

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 1 of 10

## **SECTION 1 : PLANTING**

### **1.0 GENERAL**

This section describes the work to be carried out to prepare planting sites and complete planting of trees, shrubs and groundcovers. It is to be read in conjunction with Planting Plans supplied and is supplementary to them. The drawings show the nature and extent of the work in sufficient detail to enable the works to be carried out.

All landscape planting within the road reserve shall be designated and implemented according to Volume 2, Part 7 – Street Landscaping.

### **2.0 SITE PREPARATION**

All irrigation and drainage works, utilities installation, signs or landscape structures shall be completely installed prior to planting.

Saw cutting of existing seal where required shall be undertaken between 250mm and 300mm from the back of the kerb. The cut line shall be parallel to the kerb lines wherever possible. Small radius curves shall be cut using a series of short incisions to approximate as best as possible the curve arc.

#### **2.1 Excavation of Planting Areas**

Excavation shall be carried out where necessary to achieve either of the following required soil profiles where depths indicate are post consolidation:

##### **2.1.1 Landscape Bedding (refer to Figures 1 and 2):**

- 150mm of base soil
- 150mm composite topsoil, being 70% topsoil and 30% manure or compost incorporated (refer below)
- 75mm of bark or 10mm biodegradable fabric mulch (refer to Clause 7.0) (to be maximum of 25mm below top of kerb)
- Total depth of excavation 400mm below top of kerb

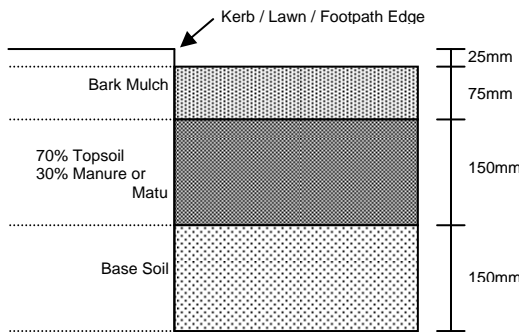
##### **2.1.2 Annual bedding (refer to Figure 3):**

- As per the Landscape Bedding profile
- Total depth of excavation 325 mm below top of kerb

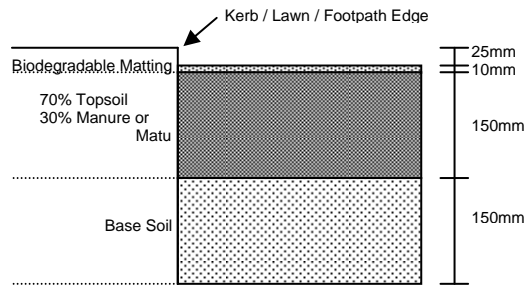
All waste material shall be removed from site.

Exposed subgrade shall be trimmed and levelled so that no part of the subgrade shall be above the required depth of cut.

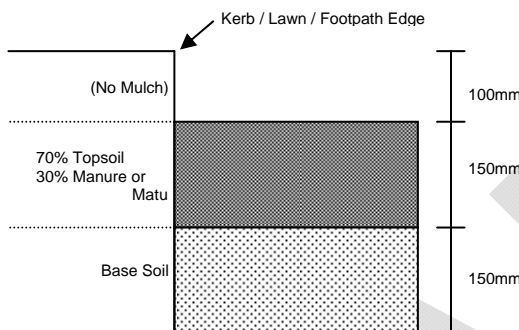
**Figure 1. Option (A) Planting Area – Topsoil & Mulch Profile, post-consolidation, for slopes less than 1:3 gradient. (Refer to clauses 2.1 and 7.0.)**



**Figure 2. Option (A) Planting Area – Topsoil & Mulch Profile, post-consolidation, for slopes more than 1:3 gradient. (Refer to clauses 2.1 and 7.0.)**



**Figure 3. Option (B) Annual Bedding Planting Area - Topsoil Profile, post-consolidation. (Refer to clauses 2.1.)**



The Subgrade of the proposed plating area shall be firm but free draining. If required by the Engineer the subgrade strata shall be made permeable by the insertion of vertical holes to permeable layers, by scarifying of the surface to ensure free draining through the underlying material, or by undercutting the existing subgrade to a greater depth than specified. In this case, the unsuitable material shall be removed and replaced by imported pit sand to top of subgrade level.

In areas of new planting, base soil (either 2<sup>nd</sup> grade topsoil or pit sand) shall be placed evenly over the prepared subgrade and consolidated to a depth of 150mm. The sand/soil shall be placed without the Engineer’s prior consent.

In all sites, except natural gully systems, where the slope gradient is steeper than 1:3, it is preferable that the embankment is either scarified or grooved on an angle to a depth of 200mm, from the top of the bank to the base. This assists topsoil adhesion and prevents separation of top 1500mm topsoil from the base material due to gravity and/or glazed/planning of base material.

Should site conditions, such as gradient or compaction, prevent scarifying, the embankment sub-base shall be benched to develop and adequate top soil profile. The horizontal benching depth is dependant on the slope gradient.

**2.2 Soil for Planting Areas**

Topsoil, both imported or existing on site, shall be a loam soil of good quality, free draining, free of perennial weeds and debris and capable of sustaining the

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 3 of 10

required plant growth. All topsoil shall be inspected at its source and shall not be placed without the Engineer's consent.

Stockpiles of imported or site topsoil to be used in planting areas shall be left to grow vegetation and sprayed by the contractor to eliminate perennial weeds prior to their seeding and prior to the soil's use. A knock-down systemic herbicide without long term residues shall be used (see Clause 10.0). Treated soil shall not be placed without the Engineer's consent. If, after placing the topsoil and prior to any final cultivation, there is evidence of vegetation growth, the surface shall again be sprayed by the Contractor with a Knock-down systemic herbicide. Areas so treated shall not be planted for at least two weeks.

All new planting areas on insitu topsoil shall be deep ripped to 300mm prior to planting. Heavily compacted soils shall be deep ripped to 600mm. If in the Engineer's opinion, at time of planting, the soil has consolidated to a density unsuitable for planting out, re-cultivation of soil to a depth of 150mm shall be undertaken by the contractor.

All new planting areas shall be filled with topsoil or excavated (as appropriate), to be 100mm below adjacent paving, kerbs, or lawns after cultivation and reasonable consolidation.

Prior to planting, all planting areas shall be cleaned of rubbish, stones, unwanted vegetation and other debris.

At planting, all planting areas shall have a minimum uniform soil moisture level or greater than 50% to 200mm depth.

### **2.3 Soil Laboratory Testing**

At Council's discretion, when 2,500 or more shrubs and/or trees are to be planted the topsoil shall require nutrient laboratory testing. The minimum number of sample sites depends on the following criteria:

- a) If the topsoil has already been installed on site or existing insitu top soil is being used for planting, a minimum of 10 soil samples shall be taken throughout the site.
- b) If the topsoil has yet to be installed then a minimum of 3 soil samples shall be taken at its source, ensuring that the same topsoil tested in stalled on the site after Council has approved its use.

Soil samples shall be taken as per sampling instructions provided by the soil testing laboratory.

The laboratory results and a plan indicating sample site locations shall be provided to Council prior to planting. Planting shall not proceed without Council soil test approval. Council reserves the right to undertake further topsoil sample testing prior to soil test approval should it be deemed necessary.

Where sample results are beyond acceptable parameters, the topsoil shall be modified to ensure that it aligns within these parameters or another conforming topsoil source shall be identified to be used for planting. Soils with a high pH level may require Extractable Aluminium testing at Council's discretion.

Waipa District Council Development and Subdivision Engineering Manual		
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works	
Authorised by : Parks and Reserves Team Leader	Section 1 - Planting	Page 4 of 10

The following soil testing is required per sample:

<u>Soil Component</u>	<u>Acceptable Parameter</u>	
pH	5.8 - 6.3 (dependant on plant species requirements)	
Phosphorus	30 - 80	ug/mL
Potassium	0.5 - 1.0	me/100g
Calcium	6 - 12	me/100g
Magnesium	1 - 3	me/100g
Sodium	0 - 0.5	me/100g
CEC	12 - 25	me/100g
Base Saturation	50 - 85	%
Volume Weight	0.60 - 1.00	g/mL
Available Nitrogen (15cm Depth)	150 - 250	kg/ha
Organic Matter	7- 17	%
Total Nitrogen	0.2 - 05	%

When less than 2,500 shrubs and/or trees are to be installed, the topsoil may require laboratory testing, as per above, at Council's discretion.

### 3.0 PLANT MATERIALS

All plants shall be supplied true to the species and grades specified on the approved landscape plans. All street trees, unless specified otherwise, shall be a minimum grade of 2.0m with a 30mm calliper. Other tree grades shall be supplied as follows:

- 1.5m – 2.5m specimens shall have a calliper of 30 – 50mm
- 2.5m – 3.5m specimens shall have a calliper of 50 – 70 mm
- 3.5m – 5m specimens shall have a calliper of 70 – 100 mm

All other stock shall be a minimum pb3 grade for groundcover and pb5 grade for shrubs.

All plants to be advanced specimens for their grade and to be well furnished and rooted relative to container size.

No substitution of species or grade shall be made without the written approval of the Engineer. If species or grades specified are unobtainable, the Engineer may approve alternatives. Smaller grades may require an increased planting density and numbers, which shall be at the Contractor's expense,

All plant material supplied shall be clearly labelled stating the plant's Latin name and the supplier's name, (one label per plant ground planted). These labels shall be removed on completion of planting.

The contractor shall give the Engineer not less than five days notice of dates upon which plants are to be delivered on site, so that arrangements can be made for quality inspection and confirmation of identification of plant material.

Plants shall be well branched, symmetrical and of typical habit for the species. All plants shall be nursery stock of good form, healthy and vigorous with strong fibrous root systems and free of all pests and diseases.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 5 of 10

All trees shall be supplied with the central leader intact – no pruning of the central leader shall have taken place. All torn or damaged roots shall be pruned before dispatch. All stock shall be well rooted but not rootbound. Open ground stock shall be well-wrenched. All root balls and containers shall be free of all weeds. Plants shall be well ‘hardened – off’ prior to supply.

The Contractor shall ensure that all plants and their roots shall be maintained in a moist environment, protected from adverse conditions such and drying winds, frost or water logging. All roots must be covered during transit and storage to prevent desiccation or damage.

#### **4.0 INSTALLATION OF PLANTS**

All of the planting shall normally be undertaken between April 1 and October 1. Planting for deciduous stock shall take place between 1 June and 15 September. Planting not undertaken in this period is subject to additional maintenance requirements.

All plants shall be planted on the day of delivery to the site. Plants shall be planted in the locations shown on the plans and in accordance with good horticultural practices. Unless otherwise indicated on the plans all plants shall be planted in a random pattern at the densities specified.

Planting holes shall be excavated, a minimum of 150mm wider and 150mm deeper than the root ball. For large trees the planting hole minimum dimensions shall be:

- 1.5 – 2.5m trees: 300 x 300 x 300
- 2.5 – 3.5m trees: 750 x 750 x 500
- 3.5 – 5.0m trees: 1m x 1m x 500

The base of the planting hole shall be forked to a minimum depth of 100mm and any stones over 50mm diameter or poor quality soil shall be removed from the hole. The sides of the planting hole shall also be loosened, and the surrounding ground to two times the rootball diameter to be ‘forked’ over to reduce compaction.

Where topsoil is unsuitable for backfilling the Contractor shall use imported or modified topsoil for backfilling. The imported topsoil shall be a free drainage loam of a quality complying with that specified in Clause 2.0 and subject to inspection prior to placement.

Modified backfill soil shall consist of a homogenous mixture of the following:

- 7 parts by volume of good quality, friable topsoil from the site or imported.
- 1 part by volume of approved compost e.g. that produced from the Hamilton Organic Recycling Centre.
- 1 part by volume of coarse river sand.
- Appropriate levels of fertiliser where specified in Clause 6.0.

The contractor shall not plant into waterlogged soil or holes that are full or part full with water. If the water table is high and the Contractor cannot disperse the water

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 6 of 10

from the hole, the Contractor shall consult the Engineer as to whether planting can continue.

All plant containers or wrapping and if necessary any rootbound roots shall be removed prior to planting. Leaves and branches shall be pruned to assist plant establishment if necessary. Generally, the nursery soil level is clearly identifiable on the main stem of the plant and replanting should not exceed this level.

The hole shall first be backfilled with 150mm of consolidated soil or soil mix, mounding the soil centre to aid even spread of the roots.

The plants shall be placed in the hole ensuring that the final soil level is equal to or not exceeding 10mm above the nursery soil level and at an appropriate depth to ensure sustained growth. Roots shall be spread evenly to their natural extent without touching the sides of the hole, or being distorted in any way. Bare rooted material shall be shaken to ensure even root spread.

For trees, the hole shall be backfilled with topsoil or soil mix in 150mm layers, firming each layer. For container plants and shrubs, the hole shall be filled to half its depth and firmed and then completely filled and firmed again. Upon completion of backfilling the plants shall be well watered in.

All road reserve planting installation is to comply with Volume 2, Part 7 – Street Landscaping, especially in respect to traffic islands, berms and roundabouts.

## **5.0 IRRIGATION**

During installation and establishment, the contractor shall ensure that soil in all planting areas is moist enough to maintain active plant growth throughout the growing season (September – May). To achieve a high level of site presentation or in areas of annual bedding display planting, irrigation systems may be required to achieve this.

Where an irrigation system is required to be installed, 'Toro' brand or a similar approved brand shall be used. The system shall be capable of providing a minimum soil moisture level of 50% to 200mm depth, throughout the planted areas or within the dripline of trees specified. It shall be capable of fully re-wetting the root zone to 200mm depth when the irrigation is applied; and shall be fully automated to operate between 1am and 6am when moisture levels drop below 50%.

## **6.0 FERTILISER**

Generally, some form of fertiliser shall be applied to planting. For shrubs and trees, all fertiliser shall be well mixed with a backfilled soil. For bedding or groundcover all fertiliser shall be well mixed with the site topsoil prior to planting. Fertilisers shall be either an approved pelletised natural or organic fertiliser or an approved synthetic fertiliser.

The following synthetic fertilisers are acceptable unless alternatives have been approved:

- For bedding or perennial (groundcover) planting – 'Nitrophoska Blue' at 100g/m<sup>2</sup>

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 7 of 10

- For shrub planting – ‘Mag Amp’ at 40g/shrub
- For tree planting – ‘Mag Amp’ at 80g/tree

An exception to these is for Proteaceous species and ferns which should on no account be fertilised with Phosphate (P) containing fertilisers.

## **7.0 MULCH**

Where indicated in the schedule and on the plans the Contractor shall provide mulching to newly planted areas. In addition, all individual trees including street trees shall be mulched to a radius of 500mm.

### **7.1 Flat Site Mulch**

On sites flatter than 1:3, bark mulch shall be spread evenly to minimum depth of 75mm and maximum of 100mm except that around tree trunks and a slight hollow shall be left. The mulch shall be either coarse or fine, untreated, shredded pine bark as scheduled, and shall be approved by the Engineer prior to spreading. The bark mulch shall be clean and free of soil or sawdust. Coarse bark should have an average diameter of 50mm and with no pieces longer than 100mm. Fine bark should have no pieces longer than 40mm and be evenly graded. Coarse bark is appropriate to most locations. Fine bark may be specified by Council in Commercial zones, or for other specified locations.

All care shall be taken in placing the bark mulch so as to protect the plants and any irrigation system. All damage to the plants or irrigation system shall be rectified at the Contractor’s expense.

### **7.2 Steep Site Mulch**

On Slopes steeper than 1:3, mulching for weed control shall consist of a WDC approved matting with the following criteria:

- The matting consists of biodegradable mulching fabric or material without synthetic geonet or synthetic geotextile content.
- It shall be installed according to manufacture’s instructions prior to planting, ensuring that the mulch will not uplift due to inundation or wildlife exposure (from, for example, Pukeko birds).
- The mulching fabric shall have a minimum 24 month life expectancy and be fully biodegradable into soil within 6 years.

At Engineers discretion, mat rounds may be used instead of matting. These shall be a minimum 500mm diameter and have the same characteristics as the matting.

On steep slopes with erosion issues that are receiving planting, a biodegradable netting with no geotextile or geonet content shall be used at the Engineers discretion. The netting will have an expected lifespan of at least 36 months. His may be placed on top of the mulch matting and shall be installed according to manufacturer’s instructions. The netting is not intended to suppress weeds and should be used to conjunction and mulch matting or rounds.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 8 of 10

## **8.0 STAKING AND PROTECTION**

Newly planted trees shall be firmly staked and tied as follows:

- 1.5 – 2.5 trees shall be staked with 2 no. 50 x 50 x 1.8m stakes with at least 1m exposed.
- 2.5 – 5.0m trees shall be staked with 2 no. 75 x 75 x 2.4m stakes with at least 1.5m exposed, or with a system of ground anchors approved by the Engineer and specified in the landscape plans.

All street trees shall be staked with 2 no. 50 x 50 x 1.8m stakes.

All stakes shall be rough sawn Pinus H5 treated. Stakes shall be placed with at least one third of their length in the ground.

Two flexible ties per stake shall be attached. Ties shall be tensioned to avoid chafing of the tree against the stakes. All ties shall be fixed to the stakes. Ties shall be of a type approved by the Engineer prior to tying.

Newly planted areas shall be protected from any possible construction or other damage. To ensure protection for the duration of the site works, the Contractor shall if necessary, provide and maintain a 1m minimum height barrier around the plants.

Similarly, during planting, existing structures, turn, other planting, or irrigation system shall be protected by appropriate means from possible damage.

## **9.0 PRUNING**

Ongoing pruning during the maintenance period shall concentrate on producing good plant form, ground coverage, removal of spent flowers, healthy growth, preventing plants smothering other planting, keeping access ways clear of growth and maintaining visibility.

Trees shall be pruned up to provide good visibility for vehicles and pedestrians at all times. (Long term, trees should have a clear stem to 2.4m). Pruning should be carried out in accordance with acceptable modern arboriculture practices.

Shrubs shall be pruned down to 450mm height maximum, for good visibility at intersection and other visibility splays.

Pruning of shrubs and groundcovers shall use techniques which maintain the natural form and habit of the plants. Pruning shall avoid “hedging” techniques which create strong visual lines and detract from the natural texture and form of the plants. Groundcover plants shall be pruned by undercutting at the edges.

Planting designed as hedges shall be clipped only after Spring or Autumn growth flushes/ Hedges grown for flowers shall be clipped only after completion of flowering. Hedge trimming shall be carried out in a way that will promote even growth to the specified height and width.

All prunings shall be removed from the planted areas and the site, to maintain these in a clean and tidy condition.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 9 of 10

## **10.0 CHEMICAL APPLICATIONS (WEED & PEST CONTROL)**

All chemical application on planted areas shall be carried out by qualified, trained personnel and according to the Growsafe Code of Practice for Use Pesticides and Herbicides; NZS 8409 'The Agrichemical Users Code of Practice' and any manufacturers' directions.

All spraying operations shall be carried out in windless, dry conditions, when rain is not imminent for at least 12 hours and at times which minimise possible hazards or disruption to the public, animals or other beneficial fauna. Care shall be taken to prevent spray drifting onto non-target areas or plants and comply with notification requirements as required by the proposed Waikato Regional Plan.

Herbicides may be used to control weeds or excess grass growth over structures, surfaces or into planting areas. Approved herbicides are:

- Glyphosate with Codacide oil and Pulse Penetrant for general use.
- Glyphosate + "Versatil" for persistent perennial weeds.
- Tordon Bushkiller or Escort for spot spraying of woody weeds only.

All use of any other herbicides shall be first approved by the Engineer.

All trees in grassed areas shall have a weed release spot spray applied between 4 and 6 months after planting. General weed control shall be carried out whenever necessary to maintain the planting weed-free.

Chemical weed control in planting areas shall be kept within the edge of the planting beds, within a maximum of 500mm of tree trunks, within 50mm of the edge of any undefined mulch surface, and within 50mm of any posts or the base of any landscape structures.

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

## **11.0 MAINTENANCE REQUIREMENTS**

The Contractor (or Developer) shall be responsible for the routine maintenance of the landscape planting works including weeding, mulching, replacements of plants and watering during the defects liability period.

### **11.1 Defects Liability Period**

The planting defects liability period shall be 6 months from completion and acceptance of the landscape planting works or upon release of any implementation bond held for uncompleted landscaping, except that if planting is carried out between October 1 and April 1 the defects liability period shall be extended for an additional 6 months.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 1 - Planting</b> Page 10 of 10

During and at the end of the defect liability period, the following minimum standards are required:

- All topsoiled areas prior to planting and mulching shall be weed-free
- All planted areas shall be kept weed-free
- All planted areas including street trees shall be mulched with clean fabric, fibre or loose fill mulch.
- All trees and other planting shall be vigorous and healthy, free of disease and free of dead growth or dead flowers
- All planted areas shall be moist to at least 200mm depth.
- Planting is becoming well established. Any plants failing during this period be replaced to the specification, to ensure adequate establishment of the planting
- Plant growth shall be trimmed to the extent and height required for any visibility splays
- All tree stakes and ties shall be intact and correctly installed.

### **11.2 Weed Free Requirement**

At the end of the defects liability period, no individual weed must be larger than 30mm x 30mm x 30mm high. Furthermore no weeds that are at least 10mm x 10mm x 10mm in size shall exceed more 5 per square metre. Furthermore, no perennial grass weeds will be accepted.

### **11.3 As-built Plans**

The contractor shall supply one copy of the as built plans recording any variation from the approved landscape plans and this specification. Refer Volume 1 of this Manual.

### **11.4 Defects Liability Period Inspection**

The contractor, after completing all proposed works, shall advise the Operations Manager, Parks & Gardens, Waipa District Council, at least 7 working days prior to the proposed commencement of the defects liability period and shall be available for a joint pre-defects liability period inspection.

### **11.5 Defects Liability Period – Final Inspection**

The Contractor at the end of the required defects liability shall advise that Operations Manager, Parks & Gardens, Waipa District Council, at least 7 working days prior to the proposed commencement of Council acceptance of the asset and its ongoing maintenance.

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 2 <span style="float: right;">Page 1 of 5</span>

## SECTION 2 : GRASSING AND TURFING

### 1.0 GENERAL

This section cover the preparation and sowing of any new grassed areas or those requiring reinstatement, or turfing of such areas. It includes berms, lawns and banks.

### 2.0 PREPARATION FOR SOWING OR TURFING

Grassing and fertilising shall be carried out over all existing grasses areas disturbed by contract activity and other specified areas which may require reinstatement. In existing grassed areas, excessive compaction of the subsoil shall be relieved by subsoiling or similar as required, to achieve satisfactory long term growing conditions.

All topsoil removed to permit contract works to be carried out shall be stockpiled for reuse.

All new grass areas shall be built on subgrades prepared to a CBR of not less than 5 and no greater than 7. A minimum 75mm layer of clean, friable peat loam or sandy loam topsoil, free from perennial weeds, stones & rubbish shall be placed on the subgrade. If the subgrade has been backfilled with sand or if the existing subgrade material is of a sandy nature then the 75mm topsoil shall be a heavier silt loam.

The topsoil shall be lightly compacted or consolidated, and may be laid proud of adjoining features (such as kerb & channel, path, crossings etc) by not more than 25mm to allow for settlement, provided that it does not cause water to pond on any footpath or vehicle crossing area. All finish levels shall be those specified on the plans or to a 2-2.5% slope. New areas shall be neatly contoured to adjoining grassed areas. The top 25mm of topsoil shall have a loose tilth. No soil shall be cultivated or handled when the moisture content is at a level where soil structure damage will result.

Perennial weeds shall be sprayed with Glyphosate plus "Versatil", if clover, thistles, etc are a problem, according to manufacturer's instructions and at least 14 days before cultivation. All stones, rubbish and other foreign materials shall be removed from the areas to be grassed, and the whole area rotary hoed to a depth of 150mm or such lesser depth of topsoil as may be approved by the Engineer.

### 3.0 FERTILISERS

All fertilisers shall be delivered to the site immediately before they are required for spreading and shall be thoroughly mixed on the site. The Engineer may prohibit the use of any fertilisers which have deteriorated because of interaction, wetting, etc. Fertilisers shall be lightly harrowed into the topsoil, 2-3 days prior to seed sowing, at the following rates:

30% Potassic Superphosphate	150 kg/ha (15g/m <sup>2</sup> )
Sulphate of Ammonia	50 kg/ha (5g/ m <sup>2</sup> )
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	200 kg/ha

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 2 <span style="float: right;">Page 2 of 5</span>

This shall be followed one month after sowing, with an application of the following:  
 Di-ammonium Phosphate (DAP) 100 kg/ha

#### 4.0 SOWING

With the exception of the New Zealand Browntop component, all seed shall be certified and less than 12 months old at the time of sowing. Ryegrass component to be certified as having greater than 80% live endophyte content. The Engineer may prohibit the use of seed which has deteriorated because of wetting, fertiliser-burning, etc.

Seed Mixture to be:

NZ Browntop	50kg/ha
High endophyte Turf Rye	200kg/ha

On large areas, the seed shall be 'check' sown in at least two directions to ensure an even spread and covered by brush harrowing. The surface shall then be rolled with a suitable flat roller.

On small areas, grass seed shall be evenly applied to the prepared surface and raked thoroughly into the soil so that little seed remains exposed.

#### 5.0 ESTABLISHMENT OF SOWN AREAS

The Contractor shall ensure that the newly established grass is protected from damage by pedestrian and vehicular traffic until such time as the grass growth has reached a self-sustaining state.

The Contractor shall be responsible for watering the grassed areas and required, to achieve an efficient germination of the seed and maintain satisfactory growth throughout the Maintenance Period. Watering shall commence when root zone moisture is depleted to 50% and shall ensure full re-wetting of the root zone to 200mm depth.

During establishment, the Contractor shall maintain the newly grassed areas as follows:

- Upon the grass reaching 100mm in height, it shall be cut to 50mm high.
- For subsequent mowings, the mowing frequency shall be governed by growth rate. Minimum grass height to be 20mm – Maximum grass height to be 30mm.
- The turf shall be maintained free of all broadleaf weeds.
- Areas where there has been a poor strike of grass shall be either recultivated and resown or undersown at the Contractors expense.
- Upon completion of mowing, all grass clippings shall be collected and removed from all sown grass areas except non kerb-and-channelled berms. All clippings shall be removed from adjacent hard surfaces.
- Edges of all sown grass adjoining cultivated gardens, borders, hand paving, sealed surfaces or landscaped structures shall be trimmed to the

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 2</b> <span style="float: right;">Page 3 of 5</span>

edge or controlled by herbicide to within 25mm of flat surfaces or 50mm of vertical structures. Grass shall not be allowed to encroach over flat, sealed or paved surfaces by more than 25mm.

## **6.0 TURFING**

The turf shall be good quality, free of weeds and pests and with an even thickness of approximately 20mm x 450mm wide and of a consistent length. The constituent grasses of the turf should include Browntop and Fescue to provide grass of a close texture of even density and green colour, i.e. "Readylawn" or similar approved by the Engineer. The turf should be sufficiently fibrous for turves to hold together when handles but excess fibre or thatch is undesirable.

Turf should be packed to avoid drying out in transit. In hot weather it shall be sprayed with water and covered with hessian as required. Turf shall be delivered to the site within 24 hours of lifting and shall be off-loaded by hand unless arranged on pallets for mechanical handling. Any turf permitted to dry out shall be rejected when, in the opinion of the Engineer, its survival after placement is doubtful. All turf should be laid immediately after delivery to site. Where this is not possible, the turves shall be unloaded and stacked on clear ground to maximum height of one metre and suitably protected.

No Turf shall be laid in exceptionally hot dry weather, or in exceptionally wet or frosty soil or weather conditions, nor shall any turf be laid until the topsoiling has been satisfactorily completed by being brought to an even tilth and firmness,

Turf shall be handled carefully to ensure minimum breakage to prevent soil dropping from the roots. The turf shall be laid from planks working over turves previously laid.

The turves must be thoroughly watered until the turf mat and top 50mm of soil is wet. After allowing a "soaking in" period the turves shall be lightly and evenly firmed with a wooden tamper so that the underside of the turf mat and the wet soil surface are thoroughly bonded.

The finished level of the turf shall conform to the levels indicated. Where the turf meets paths, mowing strips etc the finished level shall be 12mm above. Any inequalities in finished levels owing to variation in turf thickness or uneven consolidation of soil shall be adjusted by raking and/or packing fine soil under the turf, not by topdressing the lawn surface.

## **7.0 ESTABLISHMENT OF TURF**

During the establishment the Contractor shall maintain the turf as follows:

- Prevent any pedestrian traffic until grass is well established and uniformly covered with a strong sward of grass.
- Apply lawn fertiliser e.g. "Readylawn Food", at a rate according to manufacturer's instructions, at monthly intervals during the growing season.
- Remove weeds replace soil if necessary.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 2</b> <span style="float: right;">Page 4 of 5</span>

- Water regularly: The turf shall not be allowed to dry out for at least three weeks after laying, then it shall be watered normally. 'Normal' watering shall commence when the root zone moisture is depleted to 50% and shall ensure full re-wetting of the root zone to 200mm depth. In summer this will require watering at least daily. Watering shall normally be carried out prior to 7am and shall not be done in hot sunny conditions.
- Initial mowing shall be carried out when first growth is apparent, with blades set no lower than two-thirds of the height of the grass. Use roll-type mower for first cuts. Grass shall be in a reasonably dry condition. All clippings shall be collected and removed from site. All clippings shall also be removed from adjacent hard surfaces.
- Edges of all turf areas adjoining cultivated gardens, borders, hand paving, sealed surfaces or landscape structures shall be trimmed to the edge or controlled by herbicide to within 25mm of flat surfaces or 50mm of vertical structures. Grass shall not be allowed to encroach over flat or paved or sealed surfaces by more than 25mm.

Areas of turf where there has been a poor establishment shall be re-laid at the Contractor's expense.

## **8.0 CHEMICAL APPLICATIONS (WEED & PEST CONTROL)**

All chemical weed and pest control shall be in accordance with Section 1 Clause 10.0. Weed control, apart from edge maintenance, shall be by manual not chemical means.

## **9.0 DEFECTS LIABILITY PERIOD**

After initial establishment, during and at the end of the defect liability period, the following minimum standards shall be maintained:

- All kerb-and-channelled verges shall have grass growth no more than 50mm high, non kerb-and-channelled verges shall have grass growth no more than 200mm high and banks shall have grass growth not more than 250mm high.
- The sward be maintained in a healthy, weed-and-disease free state without bare patches.
- Trees and other plantings shall be protected from damage by maintenance or mowing operations and if damage shall be reinstated within 1 week of the damage occurring.
- Maintenance and mowing operations shall be carried out at times which minimise disruption to the public.
- Maintenance and mowing operations shall be carried out only in conditions with equipment that ensures maintenance of good soil structure, minimum deformation of ground surfaced and ongoing establishment of the grass sward.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 2</b> <span style="float: right;">Page 5 of 5</span>

- Litter shall be removed prior to commencing maintenance or mowing operations. Highly visible shredded litter shall be removed following maintenance and mowing.
- Grass clippings, when not required to be collected during mowing, shall be spread evenly over the sward.

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<b>Waipa District Council Development and Subdivision Engineering Manual</b>		
<b>Volume 3 : Standard Technical Specifications</b>		<b>Part 7 – Landscape Works</b>
Authorised by Parks and Reserves Team Leader	<b>Section 3</b>	Page 1 of 2

## **SECTION 3 : LANDSCAPE STRUCTURES INSTALLATION**

### **1.0 GENERAL**

All landscape installations shall be constructed to the appropriate standards (including legal, national or Waipa District Council standards) and according to good practice within the relevant industry.

All installations shall use good quality, low maintenance materials.

At the completion of the work the site must be clean and free of debris.

### **2.0 FENCING**

Disturbance of or inconvenience to existing farming activities caused by contract works or traffic shall be minimised at all times. In some cases this may require erection of suitable fencing. Gates, other fences, and water supplies shall be protected from damage by contract activity and reinstated immediately if damaged. Access of stock to water shall not be interrupted at any time.

The Contractor shall initiate discussion with the Engineer before commencing the fencing operation to clarify style, details, variations and the like.

#### **2.1 Stockproof Fence**

The stockproof fence shall be a durable fence which achieves the required purpose of preventing access of all livestock to the contract works area.

At road frontages the fence shall meet the following minimum standard:

Strainers	No. 1	2.4m long with stay
Angles	No. 1	2.1m long with stays (if required) at fence line
Stays	No. 2	2.4m long
Posts	No. 2	1.8m long placed at 4.5m c/c max
Battens	50 x 40	equidistant placing, 0.8m maximum spacing
Wire	High tensile wire. 8 wires	

The wires shall be facing the roadside with posts and battens behind.

Strainers shall be set to lean away from the angle of the fence to some extent or at worst be vertical upon completion of the tensioned fence.

In poor soil conditions or variable topography, longer posts, longer strainers and more substantial footings and stays shall be used where necessary to achieve a stable fence.

Additional works/material due to poor soil conditions are a variation. Anchor or support posts required due to topography are not a variation.

All waste, particularly wire off-cuts and the like shall be collected and removed from the site at completion of the fence.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by Parks and Reserves Team Leader	<b>Section 3</b> <span style="float: right;">Page 2 of 2</span>

## **2.2 Temporary Stockproof Fence**

The temporary stockproof fence shall achieve the purpose of preventing access to all livestock as required by the adjacent land users, for the duration of the required fence, or the duration of the contract.

At road frontages, no hot wires shall be used unless they are attached at 300m inside a physical barrier.

The consequences of stock escaping due to inadequate fencing shall be the Contractor's responsibility.

Temporary fences shall be removed from the site at the completion of the contract.

## **3.0 DEFECTS LIABILITY PERIOD**

During and at the end of the defects liability period the following minimum standards shall be maintained:

- All permanent or temporary landscape structures shall be structurally sound, safe, function or operations and in a presentable finish form.
- Paint works and other finishes shall be maintained in a clean and presentable finished form. Bolts and other fixtures shall be maintained sound and without loose parts or rough edges.
- All structures shall be free of litter, graffiti, grime, weeds and plant growth or any other foreign matter.
- Borders, footing edges or paving shall be maintained so that no more than 25mm of grass or other vegetation is allowed to encroach. Vertical elements without mowing edges shall have vegetation maintained clear of the structure by no less than 25mm and no more than 75mm.

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 4 Page 1 of 9

## SECTION 4 : PLANTED STORMWATER DEVICES

### 1.0 GENERAL

This section covers the preparation, installation and maintenance of all new and existing engineered stormwater devices that have a designed landscape component (PSD). This includes, but is not restricted to, stormwater ponds, raingardens, vegetated filters and swales.

### 2.0 STANDARD LANDSCAPE SPECIFICATIONS

The specifications in this Section are supplementary to and take precedence over the Council Standard Technical Specifications Part 7 - Landscape Works, Sections 1 and 2. In all other instances, the Council Standard Technical Specifications Part 7 - Landscape Works, Sections 1 and 2 are to be followed in the site preparation, establishment and maintenance of all PSDs. These specifications are to be implemented in conjunction with this Manual's Volume 2: Design Guide, Part 9 – Planted Stormwater Devices.

### 3.0 MULCH

All PSDs shall be mulched except for areas that are grassed or turfed. All mulch is to be approved by the Engineer prior to spreading. Specific PSD mulch applications are as follows:

#### 3.1 Amenity Planting

Landscape planting between the drainage reserve boundary to the Upper Bank Zone shall only be mulched with bark or aged woodchip mulch where there is no possibility of surface ponding, flooding or mulch travel. Where surface ponding, flooding and mulch travel is possible within this area, biodegradable weed matting shall be used for all landscape planting.

#### 3.2 Stormwater Ponds

No synthetic geotextile weed matting is to be utilized in the installation of the landscaping portion of landscaping engineered stormwater devices. However, synthetic geotextiles and other materials may be used, as applicable, to meet functional engineering requirements; for example, for inlets, outlets and high velocity channels.

#### 3.3 Mulching Zones

##### 3.3.1 *Upper Bank and Lower Bank Zone Mulching*

All plants shall be mulched with Council approved 0.5 metre diameter biodegradable weed mat rounds that shall be secured around plants, allowing adequate room around the stem for future growth. Firmly secure fabric mulch with wooden or other biodegradable pegs as per the manufacturer's instructions so that the fabric mulch does not detach from the soil, during inundation and high winds.

Waipa District Council Development and Subdivision Engineering Manual		
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works	
Authorised by : Parks and Reserves Team Leader	Section 4	Page 2 of 9

### 3.3.2 *Marginal Zone Mulching*

Council approved biodegradable weed mat is to be laid in a manner that the mulch will not uplift during inundation. Ensure that plants have adequate room around the stems for future growth.

### 3.3.3 *Wet Zone Mulching*

No mulching is required within the Wet Zone.

## 3.4 **Raingardens**

Raingardens shall be mulched with Council approved biodegradable weed matting. River rocks (with a diameter of between 50mm and 150mm) in gabion mats (100mm to 300mm deep) may be permissible depending on stormwater engineering requirements and long term maintenance requirements.

## 3.5 **Swales**

Roll-on turfed swales are not to be mulched.

Non-turfed swales are to mulched according to the surface treatment and stormwater flow velocities, swale design, site location and long-term maintenance requirements. Mulching shall be installed as per manufacture's instructions.

Vegetated Swales planted with Carex sedges shall be mulched with biodegradable weed mat or secure biodegradable mat rounds.

Swales mulched with river rocks shall either be constructed with:

- Loose 50-150mm diameter river rocks on biodegradable weed mat; or,
- River rocks of 50-150mm diameter encased in gabion matting.

## 3.6 **Vegetated Filters**

Vegetated Filters shall be mulched with biodegradable weed mat. Grassing and roll-on turfing does not require mulching.

## 4.0 **PLANTING**

All PSD landscaping shall be designed and installed according to the Council Development Manual, Volume 2: Design Guide, Part 7: Landscaping Engineered Stormwater Devices.

### 4.1 **Grassing**

All areas of engineered stormwater devices that are to be permanently grassed instead of vegetated with shrubs and/or trees shall be established according to the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 – Landscape Works, Section 2: Grassing and Turfing specifications. With the exception of Stormwater Ponds and turfed Swales, the grass seed mix shall be as specified in Section 2: Grassing and Turfing.

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 4 <span style="float: right;">Page 3 of 9</span>

*During establishment and maintenance, ensure that no grass debris enters any water body or watercourse.*

#### **4.2 Stormwater Pond Planting**

Permanent stormwater ponds shall be planted up as soon as possible after the completion of civil works construction. Where site conditions such as unstable soil structures require a more rapid groundcover than shrubs and trees provide, pond slopes shall be stabilised with grassing first and a Staged Pond Planting is permitted as detailed in clause 4.3.

#### **4.3 Staged Pond Planting**

The staged pond planting shall be:

##### **4.3.1 Stage 1: Grassing**

Pond banks shall be prepared and sown with grass seed to establish rapid ground stabilization, according to the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 – Landscape Works, Section 2: Grassing and Turfing specifications.

Where ponds are to be established in nitrogen-deficient soils and at the Engineers discretion, the seed mixture shall be:

Annual Rye Grass 150 kg/ha  
Sweet Clover 100 kg/ha

All seed shall be certified and less than 12 months old at the time of sowing. The Ryegrass component is to be certified as having greater than 80% live endophyte content. The Engineer may prohibit the use of seed that has deteriorated because of wetting, fertiliserburning, etc.

Otherwise the standard landscaping grass seed specifications shall apply as per Volume 3, Part 7 – Landscape Works, Section 2, Clause 4.0.

The site shall be grassed for at least 3 months and meet establishment requirements for sown areas prior to landscaping. Marginal Zone planting and mulching shall be established at Stage 1.

##### **4.3.2 Stage 2: Landscape Planting**

Stage 2 Planting shall occur within the Council planting season (2 April to 30 September) once Stage 1 sown grass has established. Ensure that no weed species exist throughout the site. Where weed species need to be eradicated either carefully spot spray and/or hand-pull in such a manner that erosion is minimised and surrounding groundcover remains undamaged. The sown grass groundcover shall be spot sprayed to 0.50m diameter for each location where individual plants are to be planted 4 weeks prior to planting, ensuring that the established grass between spot sprays remains undamaged. Maintain sprayed areas so that no new weed growth exists at time of planting. Install and

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 4 <span style="float: right;">Page 4 of 9</span>

establish planting and mulching as per the Volume 3: Part 7 Standard Technical Specifications – Landscape Works, Sections 1, 2, 3 and 4.

#### **4.3.3 *Raingardens and Vegetated Filters***

Raingardens and Vegetated Filters are to be planted up according to Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 – Landscape Works, Sections 1 and 2.

#### **4.4 Swales**

Turfed swales shall be prepared, established and maintained as per the Council Development Manual, Volume 3: Standard Technical Specifications, Part 7 – Landscape Works, Section 2: Grassing and Turfing. Both during and post-establishment, the height of the turf shall be consistently maintained at least fortnightly to designed stormwater engineering requirements. Turf shall be of a drought-resistant hard-wearing rye-grass based variety with no weed species.

Swales planted with Carex species shall be planted according to Volume 3: Part 7 Standard Technical Specifications – Landscape Works, Sections 1.

#### **4.5 Spraying and Weed Control**

Ensure that no spray enters any water body or watercourse. In respect to Stormwater Ponds, where weed species exist both on and within 2.5m adjacent to the normal standard waterline, weeds shall be controlled by either hand-pulling or weed-eating in such a manner that no debris enters any water body or watercourse.

#### **4.6 Tree Staking and Protection**

Trees shall be tied to two stakes on opposite sides to the tree using biodegradable flexible ties made from either cloth or flax. The ties are to be positioned 1/3rd up the tree's main stem and with enough give to move in the wind to ensure adequate trunk development.

### **5.0 DEFECTS LIABILITY**

#### **5.1 Defects Liability Period Inspection**

The Contractor, after completing all proposed works, shall advise the Operations Engineer (Programmes), Water & Waste Services, Hamilton City Council, at least 7 working days prior to the proposed commencement of the defects liability period and shall be available for a joint pre-defects liability period inspection.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>		
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>	
Authorised by : Parks and Reserves Team Leader	<b>Section 4</b>	Page 5 of 9

## 5.2 Defects Maintenance Requirements

The Contractor (or Developer) shall be responsible for the routine maintenance of the landscape planting works including weeding, mulching, replacement of plants and watering during the defects liability period.

The minimum standards required during the Defects Liability Period shall be as per Table 1 – Defects Period PSD Maintenance Schedule.

The Contractor at the end of the required defects liability period shall advise the Water Services, Waipa District Council, at least 7 working days prior to the proposed commencement of Council acceptance of the asset and its ongoing maintenance.

## 5.3 Defects Liability Periods

The following Defects Liability Periods apply to PSDs after obtaining the Engineers Approval as per Clause 4.5.1 of this Part.

### 5.3.1 Stormwater Ponds (& Wetlands)

#### Permanent Grassing Without Planting

Where Stormwater Ponds are to be permanently grassed, the Defects Liability Period for the grassing is a minimum of 6 months if sown between April 2 and September 30. If sown between October 1 and April 1 the period is extended for a further 6 months.

#### Staged Planting

Where a Stormwater Pond planting is implemented according to the Staged Pond Planting (refer to Clause 4.4.3 of this Part):

- Stage 1: Temporary Grassing  
The Stage 1 Grassing Defects Liability Period will extend for a minimum of 6 months or until such time as Stage 2 Planting is investigated.
- Stage 2: landscape Planting  
The Stormwater Pond Stage 2 Defects Liability Period shall be a minimum of 12 months except when planting is carried out between October 1 and April 1 the Defects Liability Period shall be extended for an additional 6 months.

#### Full Initial Planting

Where a Stormwater Pond is planted directly after completion of civil works construction, the planting Defects Liability Period shall be a minimum 12 month period, except when planting is carried out between October 1 and April 1 the Defects Liability shall be extended for an additional 12 months.

### 5.3.2 Raingardens & Vegetated Filters

Raingardens and Vegetated Filters shall have a minimum 12 month Defects Liability Period, except when planting is carried out between

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 4 Page 6 of 9

October 1 and April 1 the Defects Liability shall be extended for an additional 6 months.

### 5.3.3 Swales

The Defects Liability Period for grassed and planted swales shall be a minimum of 6 months except when the planting is carried out between October 1 and April 1 the Defects Liability Period shall be extended for an additional 6 months.

## 5.4 Final Defects Inspection Criteria

To achieve final Defects Liability approval, the PSD shall meet the following criteria, based on Volume 2, Part 9, Clause 9.4.4 – Planting Definitions and Table 2 – Approved PSD Species Plant Types. Percentages indicated are based on the total quantity of plants specified on the approved PSD Planting Plan Plant Schedule. Note: Any Defects Liability Period extensions shall apply to the whole PSD site.

### Planting Establishment

- Wet Zone**
  - 75% planting established, 25% establishing.
- Marginal Zone**
  - 100% plants established.
- Lower Bank Zone**
  - Groundcovers 75% established, 25% establishing.
  - Shrubs 50% established, 50% establishing.
  - All trees establishing.
- Upper Bank Zone**
  - Groundcovers 75% established, 25% establishing.
  - Shrubs 50% established, 50% establishing.
  - All trees establishing.
- Plant Canopy**
  - Lower & Upper Bank Zone groundcover canopy is providing 50% minimum cover over ground surface.
- Planting Density**
  - Installed plantings are at the approved consent planting plan centres.
- PSD Maintenance Loose Mulch (For example, bark)**
  - 75mm minimum depth between plants and 25mm maximum depth around plant stems.
  - No loose mulch is below the bottom edge of the Upper Bank Zone.
- Permanent Grass**
  - Permanent grass has established and is maintained according to Development Manual, Volume 3, Part 7, Sect. 2
- Planted Areas Soil**
  - All planted areas shall be moist to at least 200mm.
- Replacements**
  - All replacement plants that have been installed due to plant failure have been successfully establishing onsite for at least 3

Waipa District Council Development and Subdivision Engineering Manual		
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works	
Authorised by : Parks and Reserves Team Leader	Section 4	Page 7 of 9

months. The Engineer may request replacement records to verify installation dates; *and*,

- No more than 25% replacements have been installed 3 months prior to the final defects inspection.
  - More than 25% replacements shall incur a 12 month minimum defects extension.
- Should the final defects inspection find that areas of the PSD require replacement planting:
  - Less than 25% replacements shall incur an additional 3 months defects period after replacement planting has been completed to the Engineers approval, if the replacement planting occurs between 1 April and 1 October, otherwise the extended defects shall be 6 months minimum.
  - More than 25% replacements shall incur an additional 12 months defects period after replacement planting has been completed to the Engineers approval.

#### **Rubbish**

- No rubbish, including domestic & building material is evident within the Drainage Reserve PSD, or where the PSD is located elsewhere, in and within 5m of the PSD.

#### **Spraying**

- There is no evidence of installed plants killed or severely Damaged by weed spraying.

#### **Stormwater Inlets & Outlets**

- No plants are evident within 1m of the inlet and outlet pipes.

#### **Trees**

- Where trees were installed with stakes, the trees are staked and tied as per the Development Manual.
- Trees are upright, healthy, free of disease & pests, without spray or weed-trimmer damage, and of good conformation.
- No self-seeded trees are growing within the Wet or Marginal Zones.

#### **Weed Cover**

- The PSD has no noxious or Environment Waikato notifiable plants evident.
- There is no more than one 300mm maximum height weed per 1m<sup>2</sup> within the PSD.
- All plants are fully weed released.
- There is no evidence of vegetative waste within the Drainage Reserve PSD, or where the PSD is located elsewhere, in and within 10m of the PSD.

#### **Weed Matting**

- Within 24 months of planting installation, biodegradable matting remains intact, has no non-plant stem holes or rips, and has not become brittle enough for a hole to be created if stood on by an adult wearing safety boots.
- Where matting rounds have been used:
  - These are intact;

- Are properly pegged to the ground around plants as per manufacturer’s instructions; and,
- Have no weeds uplifting them from underneath the round.

**Table 1.**

**Defects Period PSD Maintenance Schedule**

MAINTENANCE TYPE	SUB TYPE	REGIME	FREQUENCY (Months)
<b>Mulching</b>	<b>Bark</b>	<ul style="list-style-type: none"> <li>• Check and ensure that mulch has not deteriorated nor travelled below the Upper Bank Zone.</li> <li>• Replace where quality and depth has diminished below specification requirements. Bark should only be topped up during winter or spring.</li> </ul>	12
	<b>Biodegradable Matting</b>	<ul style="list-style-type: none"> <li>• Check, repair or replace any matting that has rips and non-plant stem holes. Matting should remain intact for minimum 24 months post - planting installation.</li> </ul>	6
	<b>Biodegradable Rounds</b>	<ul style="list-style-type: none"> <li>• Check and ensure rounds are intact and remain properly pegged around plant stems for minimum 24 months post-planting installation. Remove any weeds that have uplifted rounds.</li> </ul>	3
<b>Permanent Grass</b>		<ul style="list-style-type: none"> <li>• Check and ensure that permanent grass is establishing and maintained to a minimum 100mm height and maximum 200mm height in accordance with the Development Manual Volume 3, Part 7, Section 2 Specifications.</li> </ul>	3
<b>Planting</b>	<b>Establishment</b>	<ul style="list-style-type: none"> <li>• Check and ensure all installed plants are healthy &amp; free of pests, disease, spray &amp; weed-trimmer damage, and are growing generally consistent with the species type shape &amp; form.</li> <li>• Where plants are not establishing, either remediate or replace plants.</li> </ul>	3
	<b>Installed Trees</b>	<ul style="list-style-type: none"> <li>• Check and ensure that trees remain staked as per specifications.</li> <li>• Check and ensure that all trees are growing upright.</li> </ul>	3
	<b>Self-seeded Trees</b>	<ul style="list-style-type: none"> <li>• Remove all self-seeded trees from the Wet Zone and Marginal Zone without damaging embankment toe and installed plants.</li> </ul>	3
	<b>Replacements</b>	<ul style="list-style-type: none"> <li>• Keep a record of all replacement plants installed, including the plant species botanical name, plant grade, quantity and date(s) planted.</li> </ul>	As Required

**Waipa District Council Development and Subdivision Engineering Manual**

**Volume 3 : Standard Technical Specifications**

**Part 7 – Landscape Works**

Authorised by : Parks and Reserves Team Leader

**Section 4**

Page 9 of 9

<b>MAINTENANCE TYPE</b>	<b>SUB TYPE</b>	<b>REGIME</b>	<b>FREQUENCY (Months)</b>
	<b>Replacements ...continued</b>	<ul style="list-style-type: none"> <li>Replacement installations should only occur between 1 April to 1 October each year in the Marginal, Lower Bank and Upper Bank Zones. Planting in the Wet Zone may occur in any season as long as the soil is moist to a depth of 300mm at the location of planting.</li> </ul>	As Required
<b>Rubbish</b>		<ul style="list-style-type: none"> <li>Check and remove any domestic rubbish or building material within the PSD site.</li> </ul>	3
<b>Soil Moisture</b>		<ul style="list-style-type: none"> <li>Check and ensure that all areas with installed planting have soil that is moist to a 200mm depth. Irrigation may be required during summer if planting installation was late spring-early summer.</li> </ul>	3
<b>Stormwater Inlets &amp; Outlets</b>	<b>Plant Cover</b>	<ul style="list-style-type: none"> <li>Ensure that no plants are evident with 1m of the stormwater inlet and outlet pipes.</li> </ul>	3
<b>Swale Maintenance</b>	<b>Channel</b>	<ul style="list-style-type: none"> <li>Check and remove weeds, dead plants, debris dams and pest damage.</li> <li>Remediate any channel surface scouring that has occurred.</li> <li>Ensure that Wet Zone plants are no higher than 0.5m high.</li> <li>Remove any non-installed plants from the swale channel.</li> </ul>	6
<b>Vegetative Waste</b>		<ul style="list-style-type: none"> <li>Ensure that all vegetative waste is safely removed and disposed of offsite.</li> <li>Check and remove any vegetative debris that is blocking the PSD access track.</li> </ul>	3
<b>Weeds</b>	<b>Noxious Plants</b>	<ul style="list-style-type: none"> <li>Check, remove and dispose of safely all noxious plants, including root systems from the PSD.</li> </ul>	3
	<b>Notifiable Plants</b>	<ul style="list-style-type: none"> <li>Notify Environment Waikato should any Notifiable weeds be identified within the PSD.</li> </ul>	3
	<b>Weed Cover</b>	<ul style="list-style-type: none"> <li>Check and ensure that there is no more than one 300mm high weed per 1m<sup>2</sup> throughout the PSD.</li> </ul>	3
	<b>Weed Control</b>	<ul style="list-style-type: none"> <li>Check and ensure that all plants are fully weed - released.</li> <li>Weeds may be controlled by weed-trimming, chemical or steam spraying, hand or other manual releasing unless otherwise specified.</li> </ul>	3
	<b>Chemical Spraying</b>	<ul style="list-style-type: none"> <li>Ensure that no chemical spraying occurs in the Wet Zone and Marginal Zone. All weeds growing in these Zones must be removed by other means.</li> </ul>	As Required

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 5</b> <span style="float: right;">Page 1 of 6</span>

## **SECTION 5: STREET TREE PLANTING**

### **1.0 GENERAL**

This section describes the work to be carried out to prepare planting sites and complete planting of both street and Parks/Reserve specimen trees. It is to be read in conjunction with Approved Planting Plans supplied and is supplementary to them. The plan drawings shall show the nature and extent of the work in sufficient detail to enable the works to be carried out.

Specimen trees are those that are either of a larger grade than normally planted or have been specified as such by the Engineer.

In respect to the installation of specimen trees, this specification is supplementary to and takes precedence over the standard landscape technical specifications (Volume 3, Part 7, Section 1)

All other landscape planting within the road reserve shall be designed and implemented as per Volume 2, Part 7 Street Landscaping.

In respect to all street tree planting within Waipa District, the Parks and Reserves Contract Supervisor – Street Trees shall supervise all street tree planting. The Contract Supervisor – Street trees or Parks and Gardens Unit Manager may also delegate the authority to supervise new street tree planting to a nominated Engineer. The term Engineer in these specifications therefore refers to either the Contract Supervisor – Street Trees or nominated Engineer.

### **2.0 SITE PREPARATION**

Saw cutting of existing seal where required shall be undertaken between 250mm to 300mm from the back of the kerb. The design and measurements must be approved by the nominated Engineer in the Transportation Unit, Hamilton City Council prior to works commencing. The cut line shall be parallel the kerb lines wherever possible.

All cut-outs are to be square and be a minimum size of 1m x 1m.

### **3.0 SOIL FOR PLANTING PITS**

Topsoil, both imported and existing on site, shall be a loam soil of good quality, free draining, free of perennial weeds and debris and capable of sustaining the required plant growth.

All topsoil shall be inspected at its source and shall not be placed without the Engineer' consent. Council reserves the right to request soil tests of the intended or existing topsoil as per Volume 3, Part 7, Section 1, Clause 2.2.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 5</b> <span style="float: right;">Page 2 of 6</span>

#### **4.0 PLANT MATERIALS**

All street trees, unless specified otherwise, shall be of a minimum grade of PB 95 and be first grade nursery specimens. Grades shall be supplied as follows;

- 1.5m - 2.5m specimens shall have a minimum calliper of 30 - 50mm
- 2.5m - 3.5m specimens shall have a minimum calliper of 50 - 70mm
- 3.5m - 5m specimens shall have a minimum calliper of 70 - 100mm

No substitution of species or grade shall be made without the written approval of the Engineer.

All plant material supplied shall be clearly labelled stating the plant's Latin name and the Supplier's name, (one label per plant group planted). These labels shall be removed on completion of planting.

The Contractor shall give the Engineer, not less than five days notice of dates upon which planting will commence.

Trees shall be well branched, symmetrical and of typical habit for the species. All plants shall be nursery stock of good form, healthy and vigorous with strong fibrous root systems and free of all pests and diseases.

All trees shall be supplied with the central leader intact, whereby no pruning of the central leader shall have taken place. All torn or damaged roots shall be pruned before dispatch. All stock shall be well rooted but not root bound. All root balls and containers shall be free of all weeds. Plants shall be well 'hardened –off' prior to supply.

The Contractor shall ensure that all plants and their roots shall be maintained in a moist environment, protected from adverse conditions such as drying winds, frost or water logging.

All roots must be covered during transit and stored to prevent desiccation or damage.

All trees are shall be transported in covered trailers from the nursery to the planting site.

#### **5.0 INSTALLATION OF TREES**

All specimen tree planting shall be undertaken between May 1 and September 31, especially deciduous stock. Evergreen stock may be planted outside this period at the Engineer's discretion, but will be subject to additional maintenance requirements.

All plants shall be planted on the day of delivery to the site. Plants shall be planted in the locations shown on the planting plans and in accordance with these specifications.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 5</b> <span style="float: right;">Page 3 of 6</span>

Unless otherwise indicated on the planting plans all plants shall be planted centrally within the road berm.

Planting holes shall be excavated, according to the following specification

Street trees:

Grade PB95: 1m x 1m x 600 minimum

Park/Reserve Trees: Grade PB95 2m diameter x 600mm depth

Grade PB150 2.5m diameter x 600mm depth

The base of the planting hole shall be forked to a minimum depth of 200mm and any stones over 50mm diameter or poor quality subsoil shall be removed from the hole.

The sides of the planting hole shall also be loosened by yorking to 150mm minimum, and the surrounding ground to two times the root ball diameter shall be 'forked' over to reduce compaction.

Where topsoil is unsuitable for backfilling the Contractor shall use imported or modified top soil for backfilling. The imported topsoil shall be a free draining loam of a quality and subject to inspection by the Engineer prior to placement.

Modified backfill soil shall consist of a homogenous mixture of the following:

- 7 parts by volume of good quality, friable topsoil from the site or imported.
- 3 parts by volume of approved compost e.g. that produced from the Hamilton Organic Recycling Centre.
- 2 parts by volume of coarse river sand.

The Contractor shall not plant into waterlogged soil or holes that are full or part full with water. If the water table is high and the Contractor cannot disperse the water from the hole, the Contractor shall consult the Engineer as to whether planting can continue.

All plant containers or wrapping and if necessary any root bound roots shall be removed prior to planting.

Leaves and branches shall be pruned to assist plant establishment if necessary. Generally, the nursery soil level is clearly identifiable on the main stem of the plant and replanting shall be equal to or not exceed 10mm above this level.

The hole shall first be backfilled with consolidated soil or soil mix, mounding the soil in the centre to aid even spread of the roots in 150mm layers.

The plants shall be placed in the hole ensuring that the final soil level is equal to or not exceeding 10mm above the nursery soil level and at an appropriate depth to ensure sustained growth.

Waipa District Council Development and Subdivision Engineering Manual	
Volume 3 : Standard Technical Specifications	Part 7 – Landscape Works
Authorised by : Parks and Reserves Team Leader	Section 5 <span style="float: right;">Page 4 of 6</span>

## 6.0 PLANTING LOCATION

Unless otherwise stated all Street Trees are to be centrally located within the dedicated service – free corridor.

All trees are to be planted a minimum of:  
 3m from any driveway  
 8m from any light stand  
 6m from any intersection  
 5m from any bus stop or school speed sign

All reserve plantings shall be marked out by the Engineer prior to planting works commencing.

## 7.0 IRRIGATION

All trees are to be thoroughly watered prior to dispatch from the nursery and are to be thoroughly watered-in after planting.

## 8.0 FERTILISER

All specimen tree plantings shall have two year slow release fertiliser tablets installed at the time of planting. This shall be implemented using eight minimum 10g tablets inserted in the base of the planting pit, prior to planting, 100mm below the root ball to stimulate root growth.

All fertiliser tablets shall have a balanced NPK.

## 9.0 MULCH

Where indicated in the Schedule of Prices and on the planting plans the Contractor shall provide mulching to newly planted Street and Reserve Trees.

All street trees must have a minimum 1m diameter mulching circle from the tree trunk.

Where required in small berms the entire berm from footpath to curb line shall be mulched and squared off for easy maintenance. Park/Reserve Tree planting will require a minimum mulching circle of 2m in diameter from the tree trunk.

Mulch shall be well rotted organic tree mulch. Mulch shall be free of foreign debris such as rocks and plastic.

Mulch shall be applied to a depth of no more than 150mm after planting. The final settled depth shall be no more than 120mm and no less than 100mm. Ensure that mulch is welled to a depth of 25mm around the tree trunk.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 5</b> <span style="float: right;">Page 5 of 6</span>

## **10.0 STAKING AND PROTECTION**

Newly planted specimen trees shall be staked with 2 no. 50 x 50 x 1.8m rough sawn Pine H5 treated stakes with at least one third of their length (600mm) in the ground and at least 1m exposed minimum, or as specified on the plan with the approval of the Engineer.

Two flexible ties per stake shall be attached. Ties shall be tensioned to avoid chafing of the tree against the stakes but with enough play for the tree to move in the wind. All ties shall be fixed to the stakes.

Ties shall be of a type approved by the Engineer prior to tying. Ties are to be fixed to the outer stake face with a minimum of 4 staples in a square pattern.

At the Engineer's discretion, Park/Reserve trees may require 3-4 stakes depending on the size of tree and canopy size.

All staking shall be parallel with the road kerb.

All stakes shall be inserted to avoid hitting the root ball. Stakes shall be at least 400mm away from the tree trunk and no more than 500mm away.

## **11.0 SERVICE LOCATIONS**

All service locations shown on the planting plans are to be used as an indicative guide only. It is the Contractor's responsibility to locate and protect all services. Any repairs to damage will be at the Contractor's expense.

## **12.0 TRAFFIC CONTROL REQUIREMENTS**

The Contractor will at all times comply with Transit temporary traffic control requirements and HCC traffic management requirements.

## **13.0 DEFECTS LIABILITY PERIOD**

The Planting Defects Liability period shall be 12 months from Practical Completion and acceptance of the landscape planting works by the Engineer or upon release of any implementation bond held for uncompleted landscaping.

When planting is carried out between October 1 and April 31, the Defects Liability Period shall be extended for an additional 6 months.

During and at the end of the Defects Liability Period, the planting site shall be maintained according to Volume 3, Part 7 – Landscape works, Section 1, Clauses 11.1 and 11.2 standards.

If planting is completed outside the stated planting timeframes additional watering will be required at the Engineer's discretion.

<b>Waipa District Council Development and Subdivision Engineering Manual</b>	
<b>Volume 3 : Standard Technical Specifications</b>	<b>Part 7 – Landscape Works</b>
Authorised by : Parks and Reserves Team Leader	<b>Section 5</b> <span style="float: right;">Page 6 of 6</span>

#### **14.0 AS-BUILT PLANS**

The Contractor shall supply one copy of the as-built plans recording any variation from the approved landscape planting plans and this specification to the Contract Supervisor – Street Trees for council records.

#### **15.0 DEFECTS LIABILITY PERIOD - INSPECTIONS**

The Contractor, after completing all proposed works, shall advise the Contract Supervisor – Street Trees, Parks & Gardens, Hamilton City Council, at least 7 working days prior to the proposed commencement of the Defects Liability Period and shall be available for a joint pre-defects Liability period inspection.

#### **16.0 DEFECTS LIABILITY PERIOD – FINAL**

The Contractor at the end of the required Defects Liability Period shall advise the Engineer and Contracts supervisor, Parks & Gardens, Hamilton City Council, at least 7 working days prior to the proposed commencement of Council acceptance of the asset and its ongoing maintenance.