SCH01 Landscape Technical Specification

For Hard and Soft Landscape Works

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REV B	23.06.22	**50% Detail Design Issue**
		Not for Construction

Naenae College

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Part 1. SCOPE OF WORK

1.0 SCOPE

This specification relates to the hard landscape finishes, planting, and maintenance. Refer to the Local drawing register for the outline specification, plans and details.

NZS 3104	Specification for concrete production
NZS 3114	Specification for concrete surface finishes
NZS 3124	Specification for concrete construction for minor works
AS/NZS 4671	Steel reinforcing materials
AS/NZS 2891	Specification for asphalt

3.0 HOLD AND INSPECTION POINTS

The contractor shall notify the landscape architect before progressing the items below, so the Landscape Architect or their representative can access whether a site visit is necessary. The contractor shall request an inspection with 1 weeks-notice to allow the Landscape Architect to inspect the following:

3.1 Mark-out for excavation

3.2 Finished excavation prior to topsoil being added.

3.3 String lines for all structure, paving, retaining, steps, garden beds and edging.

3.4 Sample of all concrete finishes.

3.6 Sample of mulches, soil, basecourse and aggregates.

3.8 Garden bed prep before delivery of any plants. NB. No plants to be delivered to site before all hard landscape is complete and soil prep approved.

3.9 Planting locations before holes are dug.

Part 2. HEALTH AND SAFETY

1.0 GENERAL AND PROJECT

1.1 All landscape works to comply with Health and Safety at Work Act (2015). A copy of the completed Site-specific Health and Safety Management Plan must be submitted to the Landscape Architect prior to work commencing. All costs for maintaining site safety shall be included in the tender.

1.2 Contractor to take responsibility for the Health and Safety management of the site to ensure all risks and appropriate documents are updated and current at all times as per the Health and Safety at Work Act (2015) and Site Safe New Zealand's safety protocol.

2.0 SITE SPECIFIC HEALTH AND SAFETY

2.1 PRIOR TO WORK COMMENCING
Contractor to complete site-specific H&S agreement form prior to any work commencing on site. All PCBU must approve and sign the appropriate documentation.

2.2 SITE HAZARDS AND RISKS
Site hazard and risk register to be implemented and completed prior to any work commencing. Site hazard and risk register to be a live document that is constantly updated as per the Health and Safety at Work Act (2015)

2.3 SITE SPECIFIC HEALTH AND SAFETY MANAGEMENT PLAN
Contractor to complete any other relevant Health and Safety forms and documents to comply with the Health and Safety at Work Act (2015) and Site Safe New Zealand's Safety Plan Guidelines. Relevant documents including but not limited to; Task Analysis / Safe Work Method Statement, Hazardous Products and Substances Register, On-Site Training and Competency Register, Emergency Response Plan, Toolbox Talk Minutes, Site-Inspection Checklist, Site Incident and Injury Register and Hazardous Works Notifications.

Part 3. PREPARATION AND GROUNDWORK

1.0 EXECUTION

1.1 SURFACE PREPARATION
Comply with NZS 3604, section 3.5, Site preparation. Remove all turf, vegetation, trees, topsoil, stumps and rubbish from the area to be built on.

1.2 UNDERGROUND ELEMENTS AND SERVICES
Break out and remove old or disused foundations, slabs, drainage pipes, manholes, tanks, cables and redundant services where required to implement landscape works. Report for instructions when any unexpected voids, made-up ground or services are encountered. Seal off the ends of drains or remove to territorial authority approval.

1.3 SHORING AND UNDERPINNING
Carry out shoring and underpinning as necessary to prevent subsidence of adjoining public or private property and to ensure the safety of the public and site personnel. Maintain protection throughout the progress of the works, or until foundations and sub-grade structures have been completed and the stability of adjoining public and private property secured.

1.4 GENERAL EXCAVATION
Trim ground to required profiles, batters, falls and levels. Remove loose material. Protect cut faces from collapse. Keep excavations free from water.

1.5 STOCKPILING
Stockpile topsoil for reuse. If layers of peat or sand are encountered during excavation these should be stockpiled separately.

Note: No soil is to be removed from site without prior permission form the Landscape Architect

1.6 TREE PROTECTION
All trees shown to be retained shall have temporary tree protection fencing to the extent of the canopy dripline throughout the construction period. The contractor shall replace any tree damaged during construction with a 95L grade specimen tree.

Part 4. HARD LANDSCAPE CONSTRUCTION

1.0 SCOPE

This section relates to the supply and installation of hard landscaping including:
- Carpentry
- Asphalt paving
- Insitu concrete paving
- Timber edges
- Concrete edges
- Concrete saw cuts
- Paving paint
- Stockpile management
- Drainage
- Finishing

2.0 QUALIFICATIONS

Carry out all work using competent, qualified and experienced landscapers. Specialist concrete placer to be used for installation and specialist concrete cutter to be used for saw cuts of insitu concrete elements and paving.

3.0 CARPENTRY

Materials and construction shall be of high quality and workmanship shall be that of skilled tradesmen performing all labours in the best trade practice.

The work shall be carried out by qualified tradespeople experienced in this type of work.

All work and materials shall comply with the appropriate NZ standards. The structural timber manufacturer shall be licensed by Standards New Zealand to use the New Zealand certification mark on their products.

It is the Contractor's responsibility to ensure that the construction of all structural timber complies in all respects with the drawings and the specification. The Contractor's quality assurance procedures should encompass all aspects of the structural timber construction.

All timber construction may be subject to inspection by the Engineer to check that the requirements of this specification have been met. The Engineer may arrange to have an independent inspection service which may encompass aspects of the above. This is entirely independent of the Contractor's own procedures, and alleviates none of the Contractor's responsibilities to maintain their own quality assurance programme.

The Contractor shall advise the Engineer in writing the name of a suitably experienced and qualified representative to be responsible for the quality control of all structural timberwork. The nominated representative will be required to complete and sign a written quality control checklist for each major component after fabrication and after erection. A copy of each completed checklist is to be forwarded to the Engineer no more than seven days after completion of fabrication / erection.

3.1 Inspection

Give sufficient notice for any items to be inspected:

Submissions

Certification: Submit a supplier's certificate (which may be included on an invoice or delivery docket) verifying that the timber complies with the specification.
Inspection: Submit the authority's certificate verifying that the timber complies with the specification.
Moisture content: Submit evidence of moisture content.

3.2 Deliver, Handle and Storage

Deliver, handle and store members so no structural damage occurs, corners and edges are not damaged, or surfaces marked or stained.

3.3 Timber

All timber shall comply with NZS 3604:1990.

All timber except where specified otherwise, shall be treated, rough sawn, well-seasoned Pinus radiata of good clean quality so as to prevent any warping or movement. Timber shall be treated to TPC specification H4 where in ground contact. Where 100mm minimum ground clearance exists H3 is acceptable. Cut ends of timber shall be painted with metalex or similar tanalising treatment.

All timber shall originate from sustainably managed concessions or plantations.
It shall be the contractor's responsibility to obtain certification that the timber complies with clause 3.2. Friends of the earth have established a Code of Conduct regulating the importing of tropical hardwoods and softwoods.

3.4 Moisture content

All framing timber shall have a moisture content of between 12% and 18% before being placed on the job. All timber in load bearing walls is to be kiln-dried, to prevent excessive shrinkage reduction in the overall vertical dimension. Where required by the Engineer, the Contractor is to prove the moisture content by the use of a resistance type moisture meter.

3.5 Carpentry

All carpentry shall conform with NZS 3604.

All timbers shall be true to required lines and levels.

All mitres, butts, laps, housings, and the like shall be accurately cut to provide full and even contact over all bearing surfaces.

All fastenings and connections shall comply with NZS 3604 or shall be of an equal specified capacity. Metalwork should either be a galvanised proprietary timber fixing or a galvanised fabrication structural steel component. Refer to the Structural steelwork section of the specification

Nails shall be fully driven and where exposed shall be punched to allow a reasonable thickness of stopping material.

For hardwood, or where the nail size specified would cause significant splitting, nail holes shall be pre-drilled to 80 percent of the nail diameter.

Lead holes for screws shall be drilled so that the diameters of the lead hole does not exceed the core diameter of the screw.

In bolted joints appropriate sized washers shall be provided at each timber surface under the bolt head and nut.

All parts of the timber work shall be securely fastened so as to resist all forces likely to be encountered during construction or during the expected life of the structure, and so that the whole acts as a structural entity.

Unless otherwise specified or shown, holding down bolts for plates on horizontal surfaces shall be 12 dia. At 1000mm maximum centres. In all cases there shall be a bolt within 300mm of each end of timber. All bolts shall have hexagonal heads and nuts and have

heavy gauge washers bearing on the timber. Bolts shall be set 150mm into concrete and where closer than 75mm to the edge shall be bent into the body of concrete.

Finishing - Pre-paint all decking before fixing. Min. 3 coats tung oil based clear timber preservative to all sides of all timbers.

3.6 Fastenings

Fastenings shall comply with NZS 3604:1984.

Nails, bolts, washers, screws, and other metal fastenings shall be hot dip galvanised and of the best quality.

Any cut ends of metal hardware shall be treated with "Fisholene" and "Galvoprimer" or other approved rust inhibiting cover.

3.7 Workmanship

Setout
Ensure setout of decking before fixing.
Adjust jointing as required – max. 6mm, min. 3mm. Otherwise re-mill boards. No board less than 90% of specified width.
Edges: Chamfer edges of work to receive paint or similar coatings.
For subsurface timberwork (joists, bearers, plates) apply full system of specified finishes prior to placing decking.

3.8 Finishing

On completion of the work the contractor shall clean down exposed work leaving it free of dirt, discolouration, or disfigurement, and true to lines and levels.

Any rubbish or spoil shall be removed from the site by contractor leaving it in a clean and tidy condition.

4.0 ASPHALT PAVING

4.1 Excavate for path thickness and hardfill. Remove plants, tree roots and soft fill. Compact with a plate vibrator to form a level surface of even bearing. Place and compact layer(s) of basecourse. Place asphalt with falls shown on the drawings. Depths to be 20mm for pedestrian as specified by the civil engineer.

4.2 All work shall be carried out in accordance with relevant clauses of New Zealand standard specifications for Civil Engineering Construction. The Contractor shall be responsible for all setting out of the work from information on the Contract drawings or from such further drawings as may be supplied as the work proceeds.

4.3 All topsoil, humus and organic matter shall be removed from the surface of the ground within the limits of the paving works. Sub-grade material used for filling shall be compacted in layers of uniform quality and thickness as necessary to produce the required result. Excess material not required for filling operations is to be removed from the site. All cutting of existing asphalt areas shall be carried out with a power saw. Cuts shall be clean and straight. All junctions between new and old asphalt shall meet along at a consistent grade with no sudden dips, cracks or changes in level. Tack coats shall overlap both surfaces.

4.4 The basecourse shall consist of crushed rock free from all non-mineral matter and should comply with N.R.B. M/4, although alternative approved aggregates will be acceptable, provided the contractor can produce satisfactory evidence as to their suitability.

4.5 Build in before work proceeds all foundations, edges, walls, and insitu concrete paving. They shall all be accurately set in. Where the asphaltic concrete is adjacent to other surfaces, the final surface shall be finished flush with it, and at no place shall it hold

water. Apply tack coats in all cases. Construct to levels to marry into adjacent paving. Ensure that all ducting for all services systems have been installed prior to backfill. Clean all existing concrete paving surfaces thoroughly prior to sealing. The surface on which the paving is to be laid shall be dry and any loose material, dust, clay or foreign matter shall be removed by sweeping or other means as necessary

4.6 Compact paving with suitable compaction equipment to achieve air void percentages required by the TNZ Specifications, regardless of equipment used. Restrict all traffic until asphaltic concrete material has cooled and ensure no vehicles are allowed to stand until pavement has cooled for a period of twenty four hours after laying is complete.

4.7 All sealing work shall be true to line and levels shown on drawings. Tolerances for sealing works for the finished level to be within -0 mm to +10 mm of the design level.

4.8 No point on the sealed surface shall deviate more than 5 mm from a 3 m straight edge placed longitudinally on a board of the correct camber. The finished sealed surface shall be free from abrupt irregularities and shall not pond water.

4.9 Do not attempt any sealing or paving operations unless fine weather and the correct air temperature are guaranteed before and during the operation. Ensure sealing/paving process is continuous and that adequate material is available to ensure this.

5.0 INSITU CONCRETE PAVING

5.1 Materials and construction shall be of a high quality. Workmanship shall be that of skilled tradesman in accordance with the best trade practice. Concrete placer to be used for installation of all insitu concrete elements.

5.2 Cement shall be ordinary Portland cement. Aggregate content shall be approved with sample provided to Landscape Architect with no brown or white aggregate used where an exposed aggregate finish is specified.

5.3 Concrete shall be laid to the lines and levels indicated on the drawings.

5.4 Set timber boxing on 150mm fully compacted AP20 with top timber set to finished paved levels. Pour concrete and screed to finished levels. Remove timber when concrete has cured.

5.5 Provide samples of concrete aggregate to Landscape Architect for approval prior to pouring any concrete.

5.6 Where acid washing paving, the contractor shall provide a light broom finish in the opposite direction to traffic prior to acid wash the paving 3-6 times (depending on strength of Hydrochloric solution) in order to obtain sufficient slip resistance in accordance to AS/DS 1 Access Routes.

Finish shall be fine and free of coarse holes and bubbles in order to obtain sufficient slip resistance in accordance to AS/DS 1 Access Routes.

5.7 The contractor shall ensure compliance with any relevant Local Authority by–laws and the NZ Building Code with respect to approval of the methodology and protection measures to be used during the acid washing process. The Contractor shall contain all acid wash runoff. This shall be disposed of off-site. The final finish shall be to the approval of the Landscape Architect.

5.8 A sample panel of all finishes shall be approved by the Landscape Architect prior to proceeding with any paving.

5.9 All concrete work shall be undertaken when the weather is suitable i.e. mild, dull and moist, and in overcast conditions when direct sunlight won't cause concrete to cure faster than practically needed. All concrete operation shall be suspended during periods of severe frosts, drought, waterlogging, persistent drying winds or extreme heat.

5.10 All materials and construction shall be of a high standard, and workmanship shall be that of appropriately qualified and experienced tradesmen performing all labours in the best trade practice.

6.0 Metalwork

6.1 This section of the contract provides for the supply of materials, labour, cartage, tools and plant and equipment necessary for the preparation, construction and installation of the handrails, bollards, gates, fence panels, and furniture.

6.2 General

Galvanised mild steel shall be "hot dipped galvanised" in accordance with AS 1650.

Steelwork described to be galvanised shall be degreased and cleaned by pickling in cold dilute hydrochloric acid. The cleaned steel is to be given a pre-fluxing treatment and then dipped in a bath of pure molten zinc.

The galvanising shall be done after fabrication and in all cases after drilling, trimming or fitting is completed.

Every article shall be covered evenly on all sides and the weight of the galvanising coating shall not be less than 610 grams/square metre of surface covered.

All galvanised surfaces shall present a bright appearance having a crystalline structure clean and free from drops of zinc or treacly edges.

6.3 Fabrication

All surfaces that are visible in the completed work are to be protected during fabrication. Holes shall be drilled without distorting the surrounding metal and all burrs and sharp arises removed.

6.4 All welds shall be full penetration welds using the metal-arc process carried out in accordance with BS 5135 unless otherwise specified on the drawings or written permission has been obtained.

6.5 Galvanised Surfaces

Touch up minor damage, including on fastenings and fittings, using an approved zinc-rich paint. Apply 2 coats where necessary.

All materials shall be delivered in the makers' sealed containers.

6.6 Setting Out

The Contractor shall set out all work and shall be responsible for its accuracy and shall amend any errors. He shall verify all dimensions on the plan on the site before commencing work and he shall report any discrepancies to the Engineer for a ruling.

All dimensions are expressed metrically with the finished levels shown on the plans.

The Contractor shall set out and obtain approval of the Engineer prior to installation.

Assemble and install metal fabrications in accordance with plans and as specified.

Set the work accurately in location, alignment, and elevation free of rack, measured from established lines and levels. Assembled metal fabrications shall be firm, rigid, free of rattle, and provide maximum protection against tampering and vandalism.

Adjust handrails, posts and bollards before securing in place to ensure proper matching at joints and proper alignment throughout their length. Space posts as indicated.

6.7 Cleaning

Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris, and equipment. Repair damage resulting from metal fabrications work.

Upon completion of installation, clean factory finished metal fabrication items in accordance with manufacturer's cleaning instructions. Exercise care to avoid damage to the finish coating.

7.0 CONCRETE EDGING

7.1 This section sets out the requirements for all edge excavations, concrete or machine extruded edging and the like.

7.2 Edging and the like shall be constructed to the dimensions shown on the plans and detail drawings.

7.3 Edges shall be constructed to a first class standard true to line, level and grade as shown on the drawings. The line shall be perfectly straight between tangent points, and on curves shall sweep without kinks, flats or angles in a true arc to the radius shown or directed and with a uniform cross section around the curve.

7.4 Edges are to be cast in situ and shall have a minimum comprehensive strength of 20 MPa at 28 days in accordance with CD 101. The total cross-section of kerb and channel must be poured in one operation.

7.5 The edging shall be well keyed into the sub-base or basecourse to ensure that there is no movement when compacting against the edge. In addition, backfilling behind the edge shall be completed before laying the basecourse between the kerbs.

7.6 Within 24 hours of pouring the edge the Contractor shall cut contraction joints at 5 metre intervals. The width of the saw cuts shall be 3mm and shall be through the edge.

7.7 Compaction next to edges, kerbs and channels shall be done in such a manner to avoid damage to the concrete. If any damage is done it shall be repaired by the Contractor at his expense to the approval of the Landscape Architect.

7.8 All exposed concrete faces shall be finished dense, smooth and free from board marks and surface defects.

7.9 Tolerances
Concrete edges shall be constructed within the following tolerances:
Vertical 5mm
Horizontal 5mm
The alignment of the edge shall not deviate more than + 3 mm from a 3 m straight edge. No kinks, flats or angles shall be discernible by eye.

Notwithstanding the above tolerances, the concrete edges must be free from any defects which may cause ponding of surface water.

7.10 The concrete shall be dense, or acceptable surface texture, uniform colour, shall be free from construction cracking and have no surface pits exceeding 1mm.

7.11 All concrete edges shall be protected during sealing operations with building paper or other suitable material to avoid splashing with bitumen. Any blemishes on the kerbing shall be removed at the Contractor's expense.

8.0 CONCRETE SAW CUTS

8.1 A confident, qualified and experienced specialist concrete saw cutter to be used to complete all saw cuts.

8.2 Saw cuts shall be cut to the dimensions and layout as shown on the plan drawings.

8.3 Within 24 hours of pouring the edge the Contractor shall complete saw cuts contraction joints as shown on plan. The width of the saw cuts shall be 3mm and no deeper than one quarter of the slab thickness.

8.4 Tolerances
The alignment of the edge shall not deviate more than + 3 mm from a 3 m straight edge. No kinks or curves shall be discernible by eye.
Notwithstanding the above tolerances, the concrete must be free from any defects which may cause ponding of surface water.

9.0 PAVING PAINT

9.1 This section covers the preparation, supply and installation of all paving paint.

9.2 Remove all loose or flaking paint material in areas where there is existing paint. Existing car parks should be fully removed before applying new paint.

9.3 Ensure the paving is clean, dry, and free from grease, oil, dirt and moss before applying.

9.4 Vehicular grade paint must be used in the car park. White lines are to be used to mark out parking spaces, with yellow lines for disabled signs and loading zones.

9.5 Paint is to be applied as per manufacturer's instruction and drying times are to be observed.

9.6 The alignment of straight lines shall not deviate more than + 3 mm from a 3 m straight edge. No kinks, curves or angles shall be discernible by eye.

9.7 On completion the contractor shall clean down the surfaces and remove all dirt and markings. Care should be taken with any future work to ensure no damage is caused to the surface. Any damage is to be fixed at the contractor's expense.

10.0 DRAINAGE

10.1 This section of the contract covers the preparation, supply and construction of all drainage works.

10.2 All works shall comply with the NZ Drainage and Plumbing Act 1978 and all relevant Local Authority by-laws and regulations.

10.3 All materials and construction shall be of a high standard, and workmanship shall be that of appropriately qualified tradesmen performing all labours in the best trade practice.

10.4 Before commencing work, inspect the surfaces and dimensions where the drainage work is to be installed. Notify the Landscape Architect in writing of any defects of discrepancies which would affect or prevent the proper completion of the works. Obtain the Landscape Architect instruction before proceeding. Failure to observe this procedure will render the contractor liable to demolish and reinstate the works at his own expense.

10.5 Check the positions of all existing services prior to commencing work. Obtain all permits and give all notices necessary for the works.

10.6 All trenches shall provide for a minimum of 50mm between the side of the drainage pipe and the nearest trench wall or floor. Trench excavation shall provide for a 1.0 to 1.5 percent gradient down to the outlet point. Trench walls shall be vertical. The bottom of every trench shall be tampered and smooth, free of debris, before any drainage is laid or backfilling occurs.

10.7 The sumps shall be constructed in accordance with the local authorities' standards, complete with a 250x250mm Marley cast iron frame and flat grate (or similar approved product). The frame and grate shall be set level at the height shown on the plans. Paving should fall smoothly to the sump with no sudden changes in fall.

10.8 During the progress of the works all areas shall be kept drained at all times. Temporary drains or temporary holes in kerb, manholes, or sumps shall be provided as necessary.

10.9 The Contractor shall backfill and make good damage to footpaths, kerbs and other areas that result from the works.

10.10 The contractor shall check all trenches for settlement and refill to meet adjacent finished grades.

10.11 Refer to CIVILS documentation for strip drain and associated sump details.

10.12 Refer to CIVILS drawings for subsurface services connectors.

10.11 The contractor shall remove from the site all rubbish, debris and surplus materials associated with the drainage, clean down all surfaces and leave ready for use upon completion of the works.

11.0 RAIN GARDEN

11.1 This section sets out the requirements for the formation of the rain garden.

11.2 Comply with NZS 3604, section 3.5, Site preparation when excavating for the rain garden. Remove all turf, vegetation, trees, topsoil, stumps and rubbish from the area to be built on. Excavate to give correct levels and profiles as shown on drawings. Make allowance for compaction or settlement.

11.3 Skim and store all topsoil from rain garden excavation to be reused on site.

11.4 Backfill for the rain garden should be McMud raingarden mix unless otherwise approved in writing. The contractor shall take responsibility for ensuring the soil mix supports plant growth and allows sufficient water permeability.

11.5 Rain garden excavation and contouring to match plans and details. Landscape architect to approve landform before planting commences. Re contouring of levels to be undertaken at contractor's expense if necessary.

11.6 Refer to Civils detail for pipework and overflow plumbing.

11.7 Ensure straight crisp edge is achieved with concrete edge between rain garden and adjacent surfaces. Timber edges shall be constructed within the following tolerances:
Horizontal: 5mm
The alignment of the edge shall not deviate more than + 3 mm from a 3 m straight edge. No kinks, flats or angles shall be discernible by eye

11.8 75mm fine gravel (peametal) shall be laid over the rain garden following planting. Organic mulch (bark chip etc) may not be used as it floats and can block pipework.

11.9 No fertilisers, herbicides or pesticides to be used in rain garden once planted.

12.0 MOUNDS

12.1 This section sets out the requirements for the formation of the mounds.

12.2 Excavated soil from building excavation to be used to form mounds. Mounds to have crisp shapes and blend seamlessly into existing ground levels. Landscape architect to approve final contouring of mounds before applying topsoil. Re contouring of mounds to be undertaken at contractor's expense if necessary.

12.3 Mounds to have a maximum slope of 1:2 for ease of mowing.

12.4 100mm depth stockpiled approved site top soil or McMud lawn mix to be applied after contouring of mounds to cultivate lawn.

13.0 FINISHING

13.1 On completion the contractor shall clean down the paved surfaces and remove all dirt and stains. Any rubbish or debris shall be removed from the site by the contractor, leaving it in a clean and tidy condition.

13.2 All garden beds and rain gardens shall be left free of debris and rubbish ready for backfilling, planting etc.

Part 5: PLANTING

1.0 SCOPE

1.1 This specification covers the preparation, supply, planting, staking (of trees), fertilising and mulching of all plant material.

2.0 INSPECTION AND HOLD POINTS

2.1 All tree and shrub planting shall be placed or placement directed on site by the landscape architect. Please provide 1-week notice to the Landscape Architect so that inspection may be made at the following stages:

- Soil prepped before plants are delivered
- Shrubs placed beside the bed (not in it) ready to be set out by the Landscape Architect.
- Trees placed in holes as per the plans but not planted / backfilled.

5.0 EXECUTION

5.1 RELATIVE LEVELS
All proposed finished landscaping levels to conform to NZS 3604, section 6.14, Prevention of dampness and section 7.5.2 Finished floor levels and foundation edge construction, in relation to any adjoining habitable floor levels.

Soil level shall allow for 75m mulch to finish min. 50mm below adjacent paving surfaces to ensure mulch is not disturbed by birds and / or wind. Failure to do so will require mulch and planting removal, soil levels adjusted and replanting to correct levels.

Maintain the required cover over any buried services.

5.2 WEED CONTROL
Spray all planting areas which contain weed growth with a non-selective herbicide min 2 weeks prior to planting. Use temporary fence to ensure children are not exposed to sprays. Apply to the herbicide manufacturer's requirements, in dry, still air conditions.

5.3 EXISTING SERVICES
Confirm locations of all services in the area of the work.

5.4 GENERAL PREPARATION
Ensure areas to be planted are clean, ready to be worked and clear of any continuing work by other trades.

5.5 SITING
Position plants in locations and quantities shown on the drawings. Layout and spacing to conform to plant schedule. Landscape Architect to approve and/or complete set out.

6.0 PLANT MATERIALS

6.1 Plant materials shall mean plants (including but not restricted to trees and shrubs) of all descriptions required to be furnished for the project in accordance with the plans and as specified.

6.2 Plant material shall be first class specimens of nursery stock, true to name and type with well-developed and well-shaped trunk or stem and head. They shall be well hardened off to cope with the climatic conditions of the site, and free from pest and disease.

6.3 The roots shall have a high percentage of fibrous roots that are just touching the edge of their containers. Root bound plants with roots that are wound round their containers in circular fashion shall be rejected.

6.4 Plants shall be consistent in size, quality and health.

6.5 Plants shall be free from disfiguring knots, bark abrasions, wind, or freezing injury or other disfigurements and shall bear evidence of proper pruning.

6.6 Legible labels shall be attached to each plant which is delivered to site as a separate unit and to each box, bundle or bale containing plants. The labels shall give the approved botanical name, size, age and quantity and other information required to identify the plant or plants.

6.7 In exceptional circumstances substitution may be allowed by the Landscape Architect. Such approved substitutions shall be of similar height and habit to those specified which the Contractor is unable to supply.

7.0 TREES

7.1 MATURE TREES (20L and above)
These shall have sturdy, clean, straight stems not less than 120mm girth at 1 metre above ground level. The girth should be between 140 and 180mm. Trees shall have two stakes.

7.2 Small Trees (10L and below)
These shall have one stake if over 30mm diameter girth. All trees to have sturdy, clean straight stems capable of standing without stakes.

8.0 SHRUBS, GROUNDCOVERS AND REEDS

8.1 CONTAINER GROWN PLANTS
Container size (PB) and overall height shall be as specified in the schedule. They shall be strong well rooted sturdy plants without stakes or canes. Shrubs shall have two or three main stems and a good bushy form. They must have been grown in the containers for at least 6 months over a summer period prior to planting out and the container shall be full of root but not root bound.

8.2 Plants shall not have been grown in the container for longer than 12 months without having been potted on.

9.0 DELIVERY AND TEMPORARY STORAGE

9.1 All plant material shall be carefully packed and protected during transport to the site to prevent damage. The Contractor is responsible for the supply, unloading, placement and aftercare of these plants. Container grown plants shall not be bundled. The Contractor shall confirm that the proposed method for preparation, lifting on to pallets, loading, transport and delivery to site of advanced plants is compatible with the Contractors method for unloading.

9.2 The plants are to be delivered in batches to ensure they are planted on the day of delivery. The Contractor shall inspect the plants to ascertain their general state of health when they arrive on site, prior to being unloaded.
If acceptable to the Landscape Architect and Contractor, the plants will be accepted in writing by the Contractor to the supplier and the plants shall immediately become the responsibility of the Contractor. In the event that the plants are not acceptable to the Contractor and the Landscape Architect they will be rejected in writing, to be replaced.

9.3 The contractor shall off-load the plants and stand them in the designed area on site. In so plant material shall be planted on the day of delivery. In the event this is not possible the Contractor shall protect that stock which is not planted.

9.4 All plant material must be protected from the adverse effects of the elements during handling and transport. During transport, protection from buffering wind is to be provided in the form of framed tarpaulin covers, or enclosed vehicles. Plants delivered to site in uncovered vehicles will be rejected. Plant roots shall be protected at all times from sun or drying winds. Plants that cannot be planted immediately on delivery shall be kept in the shade, well protected, with soil kept well-watered.

9.5 Any damage to roots and limbs and damage to the main super structure may result in the rejection of the plant. Plants with damaged growing points, lop sided growth or other deformities may also be rejected at the discretion of the Landscape Architect. If major damage occurs the plants shall be replaced at the Contractor's expense.

9.6 Pots and other protective materials shall not be removed until immediately prior to planting, and shall be disposed of off the site after planting. Roots shall not be left uncovered at any time. Any plants that, in the opinion of the Landscape Architect and Contractor, are found to be root bound or defective in any way when they are removed from their containers, shall be set aside and brought to the attention of the contractor for action.

9.7 Holding methods: Submit proposed methods for holding plants beyond specified dates so that plants will continue to comply.

9.8 All plants for any garden bed must be delivered and planted in one batch to enable even setting out of all plants in that bed.

10.0 FERTILISERS

10.1 Apply approved time release fertiliser pellets with plants as they are planted. Apply quantities as recommended by the manufacturer, varying amount as recommended to suit the size of specimen.

11.0 SOIL CONDITIONER

11.1 All garden beds areas in natural ground or site top soil shall have 50mm of compost cultivated into existing site soil to a minimum depth of 300mm throughout the garden bed, not just in plant pit locations.

11.2 The Contractor shall be required to liaise closely with the Civil Works Contractor to ensure access for the application and mixing of topsoil and conditioners on site. The conditioners shall be evenly spread through at least the top 300mm of topsoil.

11.3 Apply 10 litres of compost per shrub. Cultivate into site topsoil throughout the plant pit.

11.4 All garden beds must be fully prepared and ready to plant prior to any plants arriving on site.

12.0 SETTING OUT

12.1 Planting positions shall be pegged/laid out, in accordance with the plan and schedule.

12.2 The Landscape Architect may require minor refinement to the design with adjustments to lines, levels and grouping of trees/shrubs locally as the planting proceeds and after it is completed requiring the Contractor's co-operation and agreement.

12.3 In areas of block planting, plants shall be spaced evenly so that when established they will completely fill the areas indicated as precisely and evenly as possible. The extent of the area to be filled by each species shall first be defined by plants spaced around the perimeter. The remaining plants shall then be used to fill the centre of the area in an informal manner avoiding straight lines and regular geometric patterns. The mature size of the plant should be taken into account when setting out, especially where placed beside paving to avoid trip hazards.

12.4 Realignment and re-siting may be necessary upon inspection at the Contractor's expense.

13.0 TIMING OF OPERATIONS

13.1 Work shall only be undertaken when the weather is suitable, i.e. mild, dull and moist, and when the ground is moist and workable. All planting operations shall be suspended

during periods of severe frosts, drought, waterlogging, persistent drying winds or extreme heat.

13.2 Where the timing of operations require planting outside the recognised horticultural season (April to October) the Contractor shall be responsible for ensuring all planting is irrigated. Manual (hand) watering, or temporary hose and sprinkler irrigation shall be used as well as soil moisture retention additives such as crystal rain.

13.3 The Contractor shall accept liability for all plant deaths during the maintenance period or for one year following planting if a maintenance period is not included in the contract.

14.0 WORKMANSHIP

17.1 All planting shall be performed by experienced workmen in accordance with the recognised best horticultural practice and under the supervision of the contractor's skilled foreman.

17.2 Balled and container grown plants, shall have cloth cordage or container removed immediately prior to planting. Care shall be taken to ensure that the root ball is not disturbed during container removal or planting. Any wire containment and hessian shall be removed. Plants shall be set in their final positions with main stem vertical and at such a depth that the soil, when firmed down is at the same height as the nursery earth marks on the stem or the container soil level. Loose roots shall be spread out in a natural fashion, the soil being carefully placed under and amongst them to fill all voids and firmed in. Any major roots which become accidentally broken off or frayed shall be cleanly cut off from the plant.

17.3 Roots: - Cut back any broken or damaged roots to sound growth. Treat cut ends over 25mm diameter with fungicidal sealant.

15.0 LARGE TREE PLANTING (20L PLUS)

14.1 All trees shall comply with the general requirements relating to type and quality. These have substantial evenly developed side growths and a single leader unless otherwise specified. The main stem shall be straight and the tree substantial enough to be self-supporting.

14.2 They shall be planted at the original nursery soil depth as defined by the soil mark on the stem. Planting shall be the same as for shrubs.

14.3 Mature trees
Pits for larger trees shall be:
(a) as detailed and filled with topsoil and conditioners and,
(b) 300mm greater than the root spread and at least 250mm deeper.

Sufficient soil shall be taken out from the pit to accommodate the container. The bottom of the hole shall be forked over to an additional depth of 150mm in order to facilitate root penetration, air movement and free drainage. The tree shall be set upright in the centre of the pit and finely broken down backfill mix returned and carefully packed around roots taking care to exclude air pockets. The soil shall be lightly consolidated, heeling firmly round the root collar.

14.4 The tree shall be secured to four stakes with three ties, the top one of which is fastened exactly 50mm below the top of the stake.

14.5 Care shall be taken to avoid damage to surrounding header courses, paving and underground services.

16.0 SMALL TREES (10L)

15.1 Dig holes for plants at least 100mm larger in all directions than is required to accommodate the roots of the plant. Backfill with topsoil and conditioners as required.

15.2 Roots shall be spread out in their natural position.

15.3 The soil dug out of the hole shall be placed around the roots and lightly compacted by hand to avoid air pockets.

15.4 The plants shall be set plumb, and at such a level that after settlements the soil level previously at the top of the plant container is level with the surrounding soil levels.

15.5 Place plants as shown on the planting plans. In areas detailed for random planting no 3 plants shall be planted in a straight line.

15.6 Each plant shall be planted in the centre of the hole.

15.7 The tree shall be secured to four stakes with three ties, the top one of which is fastened exactly 50mm below the top of the stake

15.8 Water all plants in following planting.

17.0 WATER GENERALLY

18.1 An irrigation system will not be provided. The contractor should carry out the work during the normal planting season (April – June). Should the planting be carried out outside of the planting season the contractor shall be required to water manually as required to ensure survival during the maintenance period.

18.2 Attention must be paid to watering during and after planting to ensure successful establishment. Notwithstanding any prevailing restrictions by the local authority on the use of water for watering any plants, the Contractor shall be deemed totally responsible for making any special arrangements which may be necessary to ensure regular and adequate watering of trees and shrubs to ensure successful establishment.

18.3 In the interests of good horticultural practice watering shall be sufficient to give 300mm minimum depth penetration and not just surface dampening. The Contractor shall bring to the site sufficient water carts, hoses and sprinklers to provide an adequate water supply to the plant material.

18.4 Prior to Planting: - All plants, shall be thoroughly watered a few hours prior to planting. Immersion of the entire rootball for a minimum period of three hours.

18.5 After Planting: - At the time of planting all trees and shrubs are to be copiously watered prior to placement of mulch in such a way that the entire tree pit or shrub station is moistened to field capacity to encourage settlement. The Contractor shall be responsible for watering all plants as required to ensure their survival.

18.6 Drought Conditions: - Lack of availability of water shall not release the Contractor from his obligation to replace all dead or dying plants at the end of the first season of growth after planting. The price submitted shall allow for adequate watering and, when not directed, the Engineer shall not need to remind the Contractor of his obligation during periods of drought. If water supply is likely to be restricted, inform the Engineer without delay and ascertain availability and cost of second-class water from a sewage works or other approved source.

If planting has not been carried out, do not do so until instructed.

18.7 Soil additives such as Triple Play (or similar) may be added to aid soil moisture penetration, distribution and retention to minimize the Contractors watering requirements.

18.0 STAKING AND TREE PROTECTION

16.1 Stakes shall be straight pointed:
H4 treated Pinus radiata stakes 50mm dia. extended 1200mm above ground level and driven min 1000mm below ground.

16.2 Prior to planting, position each stake close to the tree and drive vertically into the bottom of the pit until the top of the stake is 1200mm above ground level. Consolidate material around the stake during backfilling. The trees shall be held firmly, although not rigidly, by the staking to prevent a pocket forming around the stem and newly formed fibrous roots being broken by mechanical pulling as the tree rocks.

16.3 Position top tie within 50mm of top of stake.

16.4 Position the stakes on either side of the tree. Where only one stake is used, position on the south side of the tree.

19.0 MULCHING

19.1 Immediately after watering in the new planting, spread all garden beds with untreated mulch to a depth of 75mm after settling.

19.2 All garden beds shall finish 100mm below adjacent surface levels after settlement to allow for 75mm depth mulch to allow finished level to be 25mm below paving level to avoid mulch spilling over edges.

19.3 Ensure mulch is not piled against stems of plants and trees.

19.4 The Contractor shall supply a small sample bag to the Landscape Architect for approval prior to delivery.

19.5 During the Maintenance Period: - The mulch shall be maintained at the original thickness and shall be loosened by raking from time to time ensuring no mixing of soil/weeds at all times.

20.0 RUBBISH

20.1 The Contractor shall remove all rubbish, excess stakes, planter bags and undesirable debris, resulting from planting operations from the site, and make good any compaction marks or other damage resulting from the works.

21.0 SPRAYING

20.1 The Contractor shall remove all rubbish, excess stakes, planter bags and undesirable debris, resulting from planting operations from the site, and make good any compaction marks or other damage resulting from the works.

22.0 HYDRO SEEDING

22.1 This section covers the seeding of all grass areas except where otherwise specified by the Engineer.

22.2 Contractor shall make good all lawn areas disturbed by construction of buildings or landscape.

22.3 Supply and spread additional topsoil if stockpiled site soil is available on site. Ensure the grades are even, free draining, or directed to appropriate sumps or rain gardens.

22.4 All areas to be seeded shall be lightly cultivated to a depth of 25-100mm, harrowed or raked as required to provide a suitable tilth for seed.

22.5 Remove all stones and rubble over 50mm diameter sticks and rubbish.

23.0 SEED

23.1 The seed mix shall be:

a) Tournament Blend

b) For main grass areas: 30% Canadian Red Fescue, 40% Caliente Rye, 30% Serra (Hard Fescue)

23.2 All seed shall be free of noxious weeds. Other crop seed shall not exceed 1.0 percent. Weed seed shall not exceed 0.05 percent.

23.3 The Contractor shall be responsible for ensuring germination of all grassed areas no matter what the reason.

24.0 SOWING

24.1 The seed mix shall be hydroseeded in suitable calm weather, at a rate of 35 gm/m^2.

24.2 The seed shall be watered by the contractor immediately after sowing and then as often as necessary to keep it moist until germination and until grass is well established.

24.3 Where establishment fails, the contractor shall re-sow as many times as is required to achieve 100% cover.

24.4 All seeded areas shall be temporarily fenced off to protect from damage until established.

22.0 FINAL COMPLETION

22.1 At Practical Completion, submit supplier's written statements certifying that plants are true to the required species and type, and are free from diseases and pests.

22.2 Arrange for final inspections by landscape architect.

Part 6: Maintenance

1.0 PLANTING ESTABLISHMENT PERIOD: 52 WEEKS

The Planting Establishment Period commences at the date of Practical Completion of the entire proposed planting. Maintenance shall be continuous throughout the 12-month landscape establishment period and shall maintain a standard of landscaping at least equal to that achieved for Practical Completion and to the satisfaction of the Main Contractor's Representative.

2.0 RECURRENT WORKS

Throughout the Planting Establishment Period, continue to carry out recurrent works of a maintenance nature including, but not limited to, watering, weeding, fertilising, pest and disease control, replanting, cultivating, pruning, removal of clippings.

3.0 REPLACEMENTS

Replacements to make good defects must be planted during the planting season immediately following their loss. These shall be similar to those specified, previously supplied and approved unless otherwise agreed between the Engineer and the Contractor. All such replacement planting shall be at the Contractor's expense and the Contractor shall be responsible for any preparatory and other work necessary to enable planting to be properly carried out including the removal and disposal of dead materials. Replacement of plants which die through no fault of the Contractor may be required to be planted at the same time if so instructed by the Engineer.

Any stakes, ties, etc shall be replaced as soon as possible after being found defective.

4.0 FERTILISING

Fertilise all areas approximately 8-12 weeks following the initial works 16-18 weeks after Practical Completion, and just prior to Handover, at the following rates:
Individual trees: slow release fertiliser NPK 5:0.5:3 equal to 'osmocote Once Maintenance Hi N' 22:1:10 at 50gm/^{2} or manufacturers recommended rate.
Shrub planting/existing planting: 'AFL multigro' at 30g/m^2.

5.0 WEED AND PEST CONTROL

Eradicate all grass, weeds and pests from within garden and individual planted areas and around the base of every tree with approved weedicides and insecticides and remove site throughout the Landscape Establishment.

6.0 SPRAYING

Immediately give notice of evidence of insect attack or disease amongst plant material. Where required, spray with insecticide, fungicide or both. Submit proposal, including proposed products to be used and manufacturer's recommendations and spray only after receiving approval in writing.

7.0 MULCHING

Re-mulching as necessary throughout the Landscape Establishment Period to maintain mulched areas to the specified depth and lines.

8.0 LAWNS

8.1 The Contractor shall be responsible for spraying off weed and oversowing in areas where germination is found to be poor or unsatisfactory.

8.2 Water as required from adjacent taps to ensure good growth.

8.3 Do not mow first cut until the grass has reached 50-70mm.

8.4 The Contractor shall protect areas to be grassed from traffic and remove any barriers following the second cut. Use Waratah and wire fencing 3 wires.

8.5 The Contractor shall protect all grass areas as specified until after the second cut at which time the Landscape Architect shall inspect and may approve its removal or relocation.

9.0 COMPLETION

At Practical Completion, submit supplier's written statements certifying that plants are true to the required species and type, and are free from diseases, pests and weeds.