

# **Omāroro Reservoir**

## **TECHNICAL SPECIFICATION**

### **WAITANGI STREAM MITIGATION PLANTING**

Prince of Wales Park  
Mount Cook  
Wellington 6021

Project Ref: W16117B  
16 April 2020

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## Section A: General

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### 1. The Project

The “Specification” is deemed to include all sections of the Specification read as a whole.

The Waitangi Stream mitigation planting (Mitigation Planting) is defined as a planted area approximately 3 metres wide, each side of the Waitangi Stream waterway for approximately 30 metres upstream from the new stormwater pipe headwall. The planting is to compensate for the scale of project earthworks and any stream loss as a result of construction.

The planting is to consider and be coordinated with the reservoir main works as described and specified (or subsequently amended) in the ‘Landscape Works Technical Specification’ dated 18 September 2019.

This section of the Specification covers the general obligations the Contractor shall meet in executing the Mitigation Planting coordinated with the Landscape Works Contract.

The Mitigation Planting Works shall be for, but not limited to, the supply of all labour, plant and materials for the construction and completion of the works, including input into the preparation of the landscape section for the Asset Owner’s Manual, in accordance with the Project Drawings, Plant Schedules and Minimum or Principal Requirements.

### 2. Performance Criteria

The aim of the following performance criteria is to achieve the quality landscape outcomes sought by the Project. The following criteria apply:

*All ground preparation, topsoil and mulch shall support plant growth in the Waitangi Stream Mitigation Planting associated with the Project.*

*All planting shall include quality plant stock, true to form and shape with healthy signs of growth.*

*All associated plant ancillaries (such as climber supports, matting, tree stakes and ties) shall meet this specification.*

*Enrichment trees are to have 100% plant survival by project completion (at issue of the Defects Liability Certificate).*

*Planting shall achieve an **80% canopy coverage of the ground** and there shall not be any noticeable bare patches by contract completion (at issue of the Defects Liability Certificate).*

*The effects of pest plants shall be managed to ensure the establishment of all plantings, consistent control of pest plants is required through the contract period.*

*All defects shall have been progressively rectified during the defects period and prior to issue of the Defects Liability Certificate at the end of the period (which shall be 5 years for terrestrial and riparian planting).*

*At contract completion/issue of defects liability certificate, the Contractor shall complete a producer statement. The statement shall confirm that the contract works have been undertaken in accordance with the plans and specification. Wellington Water may accept the producer statement as evidence the landscape works comply with the landscape design and the requirements included in the Specification.*

*All planting shall be ecosourced from the Wellington Ecological District.*

### 3. Applicable Codes and Standards

All Materials and workmanship shall comply with the relevant requirements and following standards listed in this Specification, as appropriate.

Site Preparation and Pest Control work shall comply with the following:

*Relevant Regional Council Requirement(s)*  
*Code of Practice for Safety and Health in Tree Work, Part 1 – Arboriculture Relevant territorial authority Standards*  
*Hazardous Substances and New Organisms Act 1996 NZS 8409:2004 Management of Agrichemicals Biosecurity Act 1993*  
*Wild Animal Control Act 1977*  
*Local/ Regional Pest Management Strategies (RPMS) (e.g. Plant Pest Control and Animal Pest Control)*  
*Health and Safety in Employment Act 1992*

Plant Propagation work shall comply with the following:

*NZS 4454: Standard for Composts, Soil Conditioners and Mulches The “Ecosourcing Code of Practice and Ethics”*  
*Ecological regions and districts of New Zealand Ecological region and district boundaries are shown on the spatial information map service e.g. Department of Conservation (DOC) GIS Viewer, link: <http://gis.doc.govt.nz/docgis/>*  
*Source: <http://www.biodiversity.govt.nz/resources/environments/index.html> (Information is readily available on the DOC website)*  
*<http://www.doc.govt.nz/>*

Planting work shall comply with the following:

*NZS 4454: Standard for Composts, Soil Conditioners and Mulches “Site Preparation” section of this specification*  
*Relevant territorial authority standards*

Maintenance work shall comply with the following:

*“Maintenance” section of this specification*  
*Relevant territorial authority standards*

Where there is a conflict between the requirements of this Specification, standards, or between different standards, the most stringent shall apply.

The installation of all Materials shall, in addition to the requirements of this Specification, comply with the manufacturer’s requirements and recommendations. The Contractor shall be responsible for determining and complying with all of the manufacturer’s requirements.

### 4. Materials

#### 4.1 General

All Materials supplied shall be new and to the best of their respective kinds, suitable for the purpose for which they are intended and complying in all respects with this Specification.

#### 4.2 Inspection

The Contractor shall, prior to installation, inspect all Materials for signs of damage, which may have occurred during transport to site or during storage on site.

#### 4.3 Alternatives and Substitutes

The nomination of a particular manufacturer or brand name for Materials shall be taken to indicate the type and quality required. It does not imply that the nominated Material is readily available or is the only one acceptable.

Where alternative products, materials, procedures or designs are proposed, whether these are provided for in the Specification or not, written approval shall be obtained before any such changes are incorporated. Details of any alternatives shall be submitted to the Engineer for approval sufficiently in advance of them being required to be incorporated within, or used upon, the Contract Works, and prior to placing orders and / or purchasing.

## 5. Workmanship

All Materials and construction shall be to a high standard, and workmanship shall be that of appropriately qualified tradesmen performing to the best trade practice.

## 6. Setting Out

The Contractor shall set out the works from the information shown or described on the Drawings. The site shall be provided with survey control points that the Contractor may use for set-out.

Should any conflict and / or discrepancy exist, the Contractor shall request instruction from the Engineer prior to proceeding.

All existing survey marks on Site shall be protected. Any disturbance, displacement or destruction of existing survey marks shall be reinstated.

## 7. Practical Completion

Certificate of Practical Completion shall not be issued until the landscape works are fully completed as set out in the specification.

## QUALITY ASSURANCE GUIDE

The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing
Section A: 2	Contractor to provide a Producer Statement	At the end of Defects Liability and Maintenance Period.

### B. MATERIAL TESTING

Clause	Test	Frequency

### C. ONSITE TESTING

Clause	Test	Frequency

**D. HOLD POINTS**

Clause	Test	Frequency

## Section B: Quality Control; Inspections and Reporting

### 1. Scope

This section of the specification covers the obligations that the Contractor shall meet to achieve the quality sought by the Project in relation to Quality Control; inspections and reporting.

### 2. General

All Materials and workmanship shall comply with the standards listed within this specification.

### 3. Reporting

Throughout the implementation of the works and during the defects liability and maintenance period and/or the extended maintenance period; the contractor shall monitor the progress and condition of the works and provide a 3 monthly (4 X per annum) report. Reports shall note: health and safety, progress relative to the program, any requests for information, inspection requirements. They shall also report on matters of material supply, condition of plant material, design issues, construction issues, soil condition, mulch levels and condition, plant growth, pests or disease (if any), vandalism (if any) and any other issues which arise. Refer Quality Assurance Guide in Section G Defects Liability and Maintenance.

### 4. Inspections

The Contractor shall notify the Engineer for inspection of the works as specified in the following table. Inspections shall generally coincide, and multiple aspects will be reviewed on a single site visit. The scheduling of inspection visits shall maximise the value of each visit.

Table 1: Inspection Requirements

Site Preparation	<ul style="list-style-type: none"> <li>Set out for clearing</li> <li>Confirmation of measures to protect existing vegetation (e.g. mature trees, seral forest a, b, c, native bush)</li> <li>On completion of the clearance (including pest plant control)</li> </ul>
Plant Pest and Animal Pest Control inspections	<ul style="list-style-type: none"> <li>Assessment to determine any Plant and Animal Pests problems</li> <li>Methodology and programme</li> <li>Review of pest plant areas to be cleared and managed</li> <li>Following pest plant control, when signs of dieback are visible</li> <li>Following any additional pest plant control operations</li> <li>Following animal pest control operations</li> <li>Inspections for pest control shall occur twice a year (generally spring then autumn)</li> </ul>
Plant Quality	<ul style="list-style-type: none"> <li>During production and prior to delivery of plants to site</li> <li>Upon delivery of plants to site</li> </ul>
Planting	<ul style="list-style-type: none"> <li>At setting out</li> <li>During planting</li> <li>Check all biodegradable weed matting, plant ancillaries (e.g. CombiGuards, stakes and ties)</li> <li>Upon completion</li> </ul>
Defects Liability and Maintenance	<ul style="list-style-type: none"> <li>As agreed with the Engineer during the Defects Liability and Maintenance Period</li> <li>Following the remedy of any defects, this is within 20 days of being notified of a defect, or for replacement of defective planting during the growing season.</li> <li>End of Defects Liability and Maintenance Period (5 years for terrestrial and riparian planting) prior to the issue of Defects Liability Certificate</li> </ul>

### 5. Quality Control

#### 5.1 Work Plan



A detailed work plan shall be prepared for all landscape works by the Contractor, at least two weeks prior to the landscape works commencing on site. This shall be submitted to the Engineer for information.

## 6. Plant Quality

### 6.1 Samples

Sample areas are not required.

### 6.2 Plant Numbers

Plant number spacing and location is clearly defined on plan and will be confirmed at the inspection at set-out.

Plants will be randomly selected and removed from the ground to check for defects. This shall be undertaken at the following frequencies:

*Areas less than 500 m<sup>2</sup> – 1 plant/50 m<sup>2</sup> (with a minimum sample of 5 plants)*

During these operations, labour shall be available to replant specimens removed during the inspection. Planting quality control assessment shall be made using the following criteria based on the requirements of the specification:

*Specified spacings*

*Installed plants are healthy and vigorous*

*Correct species*

*Of good balanced form*

*Hardened*

*Not root bound*

*Adequate hole size*

*Planted vertical*

*Planted at correct depth*

*Stem/foliage trimmed if required*

*Roots loosened/trimmed as required*

Should more than two faults be found (based on the criteria listed) in more than 20% of plants sampled, the sample will be repeated. The results will then be based on the average of the two samples.

Should more than two faults be found in more than 20% of plants summed across both samples, investigative works shall be undertaken to identify and replace defective plants. On completion of the remedial work, the affected areas shall be re-inspected.

### 6.3 Maintenance Period Inspections

On completion of each round of maintenance, the area shall be inspected as described above to confirm plant numbers, quality and weed suppression are as specified.

### 6.4 Remedial Work

All required remedial work shall be carried out as soon as practicable but in no case later than 20 Working Days after notification.

## 7. Quality Assurance Guides

Refer to the end of each relevant section for:

- Information to be supplied

- Material testing
- Onsite testing
- Hold points
- Inspections

## Section C: Site Preparation

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### 1. Scope

This section of the Specification covers the clearing and disposal of existing vegetation and weeds (except vegetation identified to be retained), inorganic debris, site preparation spraying, pruning and minor works. Generally, the existing ground along the banks of the Waitangi Stream shall be used.

All measures to protect existing vegetation (e.g. mature trees, native bush) and features (e.g. archaeological sites) shall be in place prior to any site preparation commencing. These shall be in accordance with any designation and/or resource consent conditions.

### 2. Related Documents

Refer to Section A: General of this Specification

### 3. Materials

#### 3.1 Topsoil

Topsoil is defined as the top layer of soil characterised by the presence of organic matter.

#### 3.2 On site topsoil

The Contractor shall inspect the site together with the Engineer to assess the condition of the existing topsoil for areas which are being planted into.

Any remedial measures would generally seek to address compacted soils, water-logged soils and removal of rubbish.

#### 3.3 Topsoil care

Topsoil compaction should be avoided, measures include:

- The use of the lightest possible vehicles and machinery when spreading topsoil and/or trafficking planting areas which are to be planted
- Avoid trafficking completed topsoil areas and use of equipment in the planting area.

#### 3.4 Imported Fill

Imported fill is not required. The existing ground will be used.

#### 3.5 Unsuitable Materials

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

*soil containing rubbish or contaminated materials* *soil containing*  
*pest plant material*

The contractor may supply a methodology to remediate unsuitable materials. This shall be approved by the Engineer prior to commencement.

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

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

## 4. Preparation

### 4.1 Erosion and Sediment Control

For all areas of earthworks, the Contractor shall ensure that erosion and sediment control measures are installed in accordance with GWRC requirements. This section of Waitangi stream is well vegetated and monitoring of where weed has been removed for ground preparation is required.

During the works, the Contractor shall be responsible for undertaking regular inspections and maintaining the erosion and sediment control measures in operational order.

### 4.2 Vegetation Clearing

Prior to any vegetation clearance occurring:

- a) The maximum extent of clearance is to be clearly identified and confirmed by the Project Ecologist in consultation Project Construction Manager.
- b) Vegetation to be retained will be clearly marked on site, with special attention given to large trees and Seral Forest B
- c) As far as practicable, vegetation clearance will occur outside the breeding season of kaka, falcon, kakariki, and morepork (1 September to 30 March) Clearance shall be limited to weed clearance only along Waitangi Stream.
- d) Prior to any vegetation clearance occurring, a lizard survey is to be undertaken of the project site and surrounding area by a herpetologist.
- e) If any lizards are found or their presence is suspected measures must be developed to minimize the effect of the project on the lizard population, this may include lizard relocation prior to vegetation clearance, and habitat re-creation associated with post construction site remediation and landscaping.

Vegetation clearance is generally required for the following reasons along Waitangi Stream:

- clearance of exotic vegetation and/or pest plants in association with native revegetation planting
- clearance of exotic vegetation and/or pest plants to reduce long term maintenance costs and the spread of pest plants.

For all clearance works associated with plant pest removal, refer to Section D: Plant Pest and Animal Pest Control; where the use of herbicides in site preparation spraying is covered.

NOTE: Contractors should ensure that they are familiar with relevant conditions of any Resource Consent, or Designation, or legal/ landowner agreements prior to undertaking any clearing works on the site.

#### 4.2.1 Vegetation Clearance Works

Vegetation clearance along Waitangi Stream shall be limited to the hand removal of weed (predominantly tradescantia and exotic grasses) while retaining native plants growing in the planting area. Releasing plants from weeds will be by hand. Generally, herbicides shall not be used along the Waitangi Stream unless required to manage difficult to control invasive weeds. Any herbicide management shall be agreed with the Engineer prior to implementing.

The area of any clearing work shown on the relevant drawings shall be cleared of all exotic trees, shrubs or grass, dependant on height as tabled below. Where identified all native trees shall remain undisturbed.

Initially hand clearance of tradescantia is required at the at the plant locations but surrounding tradescantia growth is to remain in place to control sediment and for stream habitat (koura). During the maintenance period, mass clearance of tradescantia may be considered once the plants have become established and will have shade that compensates for the weed removal.

Where native fauna (e.g. reptiles) are required to be captured from the area prior to clearance works, no works shall be undertaken until an instruction to proceed has been issued by the Engineer.

Any large clumps of flax that are removed as part of the pipe intake headwall, shall be put aside in a nursery for replanting by the local community.

Clearing Schedule Table

Material	Location	Height	Clearing Details
Grass and weeds	All areas to be planted or grassed	AL	Blanket spray with herbicide, up to two applications, dependant upon the situation and weed type.
Blackberry	All areas to be planted or grassed	All	Blanket spray with herbicide, up to two applications dependant on the situation. Cut, mulch and respray growth.
Gorse	All areas to be planted or grassed	All	Cut and mulch and spray regrowth with 2 applications and spray regrowth with approved herbicide specific for gorse
Convolvulus	All areas to be planted or grassed	All	Spray active growth with approved herbicide with marker dye added; monitor closely and re-spray any regrowth, on approval of the Engineer

#### 4.2.2 Vegetation Disposal

If vegetation disposal is required, the contractor shall work with the Main Works contractor, to dispose of the material in an acceptable way.

#### 4.3 Vegetation to be retained

Any groups of vegetation to be retained along the stream shall be marked on site by the Contractor, and then inspected and approved by the Ecologist and the Engineer, prior to fencing off.

There are no significant trees in the mitigation planting zone that requires fencing off but the extent of work at the upstream end of the Waitangi Stream is to be fenced.

Large trees to be retained within the main planting area, as identified on the drawings and/or required by the conditions of Designation, shall be fenced under the main reservoir works. It is the Contractors responsibility to ensure that all persons engaged of working on the project are aware of the conditions related to working around trees and the subsequent penalties for non-compliance.

#### 4.4 Habitat features

Material identified on the drawings to be retained, recovered and reused within the project area, shall be protected or set aside and retained for use. All habitat features shall be positioned as required and installed to avoid dislodgment.

### 5. Workmanship

#### 5.1 General

All plant and equipment shall only be operated by licensed, experienced operators. Only certified applicators shall be responsible for the application of herbicides. All chemical sprays will need to be Wellington City Council approved spray/chemical list, with an approved Wellington City Council contractor. All chemical used should be recorded in a spreadsheet, with operator’s name, product name, quantity used, and date sprayed.

#### 5.2 Clearing - General

The Working Area shown on the Drawings shall be cleared of all vegetation and structures except those specifically required to remain as noted on the Drawings. Generally, the site clearance will be for the main works. Site clearance in the Waitangi

Stream is limited to the construction of the intake headwall and weed clearance at plant locations

Any works near a watercourse shall be undertaken in accordance with relevant territorial authority standards.

The extent of clearing shall include all areas affected by cutting and filling.

Unless elements are noted for retention on the drawings; clearing shall include the complete removal of all trees and other vegetation, stumps, inorganic debris, pipes, fences, stonewalls, retaining walls, hardstand surfaces, boulders, and other materials as specified.

Where machine clearing is not possible, vegetation shall be removed by hand methods and removed off site. Roots from cleared vegetation shall be removed during cultivation work. Particular care shall be taken around the root zone of trees to be retained.

Cleared materials shown on the drawings for reuse or to be stockpiled for the Principal's reuse, shall be stored on site in a location to avoid relocation and damage. Where there is clean topsoil free of pernicious weeds and in the Waitangi Stream headwall construction area, suitable for reuse, the topsoil shall be stripped and stockpiled for reuse on the main works outside the stream zone.

### 5.3 Tree Clearing

Trees and shrubs to be cleared shall include the removal of stumps off site (unless specified otherwise). Stumps in excess of 300mm in diameter may be ground in lieu of removal.

All cleared material (including chipped material) shall be removed off site and may not be burnt on site. If the Contractor elects to chip cleared material on-site, then the Contractor shall ensure that its operations do not affect neighbouring properties.

### 5.4 Pruning

All pruning shall be undertaken by skilled operators. Pruning shall remove all damaged twigs and branches.

Operations are to be carried out using sharp clean implements to give a clean sloping cut with one flat face. Ragged edges of bark or wood are to be trimmed with a sharp knife.

All pruning's shall be chipped and removed offsite.

### 5.5 Site preparation Spraying

Refer to Section D, of this specification. The use of herbicides along the Waitangi Stream is not acceptable unless authorised by the Engineer.

### 5.6 Soil Disposal

Unless otherwise specified, the Contractor is responsible for the disposal off site of all cleared materials in a safe and legal manner, including payment of any associated fees as required.

### 5.7 Earthworks and Topsoil

The planting area is not to be disturbed or have additional topsoil. Any additional topsoil around the stormwater pipe headwall will be under the Main Works contractor and specification,

### 5.8 Unsuitable Materials

Should sub-surfaces include unsuitable materials and are not to the required standard, topsoiling shall not proceed until directed by the Engineer under the main works.

### 5.9 Topsoil/Soil Mix Placement

Topsoil shall be spread to the compacted depth as stated in for the following areas:

<i>Grassed areas</i>	<i>150mm</i>
<i>Shrub areas (reservoir top/biocoir areas)</i>	<i>300mm</i>

<i>Shrub areas</i>	<i>450mm</i>
<i>Tree pits</i>	<i>1000mm</i>

Topsoil shall not be placed and spread if the earth-worked sub-surfaces do not have sufficient fall to shed water in a controlled manner to prevent ponding.

Topsoil shall not be placed until the sub-surfaces are at the required standard. Unduly compacted areas (such as in traffic routes) shall be loosened by ripping or discing (to the full depth of a spade) prior to final levelling in readiness for topsoiling.

Topsoil shall not be placed and spread when the ground or topsoil are excessively wet or in a condition which would be detrimental to the work.

Final grading of the top 100mm to 150mm of topsoil shall be carried out to ensure a true specified level and slope and to avoid dishing or other depressions where water may collect.

The placed topsoil profile shall allow for subsidence so that after settlement the levels shall be the final specified levels.

The Engineer shall inspect final topsoil / soil mix depths to ensure they meet specification, after placement and prior to planting.

#### 5.10 Imported Topsoil

The contractor is to co-ordinate with the Engineer early in the project regarding both the volumes of topsoil required for planting and the specifications for the imported topsoil. Imported topsoil shall be carefully managed to avoid any contamination, seeds or undesirable material being brought to site.

#### 5.11 Final Grading

The Contractor shall ensure that –

*All earthworks shall have been shaped to integrate the works with the surrounding landform.*

*All areas to be planted (or grassed) shall have been contoured when the topsoil is reasonably dry and workable to smooth flowing contours with falls for adequate drainage and, removing all minor hollows and ridges.*

#### 5.12 Inspections

The Contractor shall notify the Engineer for inspection of the works following:

*Set out for clearing*

*On completion of the clearance*

### 6. Completion

The Site Preparation will be deemed complete when all areas are in a clean and tidy condition ready for planting.

## QUALITY ASSURANCE GUIDE

**The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.**

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing
Section C 4.2.1	Herbicide sprays to be used including licenses and consents for their use and storage. Type, quality of spray product to be available on request. Herbicides within the stream zone are not to be used unless directed by the Engineer	On approval by the Engineer and prior to application

### B. MATERIAL TESTING

Clause	Test	Frequency

### C. ONSITE TESTING

Clause	Test	Frequency
Section C 3.2	Inspect and assess existing ground conditions to be planted type.	Prior to planting



**D. HOLD POINTS**

<b>Clause</b>	<b>Test</b>	<b>Frequency</b>
Section C 4.2	Vegetation clearance	Prior to clearance

**E. INSPECTIONS**

<b>Clause</b>	<b>Inspection</b>	<b>Frequency</b>
Section C 4.2	Vegetation to be retained inspected by the Engineer.	Once marked on site, prior to fencing off.

## Section D: Plant Pest Control and Animal Pest Control

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### 1. Scope

There is a requirement for vegetation management and for plant pests to be controlled (unless otherwise stated in the contract) across the whole project area, including the Waitangi stream mitigation planting area. Before any work commences an assessment of pests shall be undertaken. Prior to planting and earthworks, the contractor shall scope pest levels and establish control methods. Plant pests shall be controlled across the project during the contract works and during the Defects Liability and Maintenance Period (unless otherwise stated in the contract). The goal shall be plant pest control Project wide, (unless otherwise specified).

Territorial authorities (e.g. Regional councils) have pest management strategies which outline priorities for each region in relation to Plant pests and Animal pests. Species identified are required to be controlled as part of a comprehensive and integrated programme of pest and weed control operations. This work generally forms part of the site preparation and landscape component.

Ongoing proactive pest control management system be put in place throughout the project with best practice poison bait stations and trapping. Servicing should occur once every 6 weeks and would be subject to review upon contractor's assessment of bait take to the engineer.

Hunting operations of any sort should be coordinated with WCC approved contract hunters due to the recent update in restrictions of fire arms use on council land. The Engineer may wish to coordinate any hunting operation through the regular hunting operations of WCC and will be independently invoiced for each job as it is requested.

#### 1.1 Management areas

The area of control can be defined as:

*The Waitangi Stream mitigation planting area, in association with the full extent of the main contractors works area, which covers management of the entire footprint of the works, this exclude requirements to manage peripheral areas (outside of the extent of works) within the designation, unless otherwise specified.*

### 2. Related Documents

Refer to Section A: General of this Specification

### 3. Materials

Generally, materials required for pest control shall align with the site-specific control methodology. All materials shall be targeted to the species, project context (including sensitive areas) and be used in accordance with best practice and Territorial authorities (e.g. Regional councils) advice.

### 4. Preparation

#### 4.1 Pest Assessment

Any pest assessment and control in the mitigation planting area shall be coordinated and included in the main contract works which are described below:

An assessment of plant and animal pests shall be undertaken prior to any works commencing. This assessment shall outline the baseline pest populations to be controlled throughout the contract works and include a list of pest species (including animal pests (if required) and plant pests including priority pests from the RPMS).

*Note: The baseline assessment would be used to evaluate progress and levels of control during the works and at completion.*

#### 4.2 Methodology and Programme

A detailed methodology and programme report shall be submitted by the Contractor for approval by the Engineer prior to

site preparation and planting. The methodology and programme shall address pests identified in the pest assessment. Including the following:

- (a) A plan or map detailing the extent of the site preparation/clearance areas to be managed, and the location of any sensitive areas;
- (b) Types of chemicals (herbicide, fungicide, baits) that are likely to be used and the times of year that any control operations are likely to occur;
- (c) Strategies used to avoid contamination of sensitive areas. This could include specific application techniques, no-spray buffer zones, a list of people who need to be informed of spraying operations.
- (d) The identity of the person likely to be undertaking the work and confirmation of their current qualifications/certifications.
- (e) Particular weather conditions which may increase potential drift hazard; and
- (f) Indication of agrichemicals to be used that may present a specific hazard
- (g) A critical path timeline capable of showing progress through the contract period up to the end of the Defects Liability and Maintenance Period.

This methodology and programme shall be prepared using critical path techniques and shall be capable of showing actual progress through the project.

The Contractor shall then undertake the pest control works in general accordance with the approved methodology and programme. Where necessary, alternative programme dates shall be set to meet the pest control strategy.

### 4.3 Experience of Staff

#### 4.3.1 Landscape / Plant Pest contractors

All plant pest control works shall be in accordance with the accepted horticultural practices and shall be carried out by suitably qualified and experience contractors in relation to use of herbicides Growsafe certified or an equivalent shall be required.

#### 4.3.2 Animal pest contractors

All animal pest control works shall be undertaken by staff suitably qualified and experienced in the handling (including holding a controlled substance licence CSL) and application of pesticides and traps, and familiarity with the Hazardous Substances and New Organisms Act 1996, the Biosecurity Act 1993 and Wild Animal Control Act 1977.

The Contractor shall take all prescribed steps contained in the Health and Safety in Employment Act 1992 (HSEA) and the Resource Management Act 1991 (RMA) to ensure that no act or omission is in breach of any duty or obligation of the Contractor under the said legislation.

#### 4.3.3 Insects

Wasp nests and bees may be an issue in places; eradication and control measures shall be undertaken by staff suitably qualified and experienced in handling and application of pesticides and traps.

### 4.4 Preparation for Plant Pest Control

#### 4.4.1 Pest plant removal

Plant Pest control shall be undertaken during site preparation and prior to planting, with all landscape areas being cleared of pest plants prior to planting.

#### 4.4.2 Disposal

Unless otherwise specified, the Contractor is responsible for the disposal off site all pest plant materials in a safe and legal manner in accordance with local authorities' guidance.

### 4.5 Preparation for Animal Pest Control

Where animal pests are a risk to the Project or have damaged the planting, the Contractor shall be responsible for

notifying the Engineer. Lack of notification by the Contractor may result in the Contractor being responsible for damage caused by pests.

The Engineer may advise the Contractor on steps to control the pests to reduce the damage caused by pests. Any of the following measures may be requested to be implemented;

*Capture and relocate birds (permit required)*

*Apply Pindone pellets to control rabbits and possums (or similar and approved pest control measures)*

*Trapping.*

#### 4.5.1 Consents

The Contractor is responsible to apply for and obtaining approval from the Medical Officer of Health of the District Health Board, to legally execute the pest control works. The consents shall include (but not be limited to) the following consent requirements;

*Application for Medical Officer of Health Permission*

*Medical Officer of Health Permission to use Controlled Pesticides Department Of*

*Conservation (DoC) consent*

*Local Authority*

#### 4.5.2 Notification, Hoardings and Signs

The Contractor shall supply install, manage and maintain all Health and Safety Warning signs as required, for the duration of the Contract Works and in accordance with the Application for Medical Officer of Health Permission to lay Controlled Pesticides.

All necessary warning notices and other signage shall be erected for the duration of the pest control and the pesticide caution period, in accordance with the consent(s).

The Contractor shall inform neighbouring landowners of the proposed pest control programme at least 24 hours prior to pesticide applications and again on completion of the programme. Notification shall be in the form of a letter delivered to the property occupier, providing the following details;

*Pests to be controlled*

*Poisons to be used Drop*

*locations Application dates*

*Name of Contractor's representative with 24 hour contact phone number.*

Notification, Hoardings and Signs:

*Pests to be controlled*

*Name of Contractor's representative with 24 hour contact phone number*

*Poisons to be used Drop locations*

*Application dates*

The Engineer to the contract and other contractors working on site shall also be formally informed of Animal Pest and Predator Control activities at least 24 hours prior to chemical applications and/ or professional hunting operations and again on completion of the programme

## 5. Workmanship

### 5.1 Site preparation Spraying

Multiple applications of herbicide may be required in order to achieve weed control. In addition, a variety of weed control measures may have to be implemented in order to achieve adequate control of the wide range of weed species present on the site. Spot spray and blanket spray methods may apply.

The Contractor shall provide details of the proposed herbicide and spraying method to the Engineer prior to spraying, for example:

Site Preparation Table (Example only) :

Material	Location	Height	Clearing Details (example only)
Grass and weeds	Open planting	NA	Spot spray 1.0m <sup>2</sup> area around plant locations – 2 applications may be required in certain locations
Gorse	Open planting	All	Cut and mulch, and spray regrowth, with approved herbicide for gorse control; marker dye to be added to confirm spray coverage. Monitor any regrowth closely; more than one spray application may be required.
Blackberry	All		Cut and mulch, and then spray regrowth with approved herbicide in Spring. Monitor any regrowth closely; more than one spray application may be required.)
Convovulus	All		Spray active growth with approved herbicide with marker dye added; monitor any regrowth closely and re-spray any regrowth.
Tradescantia	All		Spray with approved herbicide; monitor any regrowth closely and re-spray any regrowth.  Any herbicide control shall be only under the direction of the Engineer

## 5.2 Spraying operations

### 5.2.1

The Contractor shall remove and control plant pests regularly throughout the contract and maintenance period. With all planted areas kept plant pest free to the extent that perennial weed species are eradicated and annual weed species are well controlled so to not compete with any planting or pose a long term risk to plant establishment.

To attain a plant pest free area prior to planting, the existing weed growth may require cutting, trimming and removal prior to herbicide application. Any vegetation exceeding 200mm in height shall be cleared or mown prior to application of herbicide.

All vegetated areas to be planted shall be sprayed with 2 to 3 applications (as required) of approved herbicide two weeks apart and two weeks prior to final clearing for planting.

Grass in areas that are to be planted shall be eradicated by an application of translocated herbicide.

Spraying of herbicides shall not take place in windy conditions (refer to GrowSafe manual). The Contractor shall be responsible for reinstating any damage caused by any drift of spray.

All spraying equipment is to be carefully calibrated to prevent over or under dosing

No herbicide containers, empty or full, are to be left unattended on site at any time.

Where herbicide with a residual effect has been applied the Contractor shall ensure that no planting proceeds until the exclusion timeframe specified by the manufacturer has passed.

Herbaceous weeds/ pest plants shall be removed by hand removal where possible. Spraying of weeds with an approved organic herbicide may be required for persistent weeds, however the visible portion of the weed shall be removed as soon as the weed has died.

Additional pest plant control may be required in spring when the ground warms and seeds in the soil germinate.

Saplings/ re-growth of all exotic trees and woody shrubs shall be cut and the cut stumps immediately treated with an appropriate herbicide on an ongoing basis.

### 5.2.2

To avoid spray drift and damage to vegetation to be retained shall be sprayed in the summer/autumn taking care not to damage plants being retained.

Plant pest control in areas of existing native vegetation shall be sprayed in the summer/autumn taking care not to damage existing native species being retained.

Where a translocated herbicide is used around plants in leaf which are to be retained, an adequate guard must be used, or a suitable hood applicator used for spot spray treatment.

Care shall be taken to avoid disturbances of root systems and excessive compaction of existing vegetation or planting areas.

The Contractor shall remove all arising, litter and other debris and dispose off site at the end of each day.

## 5.3 Animal Pest Control Operations

### 5.3.1 Control operations

The control operations for Animal Pests shall be subject to the requirements of the project these shall be outlined within the Contractor's methodology.

### 5.3.2 Carcass Removal

The Contractor shall collect carcasses, especially during all professional hunting operations, and throughout the Contract Period, and dispose of carcasses at licensed landfills.

### 5.3.3 Animal Pest Monitoring and inspections

Where portions of the Contract Works are subject to the approval by the Engineer or Engineer, the Contractor shall ensure that they have been completed to the required standards before seeking approval.

The Contractor shall notify the Engineer of the works completed for example, following the set-up of bait stations and predator control traps. Inspection may be requested at any point during the contract.

### 5.3.4 Health and Safety

The Contractor shall include in the site-specific Health and Safety Plan, details demonstrating compliance with the requirements with the Hazardous Substances and New Organisms Act 1996, the Biosecurity Act 1993, Wild Animal Control Act 1977 and all other relevant legislation.

The Contractor shall provide all necessary Health and Safety equipment, warning signage requirements. The contractor shall hold all licences and approvals required to undertake the full scope of the works.

The Contractor shall be responsible for controlling the manner and methods of its operations and shall be directly responsible for the health and safety of its employees while on the site. The Contractor must comply with the requirements of the site Health and Safety Plan(s) and the Hazardous Substances and New Organisms Act 1996, and Biosecurity Act 1993, and Wild Animal Control Act 1977.

### 5.3.5 Ecology considerations

Where native fauna (e.g. native reptiles) are required to be captured from the area prior to control works, no works shall be undertaken until an instruction to proceed has been issued by the Engineer.

## 6. Completion

All plant pest control and/or animal pest control works shall be monitored to ensure control methods have achieved the outcomes sought, against the original baseline infestations.

The Contractor shall remove all rubbish, signage, materials and spoil from the site on completion of the works, leaving the site in a clean and tidy condition.

### 6.1 Plant Pest Control Monitoring & Acceptance

The Engineer shall inspect the area prior at practical completion to confirm the Contract has met requirements. This inspection shall be attended by the Contractor to confirm acceptance of the liability relating to the survival of the plant materials through the Defects Liability and Maintenance period.

Any areas requiring further pest control under the contract or that are not satisfactory controlled as determined by the Engineer shall be addressed by the Contractor.

#### 6.1.1 Monitoring and inspections

The Contract Works may be inspected from time to time by accredited representatives of the Principal and/ or public authorities (in relation to any consent conditions). Should such representatives ask for information in connection with the pest control component of the Contract Works or its progress, the Contractor shall give to them freely and willingly, any details within its knowledge.

#### 6.1.2 Assurances

Prior to Practical Completion of the site preparation portion and 6 monthly following planting the Contract, shall provide assurances that the plant pest control has been undertaken and meets the Contract Specifications.

### 6.2 Animal Plant Control Monitoring & Acceptance

The contractor shall provide the Engineer in conjunction with Parks, Sport and Recreation (WCC) with all necessary material to assess the pest control works. This shall include but not be limited to: Day sheets (site visit date, time, area covered and health and safety matters), evidence of control operations such as bait take data, trapping data, carcass disposal data, GPS track logs etc. Below are a list of potential pests to the site and suggestions of control:

Species	Location	Clearing Details (example only)
Rodents (rats and mice)	All	Trapping or using best practice poison bait stations with Brodificoum 0.05g bait blocks
Rabbits/Hares	Open areas and Grassy areas	Poisons to be used in fenced off areas only. Hunting through WCC approved
Wasps	All	Control proactively through Vespex during Feb to April or Permex reactively upon nest identification
Mustelids (Stoat and weasel)	All	Use weka length DOC200 traps with Dried rabbit lure or GoodNature A24 traps with stoat lure.
Possums	All	Bait stations placed at 1 per hectare

#### 6.2.1 Assurances

Prior to Practical Completion of all or a portion of the Contract, the Contractor shall provide assurances that the pest control works have been undertaken and meets the Specifications.

### 6.3 Practical Completion and Maintenance Period

The Contract Works shall be deemed to be Practically Complete when all required plant pest and animal pest control works are complete as specified in the contract and this has been confirmed in writing.



## QUALITY ASSURANCE GUIDE

**The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.**

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing
Section D 4.1	Pest plant and animal assessment.	Prior to any works commencing.
Section D 4.2	Pest plant and animal management methodology and programme	Prior to site preparation.
Section D 4.5	Notification of risk of or actual animal pest damage to planting and steps to control pests.	As soon as damage identified or becomes evident.
Section D 4.5.2	Informing neighbouring landowners in writing of proposed pest control programme and notifying personnel working on site.	At least 24 hours prior to pesticide applications and on completion of the
Section D 6.1	Confirmation in writing that the pest plant control works have been undertaken in accordance with the Specifications.	Completion of the site preparation portion and 6 months following planting
Section D 6.2	Confirmation in writing that the pest animal control works have been undertaken in accordance with the Specifications.	Prior to Practical Completion of all or a portion of the contract works.

### B. MATERIAL TESTING

Clause	Test	Frequency

**C. ONSITE TESTING**

Clause	Test	Frequency

**D. HOLD POINTS**

Clause	Test	Frequency

**E. INSPECTIONS**

Clause	Inspection	Frequency
Section D 6.1	Engineer to confirm pest control requirements have been met.	Prior to Practical Completion.

## Section E: Plant Propagation

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### 1. Scope

This section of the Specification covers the collection of seeds and parent cuttings, propagation, growing-on and hardening of plant materials.

All planting shall include quality plant stock, true to form and shape with healthy signs of growth.

### 2. Related Documents

Refer to Section A: General of this Specification

### 3. Materials

#### 3.1 Plant Materials

Plant materials shall mean plants of all descriptions required for the project in accordance with the plans and as specified.

As required by the consent conditions, all indigenous plant species shall be sourced as far as practicable from the Wellington Ecological District.

All plant material shall be of the highest quality nursery stock, true to name and type. The plants shall be of good form with a well-developed root structure, and well-shaped stem or trunk and head (foliage).

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

All plant material shall be free from pests, diseases and physiological disorders.

All plant material may be grown on in poly bags of the specified PB size or pots of the specified pint or litre grade.

All plant material shall be of the minimum size and grade specified in the plant schedule at the time of delivery.

Plant heights shall be to the minimum sizes for a given PB size or litre grade as described in the drawings and plant schedule.

Legible labels shall be attached to each plant delivered to site as a separate unit, or 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.

#### 3.2 Potting Medium - Biosecurity requirements

The Contractor shall ensure plants are propagated in a proprietary brand of potting medium which complies with New Zealand's biosecurity requirements. If necessary, alternative potting medium should be submitted to the Engineer for approval.

#### 3.3 Genetic Origin

Where required by Consent conditions, all plants shall be sourced from the Wellington Ecological District as far as practicable. They shall be propagated from seed collected from naturally occurring populations of plants growing in the area. The seed shall be collected in accordance with recognized and accepted trade practice. The Eco-sourcing methodology and locations of seed utilized shall be confirmed by the supplier to the Engineer, in a signed statement.

In summary, the supplier of eco-sourced seed shall adhere to the following:

- Arrange permits and approvals for the collection of seed from naturally occurring plant populations in the Wellington Ecological District (i.e. WCC, GWRC, Department of Conservation, landowners);
- Collect seed at an optimum time to ensure seed viability and quality;
- Accurately record data on the details, location, and date of collection;
- Label, clean and store the seed collected under appropriate conditions to maintain seed germination viability;
- Conduct germination trials of batches of seed collected to help assess seed viability;
- Maintain a completion record of information on the collected seed in a suitable format that enables the identification and tracking of plants from collection, through to subsequent propagation and installation.

### 3.4 Biosecurity

A number of unwanted organisms may pose a threat to the ecology of areas within the project network and eco-system health (e.g. Argentine ants).

The Contractor shall meet any obligations under the Biosecurity Act 1993 to prevent the spread of such unwanted organisms.

### 3.5 Rainbow Skinks

The Department of Conservation (DOC) are working to prevent rainbow skinks from spreading and occupying habitat of New Zealand's lizards.

Where plant stock is supplied from a nursery in an area that has rainbow skink:

- potting mix is a favoured breeding habitat. Check the pots for any small white eggs, all equipment, goods or other freight that is to be shifted to the planting site is to be checked for rainbow skinks
- any plants found harbouring rainbow skinks or evidence of their presence (eg eggs) shall be rejected by the Engineer

Where an issue arises, the Engineer reserves the right to reject plants on site at the nursery

### 3.6 Fertilisers

Fertiliser for container grown plants shall be of the types and at the rates that are normal industry practice for the species, for the stage of growth and the method employed.

### 3.7 Substitution

There shall be no substitution of plant species without the written approval of the Engineer.

## 4. Preparation

### 4.1 Seed/Cutting Collection

The Contractor shall ensure sufficient seed is collected or plant stock to propagate the required plant numbers, with due allowance for losses resulting from poor germination or other propagation failures.

Seed or plant stock shall be collected from healthy, vigorous, young plants with good form that are growing in a similar environment to the planting site.

The Contractor shall provide a Method Statement detailing the proposed method of collection of seed or cuttings. Prior to collection of this source material, the Contractor shall advise the Engineer to review the methodology and observe the collection of the source material.

On completion of a season's collection of source material, the Contractor shall provide a certificate certifying that the

method by which the source material is collected and the location of the source, are in accordance with the approved methodology.

## 5. Workmanship

All workmanship shall be in accordance with the best horticultural practice. All work shall be carried out by staff experienced in plant propagation and supervised by a qualified horticulturalist.

### 5.1 Method of Propagation

Those plants which are normally propagated by seed shall be grown by seed in preference over cuttings or asexual propagation. Tissue Culture propagation methods shall not be accepted.

The method of production (i.e. seed/cutting) shall be stated in the Method Statement to be approved by the Engineer.

The plant material may be grown in either poly bags or pots. These details shall be provided in the Method Statement to be approved by the Engineer.

### 5.2 Condition

All plant material shall be well hardened off and acclimatised to the site conditions for the proposed delivery area, prior to delivery.

### 5.3 Inspection

All plant material shall be inspected by the Engineer prior to delivery to ensure it meets specification. Should any plant material be grown on a sub-contractual basis then the Contractor shall arrange an appropriate itinerary of inspection at the request of the Engineer. This inspection shall be attended by the Contractor for them to confirm acceptance.

Final inspection of plant materials by the Engineer shall be undertaken on arrival of materials on site.

At final Inspection the Contractor shall have supplied all plant material to site in accordance with the Specification and Plant Schedule for the phase(s) of work being undertaken.

### 5.4 Operations

All horticultural operations, including regular potting-up, control of pests and diseases, watering, shade, frost and wind protection shall be undertaken in a method that ensures healthy, vigorous stock that is hardy to the environmental conditions expected on site.

All growing-on operations shall be programmed to include an appropriate 'hardening-off' period prior to despatch. (note: Hardening off refers to when plants grown in a nursery environment have been subjected for a sustained period to the range of environmental conditions similar to those that will be encountered in the area they are to be planted. Once installed, hardened plants should generally be able to withstand the prevailing environment).

### 5.5 Spares

The Contractor shall always make allowance throughout the Contract Period, for a quantity of each plant species in excess of that scheduled. This is to allow for plant losses. Such plant losses shall be covered at the Contractor's expense.

On completion of the propagation contract, the Contractor shall offer to sell any additional plants to the ongoing maintenance contractors at the tendered rates for those plants. If the ongoing maintenance contractors choose to not purchase the plants, the Contractor may sell or dispose of the additional plants at its discretion.

### 5.6 Inspections of the propagated plants

The Contractor shall notify the Engineer for inspection of the works following:

*Propagation*

*Upon delivery of plant materials*

The Engineer may at its discretion, inspect the plants during any phase of the eco-sourcing of parent material or seeds, propagation or on growing.

## 5.7 Reporting

The Contractor shall keep records on the progress of plant propagations and provide copies of these to the Engineer at the end of each three month period (dependent on the scale of plant propagation). These records shall include;

*Inventory of seeds and plants that have been eco-sourced including parent plant details of location (e.g. GPS locations), height, grade and condition.*

*Plant materials propagated, timing of sowing, potted up date, and size Delivery process*

*Holding areas on site, including description of area, available water supply and security Progress for each species in relation to programme for delivery date,*

*Any other matters which affect the propagation, growing, supply and storage of the plant materials.*

## 5.8 Pruning - General

Immediately prior to delivery, all shrubs shall be pruned by skilled staff as necessary to conform to the best horticultural practice appropriate to the type of plant.

Operations are to be carried out using sharp clean implements to give a clean sloping cut with one flat face. Ragged edges of bark or wood are to be trimmed with a sharp knife.

## 5.9 Timing

The plants shall be ready for delivery in the planting season required. The dates for the plants to be ready shall be confirmed by the Engineer. Generally the planting season begins 1st May and ends 31st August, but may be extended 2 weeks either side of the core period where seasonal conditions allow.

## 5.10 Delivery

The method of transportation is at the discretion of, and responsibility of the Contractor.

Plants shall be carefully loaded by hand, unless special container arrangements for mechanical handling have been provided and approved by the Engineer.

No plant material shall be subjected to adverse conditions in transit to the work site. Adverse conditions may include:

*drying-out (even in still, apparently moist air) prolonged*

*heating under humid conditions freezing*

*water-logging physical breakage*

Amongst other factors plant viability can be reduced by crushing, dropping etc. even if no visible physical breakage results. Plants must therefore be handled gently and with care at all times.

All plant material shall be adequately protected from damage during transit.

All plants shall be loaded, stacked and unloaded in such a way that breakage or crushing by the weight of plants above is avoided during loading, transit and unloading. All plant material being transported shall be completely and firmly covered in such a way that there is the minimum draught from the direction of travel. Provision shall also be made to ensure that the load always remains cool and moist.

Where transport is by others, not under the control of the supplier or the Contractor, the sender must ensure that the packaging is adequate to protect the plants whilst in the third party's charge.

All plant material being transported shall be clearly addressed, manageable units, securely packaged to withstand mechanical damage. The packaging must also include sufficient moisture retentive material around the roots to ensure that they remain cool and moist until they are delivered to the purchaser.

The Contractor (supplier) shall provide documentation showing the species, grades and quantities of all plant material being transported.

### 5.10.1 Plant delivery planning

It is essential that:-

*The planting specifications are prepared in detail to suit the requirements of the project phases and delivery locations.*

*The planting is planned, as far as possible in advance of the planting season (begins 1st May and ends 31st August, however depending on the seasonal conditions planting may occur during a two week 'shoulder' at both ends of the core planting season) and plants are propagated and available in the sizes specified.*

*Site preparation has occurred, and the soil conditions are suitable in advance of planting.*

*Plant supply is to be co-ordinated with the plant supplier so that planting can occur upon delivery, during the planting season.*

*Adequate facilities are available for the receipt and storage of plants, including a conveniently situated and suitable water supply.*

*Suitably qualified and experienced contractors shall care for plants and undertake planting and maintenance. Quality control checks shall be undertaken as per the specification.*

#### 5.10.2 Temporary storage

Generally, plants shall be planted upon delivery to site. If on site storage is required, the following shall apply: Plants shall be stood upright on well-drained, weed-free ground. All plants shall be adequately watered prior to and shall be protected from potential wind damage and sun scorching. Tall plants will require support to prevent them blowing over. Species susceptible to frost damage shall be given temporary protection.

## 6. Completion

### 6.1 Acceptance

The Engineer shall inspect the plants on site following transport to confirm they meet the Contract requirements. This inspection shall be attended by the Contractor to confirm acceptance of the liability relating to the planting and ongoing survival of the plant materials.

At inspection the Contractor shall have supplied all plant material to site in accordance with the Specification and Plant Schedule. All plant material to be undamaged by the transport, healthy, in a weed free state, free of pests and diseases and true to name and size as per the Schedule.

Any plants that are dead, dying, not true to name or size as specified, or not in satisfactory growth as determined by the Engineer shall be removed and replaced by the Contractor at their own expense.

### 6.2 Assurances

Prior to Practical Completion of all or a portion of the Contract, the Contractor shall provide assurances that the Plants delivered to the site meet the Contract Specifications and confirm authenticity of eco-sourced plant stock, if required.

### 6.3 Completion

Completion of the Contract shall be deemed to be acceptance on site of the plants in the correct numbers, species and quantities as specified in the Contract.

## QUALITY ASSURANCE GUIDE

**The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.**

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing
Section E 3.3	Confirmation in writing of eco-sourcing methodology.	Prior to seed collection.
Section E 4.1	Certificate confirming seed collection was done in accordance with approved method statement.	Annually at completion of seed collection.
Section E 5.1	Plant propagation method statement.	Prior to commencement of propagation.
Section E 5.5	Offer to sell to WCC any plant spares.	Completion of plant propagation contract.
Section E 5.7	Provide copies of plant propagation progress reports.	Each 3 month period.
Section E 5.10	Documentation showing species, grades and quantities of all plant material being transported to site.	Prior to transport.
Section E 6.2	Assurances in writing that plants delivered to site meet eco-sourcing requirements as specified.	During seed collection and propagation and prior to plant delivery on site.

### B. MATERIAL TESTING

Clause	Test	Frequency
Section E 3.3	Germination seed trials to assess seed viability.	Progressively as seed is collected.



**C. ONSITE TESTING**

Clause	Test	Frequency

**D. HOLD POINTS**

Clause	Test	Frequency

**E. INSPECTIONS**

Clause	Inspection	Frequency
Section E 5.3	Inspection of plants at nursery.	At plantable size prior to delivery.
Section E 5.3	Final inspection of plants	Arrival of plants on site.

## Section F: Planting

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### 1. Scope

The scope of planting works shall include the preparation for planting, supply of plants, planting, staking (of trees, if required), fertilising and mulching of all plant material. The installation of a CombiGuard sleeve with wool mat pegged in place may be used to protect the plants from tradescantia growth, as a variation to this specification. Weed control, to ensure that it does not suppress new plant growth, shall be continued at all times.

### 2. Related Documents

Refer to Section A: General of this Specification.

### 3. Materials

#### 3.1 Plant Materials - General

Where required by Consent conditions, all native plants shall be sourced from the Wellington Ecological District the works site is within. Refer to Section E: Plant Propagation, within this Specification for requirements.

Plant materials shall be first class specimens of nursery stock, being:

*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 pests and disease.*

*The roots shall have a high percentage of fibrous roots that are just touching the edge of their containers. Plants with roots that are wound round their containers in circular fashion shall be rejected. Plants shall be free from disfiguring knots, bark abrasions, wind, or freezing injury or other disfigurements and shall bear evidence of proper pruning.*

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

All plant material shall be available for inspection by the Engineer, prior to planting. All trees shall be inspected and approved at source by the Engineer prior to delivery.

Legible labels shall be attached to each plant delivered to site as a separate unit, or 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.

In exceptional supply shortages, plant substitution may be considered by the Engineer. No substitution shall be made without the written approval of the Engineer. Approved substitutions shall be of similar height and habit to those specified.

Plant sizes are specified by litre bag size (litre grade). Specimen trees may be specified by litre grade, girth or height or a combination of these. Where the Contractor proposes to supply plants in PB (pint bag sizes); the conversion factor shall be 1 pint equalling 0.568 litres. The exact sizes must be shown, so the engineer to the contract is aware of the exact conversion.

#### 3.2 Supply and Possession of Plants

On picking up the plants or at time for delivery of the plants, the Contractor shall inspect all plants to ensure the required quality is provided and that plants have not been damaged in transit. The Contractor shall confirm acceptance of the plants. On acceptance, the Contractor shall thereafter be responsible for the condition of the plants and shall replace dead or unhealthy plants at their own cost.

#### 3.3 Container Grown Shrubs

Container grown shrubs shall be to the container size (Litre grade) specified on the drawings.

Container grown shrubs 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.

### 3.4 Trees – Advanced Nursery Stock

This clause does not apply to mitigation planting.

### 3.5 Stakes and Ties

Enrichment trees may require a bamboo or 25 x 25 pine stake to support the plant until it is established. All stakes shall be driven sufficiently deep enough to secure the plant.

Pine stakes shall be straight pointed: H4 treated *Pinus radiata* stakes 25 x 25 x 1000mm long (or similar, to be approved). The final desired height for the stakes shall be set to ensure ties secure the plant.

Ties shall be 50mm wide Hessian webbing attached to stakes with approved galvanised fastenings (or similar proprietary products, to be approved). Ties and fixings to the stakes shall be sufficiently durable to provide required support to the plants for a minimum of 3 years.

### 3.6 Support structures

No support structures are required for mitigation planting.

### 3.7 Mulch

Mulch is not required because the mitigation planting is riparian planting. A wool mat square may be pegging into place around the plant under direction of the Engineer if weed control is deemed to be required.

### 3.8 Water Generally

All plants shall be thoroughly watered a few hours prior to planting to ensure successful establishment.

The Contractor shall be responsible for providing a suitable water supply for watering plants in the event of unseasonal dry conditions that could comprise plant survival and establishment. Plants shall be watered to the level required for season the planting is programmed for.

Notwithstanding any prevailing restrictions by the local authority on the use of water for any plants, the Contractor shall be deemed totally responsible for making any special arrangements which may be necessary to ensure adequate supply of water for watering of trees and shrubs for successful establishment. In the event of unseasonal dry conditions, the Contractor shall bring to the site sufficient water carts, hoses and sprinklers to provide an adequate water supply to the plant material.

In the interests of good horticultural practice watering shall be sufficient to give 300mm minimum depth penetration and not just surface dampening.

- a. Prior to Planting

All plants shall be thoroughly watered a few hours prior to planting to ensure successful establishment.

- b. After planting

The Contractor shall be responsible for watering all plants as required to ensure their survival

- c. Drought conditions

Lack of availability of water shall not release the Contractor from their 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/or plant replacement.

If during a drought some planting has not been carried out, planting may be delayed by agreement with the Engineer.

### 3.9 Fertilisers

Fertilisers broadcast or as tablets are not required for the Mitigation Planting.

### 3.10 Delivery and Temporary Storage

The Contractor shall arrange for the plants, once brought to site, to be placed in a secure, temporary storage area on site. Plants delivered shall be limited to that able to be planted over the following 3 days.

All plants stored on site shall be watered daily.

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.

If shoots or roots suffer slight damage they shall be carefully pruned and treated with an approved fungicidal sealant. If major damage occurs the plants shall be replaced at the Contractor's expense.

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.

## 4. Preparation

Refer to Section C: Site Preparation and Section F: Topsoil Quality within this Specification.

### 4.1 Cultivation of natural ground prior to planting

Cultivation or modification of existing ground following clearing and ground preparation is not required if the ground conditions are deemed to be suitable for planting by the Contractor and Engineer.

### 4.2 Acceptance of Soil Conditions

All subsoil shall be reviewed prior to planting. Prior to planting the Contractor shall also consider whether the existing topsoil is deficient, or waterlogged.

In the event that the Contractor fails to accept the advice of the Engineer regarding soil problems and remediation, and plants subsequently die due to topsoil conditions or associated effects (e.g. waterlogging), the Contractor shall be responsible for the replacement of those plants.

### 4.3 Setting Out

Prior to planting all plant positions shall be laid out, in accordance with the planting plan. Set out shall recognise the growth and spread of all planting and associated setbacks in relation to the waterway and existing vegetation.

Enrichment tree planting is to occur one season after massed planting. The Engineer is to inspect the setting out of enrichment tree planting to ensure the correct methodology is being used to locate enrichment species amongst massed planting.

The Contractor shall arrange for the Engineer to inspect the setting out. The Engineer may require minor refinement to the design with adjustments to lines, levels and grouping of trees/shrubs locally as the planting proceeds requiring the Contractor's co-operation and agreement.

The Contractor shall not commence planting until the setting out has been inspected and approved. If work is carried out without the prior approval, realignment and re-siting may be required.

## 5. Workmanship

### 5.1 Planting Generally

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.

The base of the planting hole shall be loosened to permit drainage.

Container grown plants shall have the container removed immediately prior to planting. Care shall be taken to ensure that the root ball is not disturbed during container removal or planting.

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 that become accidentally broken off or frayed shall be cleanly cut off from the plant. Damaged roots over 25mm diameter on advanced nursery stock and specimen trees shall be cut back to sound growth and treated with fungicidal sealant.

The Engineer shall regularly check the planting, mulch placement, stakes and ties, progressively as planting is completed.

## 5.2 Timing of Operations

Work shall only be undertaken when the weather is suitable, ie. mild, dull and moist, and when the ground is moist and workable. All planting operations shall be suspended during periods of severe frosts, waterlogging, drought or persistent drying winds.

## 5.3 Pruning - General

After planting, all plants with damaged branches unless rejected, shall be carefully pruned back to healthy wood.

Operations are to be carried out using sharp clean implements to give a clean sloping cut with one flat face. Ragged edges of bark or wood are to be trimmed with a sharp knife.

All pruning waste shall be removed from site.

At the end of the maintenance period, all plant material shall be checked for any dead wood, broken or damaged branches which shall be pruned and removed from the plant.

## 5.4 Riparian planting

### 5.4.1 General

Riparian planting is defined as those areas on with side of the Waitangi and Papawai Streams where revegetation planting will be undertaken. This section shall apply to riparian planting only and is additional to (not instead off) all other clauses within this document.

The extent of riparian planting shall be shown on the drawings.

### 5.4.2 Timing of Operations

Riparian plantings shall be carried out in spring (May through to Late October) when the water temperature is starting to rise

### 5.4.3 Fertilisers

No fertiliser is to be used in riparian plantings.

### 5.4.4 Weed mat

Only biodegradable weed mat shall be used.

## 5.5 Water - General

The Contractor shall be responsible for providing a suitable water supply for watering plants (or water carts if necessary). Plants shall be watered to the level required for season the planting is programmed for.

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 adequate watering of trees and shrubs for successful establishment.

In the interests of good horticultural practice watering shall be sufficient to give 300mm minimum depth penetration and not just surface dampening.

#### d. Prior to Planting

All plants shall be thoroughly watered a few hours prior to planting to ensure successful establishment.

#### e. After planting

The installer shall be responsible for watering all plants as required to ensure their survival

f. Drought conditions

Lack of availability of water shall not release the installer 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/or plant replacement.

If during a drought some planting has not been carried out, planting may be delayed by agreement with the Engineer.

## 5.6 Staking

Stakes shall be driven 600mm into the ground clear of the plant root ball.

## 5.7 Mulch Placement

No mulch Refer to clause 5.5.4 above.

## 5.8 Quality Control

See Section B: Quality Control, of the specification Weed Control

During the Contract Period, the Contractor shall control weeds, which affect the establishment and growth of the plants already installed under the contract. Prior to release of the Certificate of Practical Completion, the Contractor shall remove all weeds within landscape treatment areas. Removal shall be deemed to include the killing of the weed with approved herbicide or removal of the root system.

### 5.11.1

All weed material shall be cut off or sprayed out and left to break down on site. Any large weeds shall be cut to suitable smaller sizes and laid discretely between plantings to break down.

Any seed heads on weeds that are well formed and could potentially germinate shall be removed from site and disposed of in a safe secure manner to an approved facility.

## 5.9 Defects

During the implementation of the planting works under the contract, all defects shall be repaired / replaced at the Contractor's expense. (There are also defects following practical completion, refer Section G)

Defects for which the Contractor is liable prior to issue of Practical Completion include the following;

*Defective plants shall be deemed to be those plants, which in the opinion of the Engineer are dead or dying,  
Vandalised or broken plants or stakes,*

## 6. Completion

### 6.1 Condition on Acceptance

The Contractor shall ensure that any non-conformance with these specifications will be remedied prior to application for issue of the Certificate of Practical Completion. Within any planting project there may be natural attrition of plants which have been planted. Under this contract up to a level of 5% is acceptable as provided for in 6.2 below.

### 6.2 Loss, Damage or Theft of Plants

Loss or damage of plants during the Defects Liability period, shall be made good by the Contractor at its own expense.

Greater than 5% loss or damage of smaller plants (other than to create a bare patch) during the Defects Liability period, shall be made good by the Contractor at its own expense.

A loss of 5% of plants less than (and not including enrichment plants) is deemed to be an acceptable loss, provided the lost plants are evenly spread over the whole of the planted area and are not noticeable as a bare patch. In the event that loss occurs over a confined area, the Contractor shall replace such plants at its cost. The Engineer shall have sole discretion to determine if the plants are evenly spread or in a confined area.

## QUALITY ASSURANCE GUIDE

**The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.**

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing

### B. MATERIAL TESTING

Clause	Test	Frequency
Section F 3.2	Confirmation of any soil remedial measures are needed.	Following weed clearance

### C. ONSITE TESTING

Clause	Test	Frequency

**D. HOLD POINTS**

Clause	Test	Frequency
Section F4	Hold planting until Engineer has approved setting out.	Prior to planting in each sector.

**E. INSPECTIONS**

Clause	Inspections	Frequency
Section F 3.1	Plant quality at plant nursery.	Prior to delivery.
Section F3.2	Plant quality on site.	On arrival at site.
Section F 4	Setting out for Enrichment tree planting.	One or more seasons after stream planting has been completed.
Section F 4	Setting out planting generally.	Prior to planting.
Section F 5	Planting installation, for riparian planting	During installation.
Section F 6	On completion of planting.	Make good loss or damage to planting



## Section G: Defects Liability and Maintenance

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*Note–Defects Liability and Maintenance are 2 separate things:*

Defects liability relates to the contractor making sure the works installed meet the specifications at the end of the Defects Liability Period. The Defects Liability Period for the Mitigation Planting is:

- 5 years for all planting and landscaping. While there may be areas that have achieved the success measures outlined in Designation Condition 33, Wellington Water will still be liable until the end of the five year period so as to ensure the ground conditions are performing as intended.
- NOTE: The Mitigation Planting is part of the overall reservoir construction works and a review must be carried out by a suitably qualified and experienced landscape architect within 3 years of completion on the construction of the reservoir. The review will focus on the revegetation and assess the effectiveness of plant growth, particularly on mechanically stabilised slopes. Where required remedial works shall be undertaken to ensure that planting treatments are successful and have the potential to improve the landscape values of the site. Evidence of this review must be provided to the CMO.

Maintenance relates to works in maintaining the planting during the Defects Liability & Maintenance period.

### 1. Scope

This section of the Specification covers the correction of defects relating to the Waitangi Stream Mitigation Planting works installed by the Contractor together with maintenance of the site during the five-year Defects Liability & Maintenance Period.

*Landscape treatment works include all ground preparation, plant procurement, planting and planting ancillaries.*

#### 1.1 Defects Liability and Performance Criteria

The Contractor shall remedy all defects relating to the planting works, each year during the defects and maintenance period, at the first available opportunity. All planting defects shall be addressed within the planting season (begins 1st May and ends 1st September). The aim of the defects liability is to achieve quality establishment of the projects landscape components.

To ensure that this is the case set out below is the performance criteria for landscape establishment:

- All ground preparation and ground conditions shall support plant growth
- All planting shall include quality plant stock, true to form and shape with healthy signs of growth
- All associated plant ancillaries (such as climber supports, matting, tree stakes and ties) shall meet this specification
- All planting shall be 100% complete at practical completion, with 5% maximum plant loss being acceptable for grades smaller than PB 18 at the completion of the Defects Liability and Maintenance period, provided that the losses are spread evenly throughout the planting and there are not noticeable bare patches
- All specimen trees shall be 100% complete at practical completion, with no loss being acceptable at the completion of the Defects Liability and Maintenance period (by contract completion)
- Planting shall achieve an 80% canopy coverage of the ground at the completion of the Defects Liability and Maintenance period (by contract completion)
- The effects of pest plants shall be managed to ensure the establishment of all plantings and amenity outcomes. Limiting the distribution of pest plants and costly retrospective maintenance across the network is also sought. Consistent control of pest plants is required through the contract period
- All defects shall have been progressively rectified during the defects period and. prior to issue of the Defects Liability Certificate

Defects relating to planting works include reinstatement of the soil profile where ground conditions following earthworks have adversely affected plant establishment, replacement of dead or dying plants, checking and correcting all plant ancillaries, for example, ties loosened to allow for plant growth, stakes inspected and re-fixed or replaced as required (or removed at years 3-5 as sought). The Contractor's responsibility relating to defects liability of planting includes control of pests and diseases in order to maintain the plants to ensure the plantings establish and grow.

## 1.2 Maintenance

In addition to the remedy of defects, the Contractor shall undertake maintenance of the area or of the landscape works regularly throughout the Defects Liability and Maintenance Period. The degree required and frequency is detailed in these specifications.

The objective of maintenance is to maintain plant pest free areas and to encourage the healthy establishment of landscape treatments to a point where the Principal can be assured that there are no inherent defects in the planting stock.

Further to this, in areas of mass planting the objective is to establish a self-sustaining low maintenance planting. Throughout the Defects Liability and Maintenance period the Contractor is to maintain the plants as they adapt to the site conditions and live in the ground conditions beyond the material that was in their plant bags and fertiliser.

## 1.3 Areas of Landscape Maintenance

The area to be maintained shall be the site as defined by the contract. This will depend upon the requirements of a particular project, the extent of the area to be maintained can be defined as either:

*The full extent of the contractors works area, covers landscape maintenance across the entire footprint of the works, this would exclude peripheral areas unless otherwise specified.*

*In all cases landscape maintenance access shall be established, unless otherwise specified.*

## 2. Frequency

### 2.1 Defects

Defects of landscape treatments shall be remedied within a reasonable time of being notified by the Engineer of the defect and shall be completed no longer than one month after notification. Replanting where required to meet a defect shall be carried out annually during the planting season (begins 1st May and ends 31st August), however regional variations may apply). Any defect shall be remedied prior to release of the Defects Liability Certificate.

Watering, pest and disease control associated with defects liability of landscape treatments shall be at a frequency proposed by the Contractor and agreed with the Engineer. The Contractor shall submit a proposed maintenance regime, based on the schedule included as a guide in this document, to the Engineer for approval. If in the opinion of the Engineer, the frequency of maintenance visits proposed is inadequate, the Contractor shall amend the maintenance regime to the satisfaction of the Engineer. The approval of the maintenance regime, by the Engineer, shall not relieve the Contractor of its liabilities with respect to defects, in the event that the planting is found defective.

## 2.2 Maintenance

Maintenance shall be undertaken in accordance with the following schedule, which is provided as a guide. The final maintenance work in each task shall be completed immediately prior to release of the Defects Liability Certificate.

LANDSCAPE TREATMENTS MAINTENANCE SCHEDULE			
GROWING SEASON			
SPRING	SUMMER	AUTUMN	WINTER
<b>TREES, SHRUBS AND GROUNDCOVERS</b>			
Staking	Monthly – As Required		
Trimming/foilage reduction	Monthly – As Required		
Fertiliser			
Weed Control	Three monthly		
Watering/ Irrigation	As required During Dry Periods		
Replacement	Annually		
Weed Control	Three monthly		
Replacement	Annually		
<b>GRASS</b>			
Mowing (specifier to input mowing requirements to WCC setting)			
Fertiliser			
Weed Control			
Over Sowing			
<b>LITTER REMOVAL</b>			
Removal	Monthly		
<b>MULCH</b>			
Top Up			

## 2.3 Responsive Maintenance

In addition to the routine maintenance of landscape treatments programmed above, responsive monitoring and repairs are required as necessary. These should be carried out as follows:

- Following a storm event,*
- Following prolonged dry or wet periods,*
- If damage from animal pests occurs*

The contractor shall visit the site and report back to the Engineer for confirmation of any actions required to address issues arising.

## 2.4 Notification of Defects Liability/Maintenance Visits

The Contractor shall supply to the Engineer a maintenance schedule which details the location and dates of proposed visits and detail of work to be undertaken. In addition, the Contractor shall notify the Engineer immediately prior to those visits being made, the Engineer shall attend to make all necessary inspections.

## 2.5 Landscape – Defects

The Contractor shall check for the following defects in accordance with the maintenance schedules above (or as notified by the Engineer) and remedy as necessary at the Contractor's expense.

## 2.6 Top soiling

Any settlement or slipping shall be made good. All surfaces shall be reinstated to originally specified condition. Topsoil used for levelling shall be uncontaminated, dry, screened, imported topsoil meeting the requirements for imported topsoil as specified in the Contract Specification.

## 2.7 Removal of Temporary Works

Prior to issue of the Defects Liability Certificate, the Contractor shall remove all temporary fencing or other works provided to protect the works during the Defects Liability Period or during the establishment of the planting/grassing. Areas affected by the removal of the temporary works shall be made good.

# 3. Landscape – Maintenance

The Contractor shall undertake the following maintenance works in accordance with the specified maintenance programme. The maintenance work is additional to the remedy of defects.

# 4. Landscape Treatment (planting, grassing) - Defects

## 4.1 Planting Defects

Any material or plant that is found to be defective (e.g. does not show leaf or make adequate growth) during the Defects Liability Period from any cause other than vandalism, shall be replaced at the Contractor's expense. If there is significant plant mortality within a given area or of a certain plant species the contractor shall review the defects with the Engineer, this may result in replacements with a different species.

Planting shall be done to a standard that is fit for purpose. If poor growth of plants is attributed to the ground preparation or any associated horticultural operation that is within the control of the Contractor, then the Contractor shall be liable for plant replacement and any other associated costs.

Where the Contractor does not advise the Engineer within one week of becoming aware, that vandalism of plants has taken place, any damage or plant die off shall be deemed to be a defect.

Broken or damaged stakes and ties shall be replaced as soon as practicable. Damage to the plants resulting from delays in replacing plant supports shall be made good at the Contractors expense. Refer to the clause relating to vandalism at the end of this Specification.

The Contractor is responsible to ensure that plants installed, survive and grow. Water is essential to achieve this. As part of the Contractor's work relating to defects liability, the Contractor shall water the plants installed as frequently as necessary to achieve this obligation (refer to clause 2.1 above relating to *Frequency: Defects*).

The Contractor shall inspect the landscape works no less than monthly to confirm the health of the plants, existence of pests or diseases or vandalism. The Contractor shall control pests, diseases or repair vandalism as directed by the Engineer, as a Variation.

#### 4.2 Riparian Area Defects

Given the nature of planting in riparian zones, it is expected that there will be some weeds present. Manual release of plants is likely to be required in these areas because the use of herbicides in water zones is restricted. Consequently, it is acceptable that some weeds species may be present providing these do not inhibit or compromise the growth of riparian species.

#### 4.3 Grassed Area Defects

Grass is not included in the Mitigation Planting

#### 4.4 Replacement Plants

Plants used to replace defective plants, shall be reviewed to ensure that the species are suitable. Replacement planting shall be of a similar size to those originally specified, supplied and approved, unless otherwise agreed between the Contractor and the Engineer. 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 plants and materials.

Dead or unhealthy plants shall be replaced, within the immediately following planting season of the Contractor being aware of this condition of the plants. Any plant which is found to be defective (e.g. does not show leaf or make adequate growth) from any cause other than vandalism (See below), shall be deemed to have deteriorated through poor installation and/or poor maintenance and shall be replaced by the Contractor, at their expense.

The Contractor shall be responsible to ensure replacement plants survive and grow in accordance with these Contract Specifications.

Replacement of plants, which are damaged through vandalism, may be replaced as a variation at the discretion of the Engineer.

### 5. Landscape Treatment (planting,) - Maintenance

#### 5.1 General Maintenance

General maintenance shall include watering, weed removal, plant trimming, cultivation, insect and disease control, checking stakes and ties, pruning and other accepted horticultural operations to ensure normal and healthy plant establishment and growth and generally keeping the area neat the tidy.

#### 5.2 Watering

The Contractor shall water all plants over periods of dry weather as part of the Contractors obligation relating to Defects Liability. In addition to the defects liability requirement to ensure the plants survive and grow, the Installer shall undertake additional watering as necessary.

Water shall be applied until the top 200mm of topsoil around each plant is saturated.

Watering should not be undertaken during the hot part of the day. Watering nozzles shall be fine rose or sprinkler heads to prevent damage growth areas of the plants.

#### 5.3 Weed Control

The Contractor shall remove and control weeds regularly throughout the period of maintenance. Removal of weeds at the end of the Defects Liability/Maintenance Period only is not acceptable.

All cultivated planted areas shall be kept weed free to the extent that perennial weed species are eradicated and annual weed species are well controlled. Care shall be taken to avoid disturbances of the shrub roots and excessive compaction of the bed surface. The Contractor shall remove all arisings, litter and other debris and disposed off site at the end of each day.

Weeds shall be removed to best horticultural practice and in accordance with designation requirements. Spraying of weeds with an approved herbicide will only be allowed under special conditions. Generally weeds shall be cleared by hand in the Mitigation Planting area. Focused weed control shall be required in spring when the ground warms and seeds in the soil germinate. Herbicide application shall be spot sprayed using a protective spray nozzle/cone. Chemicals shall be selected to target weed species and avoid damaging any adjoining vegetation through spray drift or run-off.

#### 5.4 Fertiliser

Slow release fertiliser is to be broadcast onto planting areas is not required unless to correct soil deficiencies.

Further applications of approved, NPK (nitrogen, phosphorus, and potassium) balanced; slow-release fertiliser shall be applied in accordance with the Maintenance Schedule. Application rates shall be as recommended by the fertiliser manufacturer with regard to the size of plant.

Fertiliser should be watered-in after application.

#### 5.5 General Pests

The Contractor shall monitor the works for insect and plant problems (e.g. disease), on identifying a problem the contractor shall apply appropriate remedy through accepted horticultural practices including isolating the area, chemical control or biological control methods.

The Contractor is responsible to take all suitable precautions for the safe handling and application of herbicides, fungicides and insecticides and shall use these strictly in accordance with the manufacturer's specifications. In all cases, sprays shall be applied on windless days. Public shall be advised by signage that spraying is occurring and shall be directed away from the spray area.

Damage to neighbouring properties caused by the Contractor's spraying, shall be made good at the Contractor's expense.

#### 5.6 Mulch

Mulch is not included and does not apply to the Waitangi Stream Mitigation Planting.

#### 5.7 Small trees and sedges

##### 5.7.1 Operations

The Contractor shall maintain stream planting to establish planting to a high level that will fully cover the ground and shade out competing weeds to improve the stream environment. Maintenance shall include weed control, trimming, and watering. Sedge plants should grow to fully cover the ground and thus reduce weed growth and provide stream habitat.

Planting shall be maintained to a neat a tidy appearance in the same condition as when the works were completed at Practical Completion.

##### 5.7.2 Trimming

The Contractor shall undertake regular trimming of plants to maintain the following aspects:

*Removal of dead or old weak growth,*

*Cutting back to encourage vigorous growth,*

*Thin out planted areas to allow enrichment plants to overtop and dominate,*

*Generally, pruning operations to maturing shrubs will be unnecessary for some time.*

#### 5.8 Riparian Planting

Riparian plants require weed removal and replacement of dead or damaged plants. Fertiliser shall not be applied to riparian areas.

Certain herbicides cannot be used in riparian areas due to their impacts on aquatic environments. The contractor shall seek specialist advice (e.g. territorial authority guidance) on the use of herbicides within riparian planting areas.

## 5.9 Plant and Animal Pest Control

Refer to Section D: Plant Pest Control of this Specification.

Undesirable weeds in grassed areas shall be sprayed with approved herbicide strictly in accordance with the manufacturer's specifications and with all necessary safety precautions and only under strict control in for problem plants agreed with the Engineer.

Fungal infection and insect attack shall be controlled with appropriate chemical sprays as approved by the Engineer, applied strictly in accordance with the manufacturer's specifications.

## 5.10 Vandalism

The Contractor shall notify the Engineer of areas, which have in their opinion have been vandalised (including any graffiti). The Engineer may issue a request for the vandalism to be reinstated as a Variation.

Any plants vandalised after Practical Completion shall be notified in writing to the Engineer.

Those plants which fail and are not notified to the Engineer shall be assumed to have died as a result of planting operations and shall be replaced at the Contractor's expense.

The cost of plants or other landscape works deemed to have failed due to theft, wilful damage or vandalism shall be the Principal's responsibility.

Where planting is suffering damage as a result of wear and tear, the Contractor shall advise the Engineer who may issue a request to provide temporary barriers or substitute damaged species with a more resilient planting solution as a variation.

## 5.11 Fly Tipping

Fly tipping shall refer to items such as soil, aggregate, builders' rubble, motor vehicle bodies, beds, mattresses, fridges and televisions or any other larger item requiring removal by machine. Any fly tipping shall be reported immediately.

Removal shall be advised by the Contractor.

## 6. Completion of Maintenance

On completion of the Defects Liability Period and prior to issue to the Defects Liability Certificate, the Contractor shall undertake/supply the following;

*Repair all defects to the satisfaction of the Engineer and undertake all maintenance as required in accordance with the maintenance schedule.*

*Provide written summary of all maintenance visits, machinery used, staff employed and weather during defects liability/maintenance visits.*

The Contract Works may be inspected from time to time by accredited representatives of the Principal and/ or public authorities (in relation to any consent conditions). Should such representatives ask for information in connection with the pest control component of the Contract Works or its progress, the Contractor shall give to them freely and willingly, any details within its knowledge.

## 7. Completion of Contract

On completion of the Contract and prior to issue the Final Completion Certificate, the Contractor shall undertake/supply the following;

*Provide a copy of the maintenance and defects reporting*

*Provide a copy of the Engineer review sign-off and quality control reporting (prepared by the Engineer)*

*Complete the landscape section of the Asset Owner's Manual for Waitangi Stream.*

*Review and confirm Waitangi Stream details in the 'As built drawings' for the main works*

## QUALITY ASSURANCE GUIDE

**The following is summary of the quality information, testing and hold points associated with this Technical Specification. This guide is intended as a summary of key quality assurance information contained within this Specification. Refer to the main document for a more comprehensive description of the quality assurance information required.**

### A. INFORMATION TO BE SUPPLIED

Clause	Description	Timing
Section G 2.2	Maintenance regime submitted by the Contractor.	At Practical Completion.
Section G 2.4	Maintenance schedule with location and dates of maintenance visits and work to be undertaken.	At Practical Completion.
Section G 7	Written summary of Defects Liability and Maintenance visits.	At completion of Defects Liability and Maintenance Period and prior to issue of defects Liability Certificate.
Section G 7	Supply maintenance defects report by Contractor.	At Final Completion and prior to issue of Final Completion Certificate.
Section G 7	Contractor to supply copy of Engineer review sign off and quality control reporting.	At Final Completion and prior to issue of Final Completion Certificate
Section G 7	Complete landscape Section of Asset Owners' Manual by the Engineer	At Final Completion and prior to issue of Final Completion Certificate
Section G 7	Contractor to review and confirm Waitangi Stream details in 'As Built' drawings. Supplied for the main works	At Final Completion and prior to issue of Final Completion Certificate
Section B 3	Constructor to supply report based on progress and condition of the works during defects and maintenance period (3 monthly/4 annually). Refer section B 3. for full details.	During Defects Liability and Maintenance Period



**B. MATERIAL TESTING**

Clause	Test	Frequency

**C. ONSITE TESTING**

Clause	Test	Frequency

**D. HOLD POINTS**

Clause	Test	Frequency

**E. INSPECTION**

Clause	Inspection	Frequency
Section G	Defects inspection.	At Practical Completion.
Section G	Defects that have been remedied.	Following remedy of any defects.
Section G	Final Completion.	At end of Defects Liability and Maintenance Period.