast using a non-metallic media galvanized steelwork to be painted to NZS 4680, Appendix I, Information on the use of sweep (brush) blast cleaning of galvanized steel prior to painting.

8.8.2 Inspection

Integrity of the coating to be determined by visual inspection and coating thickness measurement, to AS/NZS 4680. For critical locations, with exposed or painted finish, all spikes to be removed and all edges free from lumps and runs.

8.9 REPAIRS

All repairs to AS/NZS 4680, Appendix E:

Small repairs: Colour matched zinc rich paint.

Large repairs: With approval colour matched zinc rich paint or other agreed option.

8.10 PRIMING

Refer to the painting section/s for preparation, primer and paint system.

8.11 COMPLETION

8.11.1 Ensure

Ensure all elements are free of marks or blemishes.

8.11.2 Replace

Replace damaged, cracked or marked elements.

8.11.3 Leave

Leave work to the standard required by following procedures.

9.0 TIMBER FENCES

9.1 GENERAL

This section relates to fencing and gates.

It includes;

- Timber fencing

9.2 DOCUMENTS

The following documents are specifically referred to in this section:

NZBC F9/AS1 Means of restricting access to residential pools

AS/NZS 1163 Cold formed structural steel hollow sections

NZS 3104 Specification for concrete production

NZS 3607 Round and Part Round Timber Posts

NZS 3640 Chemical Preservation of Round and Sawn Timber

AS/NZS 60335.2.103 Household and similar electrical appliances - Safety - Part 2. 103: Particular requirements for drives for gates, doors and windows

9.3 INSPECTIONS

Notify the Contract Administrator for inspection of the following:

- Set out of fence line prior to commencing construction
- Excavation of foundation prior to post embedment.
- Completion of work.

9.4 DESIGN PARAMETERS WIND - DESIGN BY CONTRACTOR

Design the installation to the manufacturer's requirements and as appropriate for the project wind design stated in the general section 1220 PROJECT.

9.5 PRODUCTS

9.5.1 Certified Sustainable Timber

Certified Sustainable FSC-COC Certified (or similar pre-approved) timber from forest to installation.

Contractor to obtain and track all timber FSC-COC certificates and receipts showing FSC-COC numbers, including signed FSC outsourcing agreements between parties (ie FSC timber broker and non-FSC door joiner).

FSC suppliers lists: - <https://info.fsc.org/certificate.php#result>

9.5.2 Timber Fence Palings, Posts and Rails

Rough sawn, treated to NZS 3640 Chemical Preservation of Round and Sawn Timber. Posts treated to H4 CCA (preservative code 01 or 02), all other timbers shall be treated to H3.2 CCA (preservative code 01 or 02) minimum.

Timber shall be sound, well-seasoned and maintain figured dimensions (dimensions are nominal size - not gauged size), free from twist and bowing, tearing, wooliness, wane, chip bruising and other defects.

9.5.3 Plywood panels

Timber Noise Fences will be constructed from B GRADE STRUCTURAL PLYWOOD - S1S - A Bond - TO AS/NZS 2269 - F11/F14 to 3.2 hazard class.

H3.2 treated rough sawn timber (*Pinus radiata* or approved similar) will be used for decorative purposes and fixed to the plywood sheets in per the Landscape Drawings.

9.6 EXECUTION

9.6.1 Delivery, storage and Handling

Take delivery of materials and goods and store on site and protect from damage.

Move/handle goods in accordance with manufacturer's requirements.

Reject and replace goods that are damaged or will not provide the required finish

Installation/application

9.6.2 Clearing

Clear a 1.0m strip within fence alignment, to allow for erection of new fence. Grub up shrubs and trees not required to be retained.

9.6.3 Setting Out

Boundaries to be defined by legal survey pegs. Do not install fences where pegs have not been located. In this event, instruction from the Contract Administrator on fence location is required.

Where fences are installed on property boundaries, fence lines shall be installed parallel to and 25mm within the subject property boundary.

If using palings or similar, fix palings on the road face of fences and inside faces of internal boundaries.

9.6.4 Excavations

Excavate by auguring to the dimensions detailed on the drawings. Driving of posts will not be accepted.

9.6.5 Post Embedment

Embed posts with a minimum of 100mm clearance between the base of the excavation and bottom of the post.

Place no fines concrete under and around the post and compact by tamping or vibrating. Ensure the posts are set vertical and temporarily prop for at least two days after placement of concrete.

9.6.6 Close Boarded Timber Fencing

Refer to drawing 3311120-AR-1106 for fencing details.

9.6.7 Tolerances

Posts shall not deviate by more than 30mm from the vertical over the height of the post.

9.6.8 Reinstate

Ensure all surfaces affected by the works are reinstated to pre-construction condition (e.g. topsoiled and grassed).

9.6.9 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.

9.6.10 Defective or Damaged Work

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

10.0 TIMBER STRUCTURES

10.1 DESCRIPTION

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

The construction of the timber seats

10.2 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 3602	Timber and wood-based products for use in building
NZS 3604	Timber Construction Requirements
MP 3600	Treatment Specifications
AS/NZS 1328	Glued laminated structural timber
AS/NZS 5068	Timber – Finger joints in structural products – production requirements
AS/NZS 3661.1	Slip Resistance of pedestrian surfaces - Requirements

10.3 RELATED SECTIONS

Refer to:

7.0	Steel Metalwork
11.0	Street Furniture
12.0	Shop Drawings and Prototypes

10.4 QUALIFICATIONS

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

10.5 MATERIALS

10.5.1 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.

All hardwood timbers shall be dressed four sides with edge radius or chamfer as detailed. Timber samples shall be provided for review prior to laying.

Refer drawings for all fixing methods.

Location / item	Species	Size & detail
S01 (streetfurniture.co.nz)	Vitex or approved similar	As specified by supplier.
Timber top seat to Precast seating units (Unit 3)	Native hardwood timber battens will match the timber used adjacent mahi toi sculptures. For e.g. Podocarpus totara. AT and Artists to confirm supply (Refer drawings). Unless otherwise stated in the drawings Vitex hardwood battens or approved similar to be used.	40mm x 40mm. 5mm chamfer to edges.

10.5.2 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 installation.

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.

All non-standard timbers including carved native timbers fall outside of this specification and will be treated and maintained through a specific specification and maintenance regime.

10.5.3 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, excluding fencing staples 3mm past flush. Avoid hammer marks to exposed surfaces.

10.5.4 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	Hot Dip Galvanised	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.

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.

10.5.5 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.

Stainless Steel connectors shall be a minimum of 1.0mm thick and connected using stainless steel 45 x 3.3 annular grooved nails only.

10.5.6 Adhesives

As approved by the manufacturer for the timber product or pre-finished timber product joint being used.

10.5.7 Concrete footings

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

10.6 CONSTRUCTION

Comply with NZS 3604 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.

11.0 STREET FURNITURE

11.1 DESCRIPTION

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

- Pre Cast Concrete and Timber Seat Units (U1,U1b,U1c, U2, U2b, U3, U4)
- Low Insitu Concrete Wall
- S01 Portland Timber Seat by streetfurniture.co.nz
- B01 Sub surface fixed timber bollard by streetfurniture.co.nz
- B02 Removable timber bollard by street furniture.co.nz

11.2 RELATED SECTIONS

Refer to

- 5.0 Insitu Concrete (furniture bases)
- 6.0 Precast Concrete (Concrete Planters)
- 12.0 Shop Drawings and Prototypes

11.3 NO SUBSTITUTIONS

Substitutions are not permitted to any specified system, or associated components and products.

11.4 QUALIFICATIONS

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

11.5 PROTOTYPES

Prototypes to be supplied for the following furniture items – Refer to Section Prototypes:

- U1,U1b,U1c, U2, U2b, U3, U4
- Low Insitu Concrete Wall
- S01 Portland Timber Seat by streetfurniture.co.nz

11.6 GRATTIFI GUARD

All street furniture to be protected with graffiti guard. Product to be approved by Engineer prior to application.

11.7 WARRANTIES

11.7.1 Warranty – Manufacturer / Supplier

Provide a material manufacturer/supplier warranty:

1 year: For street furniture

2 years: For painted finishes

- Provide this warranty on the manufacturer/supplier standard form.
- Commence the warranty from the date of practical completion of the contract works.

11.7.2 Warranty – Installer

Provide an installer warranty:

1 year: For street furniture.

- Provide this warranty on the installer/applicator standard form.
- Commence the warranty from the date of practical completion of the contract works.

11.8 INSPECTIONS

Carry out inspections of the following:

- Custom built fixtures fabricated and ready to be delivered to the site.
- Furniture items delivered to site before installation.
- Locations or footings prepared to receive furniture or fixtures before installation.
- Services - prior to installation of Street Furniture.

11.9 DELIVERY, STORAGE AND HANDLING

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

11.10 INSTALATION

11.10.1 Concrete Work

Concrete work to NZS 3124. Excavate footings at required positions and of size specified by manufacturer. Refer to Civil Specification and Insitu Concrete - Surface Finishes

11.10.2 Street Furniture

Mount street furniture onto footings in accordance with manufacturer's recommendations. Erect all posts or poles vertically. Assemble items to manufacturer's requirements. Erect/locate furniture items level.

11.10.3 Services

Allow for installation and connection of services including lighting.

11.11 COMPLETION

11.11.1 In situ touch-up

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

11.11.2 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.

11.11.3 Defective or damaged work

Repair damaged or marked elements. Replace damaged or marked elements where repair is not possible or will not be acceptable. Adjust operation of equipment and moving parts not working correctly. Leave work to the standard required for following procedures.

11.11.4 Protection

Protect adjacent structure and finishes and make good any damage.

11.12 SELECTIONS

PRECAST CONCRETE SEAT UNITS U1, U1b, U1c, U2, U2b, U3, U4

Location: Refer drawings

Manufacturer: To be confirmed

Model: Precast modular concrete seats

Size: Refer Landscape drawings

Material: Concrete, timber battens (see Section 9.5) on a HD Galvanised steel frame

Finish: Sandblast finish to specification and Graffiti Guard, Briwax Danish Oil and Graffiti Guard to Timber

SEAT TYPES S01

Location: refer drawings

Manufacturer: streetfurniture.co.nz

Model: 'Portland' Timber Seats

Size: Refer manufacturer's drawings

Material: Refer manufacturer's drawings

Finish: refer manufacturer's drawings

12.0 SHOP DRAWINGS AND PROTOTYPES

12.1 DESCRIPTION

The work specified in this section relates to common requirements for the preparation, submission and review of shop drawings and prototypes. Detailed requirements for shop drawings and prototypes for particular parts of the work are included in the specific work section.

12.2 PREPARE SHOP DRAWINGS

Where specified in the work sections prepare shop drawings and submit for review. Make due allowance in the contract programme for the preparation, review and subsequent correction and re-review of shop drawings, prior to the time required for ordering materials/equipment and commencing fabrication.

12.3 SHOP DRAWINGS REVIEW

Submit shop drawings to the named reviewer(s) for review. Proposed shop drawings to be submitted to the reviewer, in due time to ensure conformance with the contract programme.

- Where no time is stated in a specific section allow 10 working days for review by the reviewer. Where a large number of drawings are involved more time will be necessary.
- Where no person is named in a specific section as the reviewer, submit the shop drawings to the contract administrator.

Shop drawing review indicates only that the supplied interpretation of the design concept has been reviewed without the need for further modification, other than the corrections indicated by the reviewer.

Review of shop drawings does not relieve the Contractor of responsibility for the correctness of the shop drawings, site dimensions, the overall design and performance, or for ensuring the work is carried out in compliance with the contract documents. Nor does it remove the need for the contractor to comply with the stated requirements, details and specifications of the manufacturers and suppliers of individual components, materials and finishes. Neither can the review be construed as authorising departures from the contract documents.

Reviewed drawings which contain comments or notations indicating where the shop drawings are at variance with the contract documents to be modified and resubmitted to the reviewer for re-review. Allow 5 working days for re-review by the reviewer.

12.4 PROVIDE FINAL SHOP DRAWINGS

Provide final shop drawings for Designer and Engineer's approval, including required modifications, before proceeding with any fabrication, installation or erection.

12.5 SHOP DRAWING REVIEWER(S)

Submit the following shop drawings for review to the named reviewer(s) identified in this clause or the specific work section, if no reviewer(s) are identified submit to the contract administrator:

Item	Reviewer(s)
S01 Portland Timber Seat	Beca Landscape Architect and Engineer
U1, U1b, U1c Precast Concrete Units	Beca Landscape Architect and Engineer
U2, U2b Precast Concrete Units	Beca Landscape Architect and Engineer
U3 Precast Concrete and timber Unit	Beca Landscape Architect and Engineer
U4 Precast Concrete Unit	Beca Landscape Architect and Engineer
Low Insitu Concrete Wall	Beca Landscape Architect and Engineer
BA1 Pedestrian Barrier	Beca Landscape Architect and Engineer
BA2 Pedestrian Fence	Beca Landscape Architect and Engineer
BA3 Pedestrian Barrier	Beca Landscape Architect and Engineer
NF 1 & 2 Noise Fence	Beca Landscape Architect and Engineer

12.6 PROCEDURE FOR DISTRIBUTION AND REVIEW OF SHOP DRAWINGS

- The Contractor is responsible for distributing shop drawings to the relevant consultants.
- The Consultants will review and return shop drawings directly to the Contractor and copied to the Engineer
- The Contractor is to ensure that all relevant reviews have been completed and final shop drawings are prepared accurately.

12.7 SCHEDULE OF SHOP DRAWINGS

The following work sections have shop drawing requirements; refer to these sections for details:

5.0	Insitu Concrete
9.0	Timber Fences
10.0	Timber Structures
11.0	Street Furniture

12.8 PROTOTYPES

Allow to develop and fabricate a prototype of the fixture/fitting from the reviewed shop drawing details for evaluation. This prototype may be used in the contract when approved by the Engineer and Designer. Items

identified below are to be reviewed by Engineer and Designer prior to the Contractor undertaking fabrication of the full works.

Prototypes to be supplied for the following items:

- S01 Portland Timber Seat (Street Furniture NZ)
- U1, U1b, U1c Precast Concrete Unit (To be confirmed)
- U2, U2b Precast Concrete Unit (To be confirmed)
- U03 Precast Concrete and timber Unit (To be confirmed)
- U04 Precast Concrete Unit (To be confirmed)
- Low Insitu Concrete Wall (To be confirmed)
- BA1 Pedestrian Barrier (Hampden Fence Ltd)
- BA2 Pedestrian Fence (Hampden Fence Ltd)
- BA3 Pedestrian Barrier (Hampden Fence Ltd)

