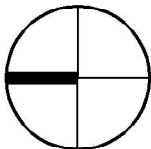
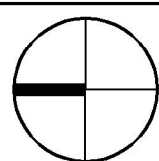
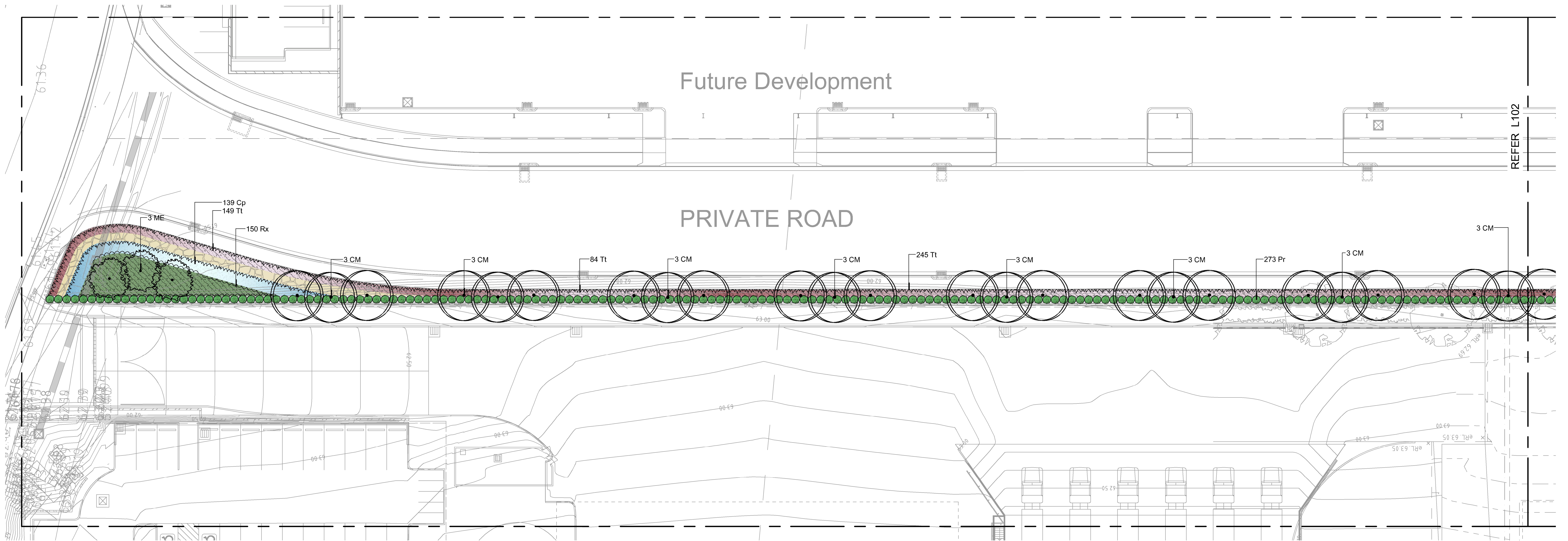
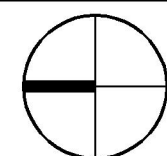
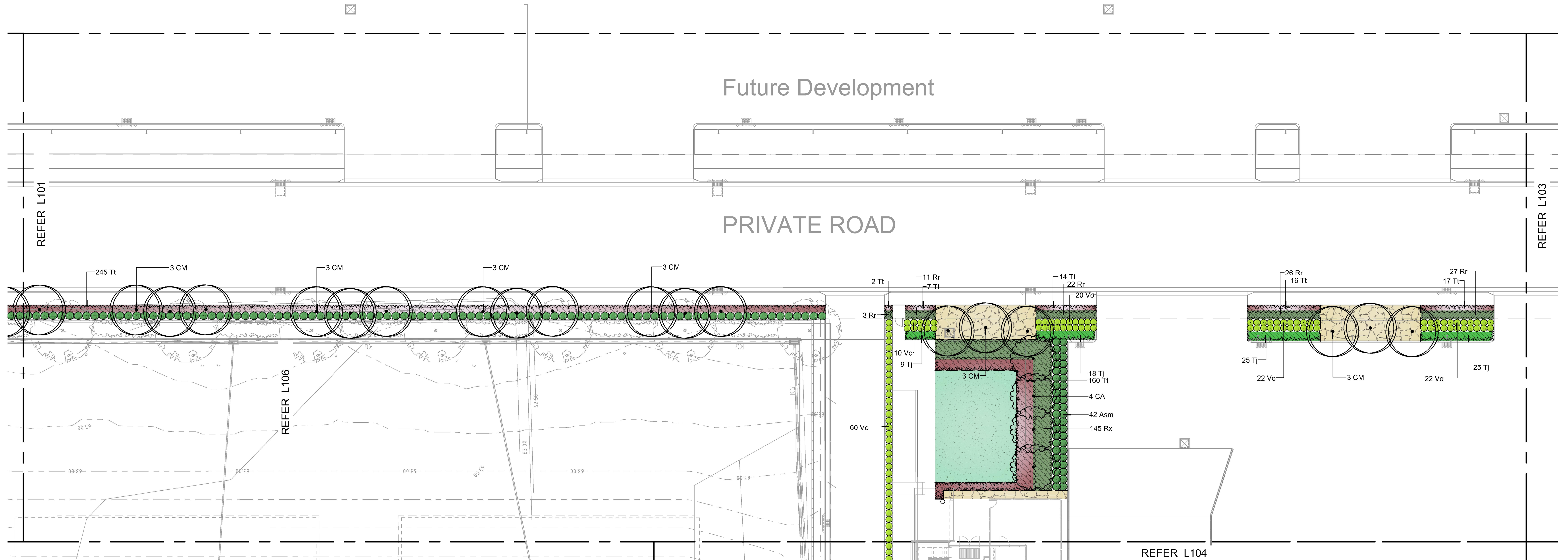


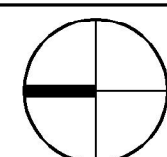
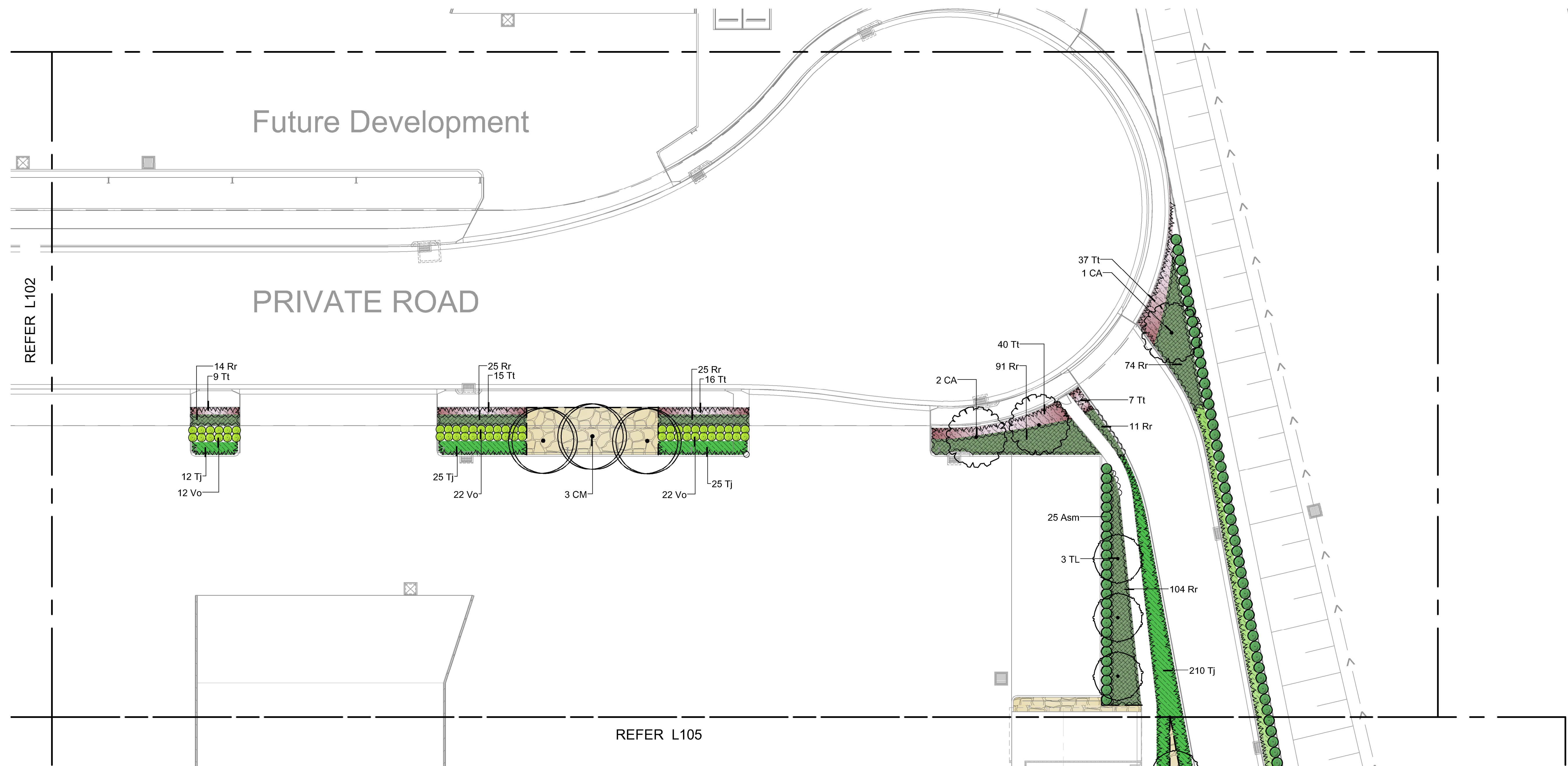
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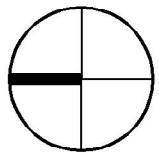
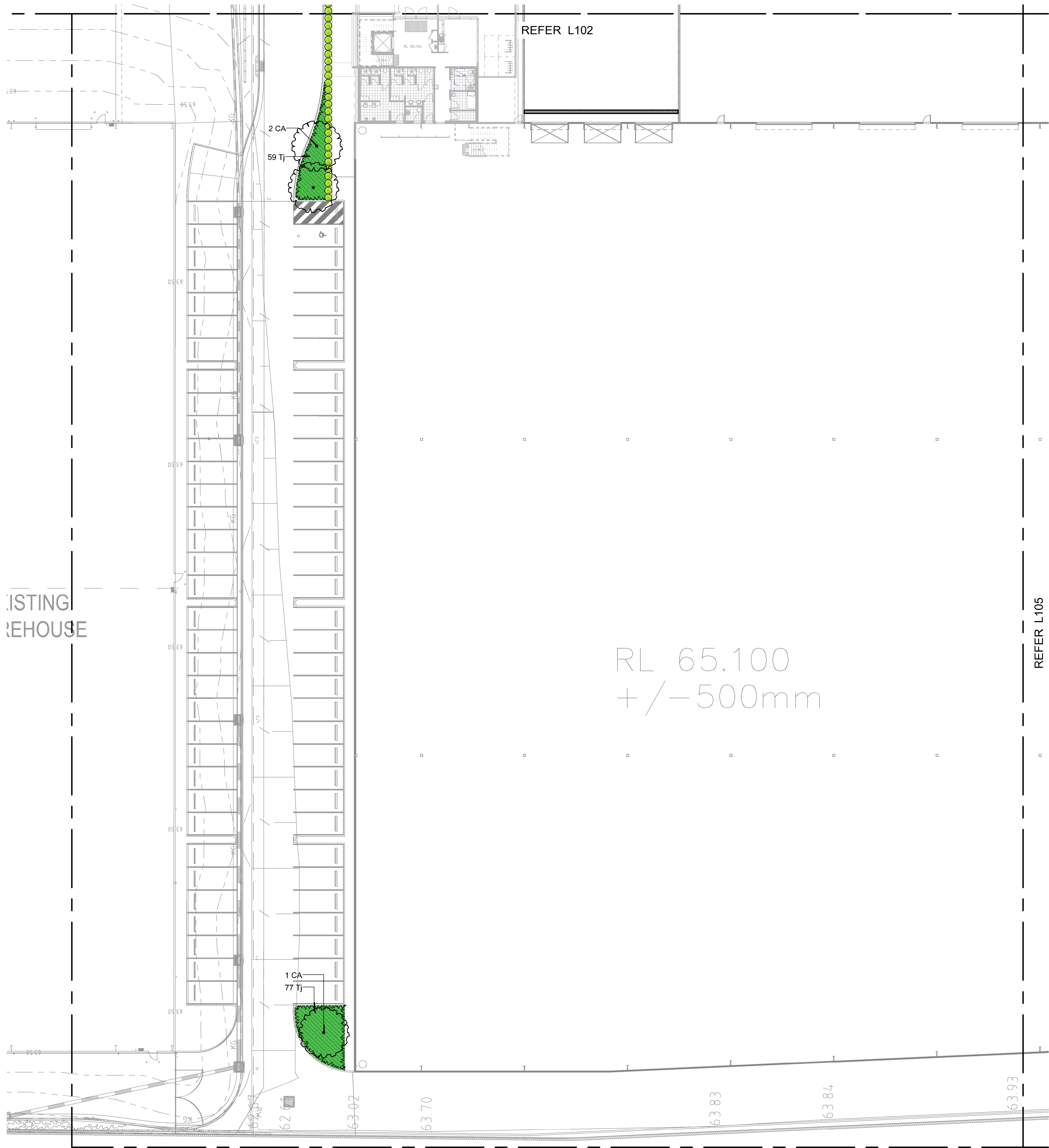
DRAWING No:	TITLE	SCALE
L-100	COVER SHEET	
L-101	LANDSCAPE LAYOUT	1:200
L-102	LANDSCAPE LAYOUT	1:200
L-103	LANDSCAPE LAYOUT	1:200
L-104	LANDSCAPE LAYOUT	1:200
L-105	LANDSCAPE LAYOUT	1:200
L-106	SCHEDULES	

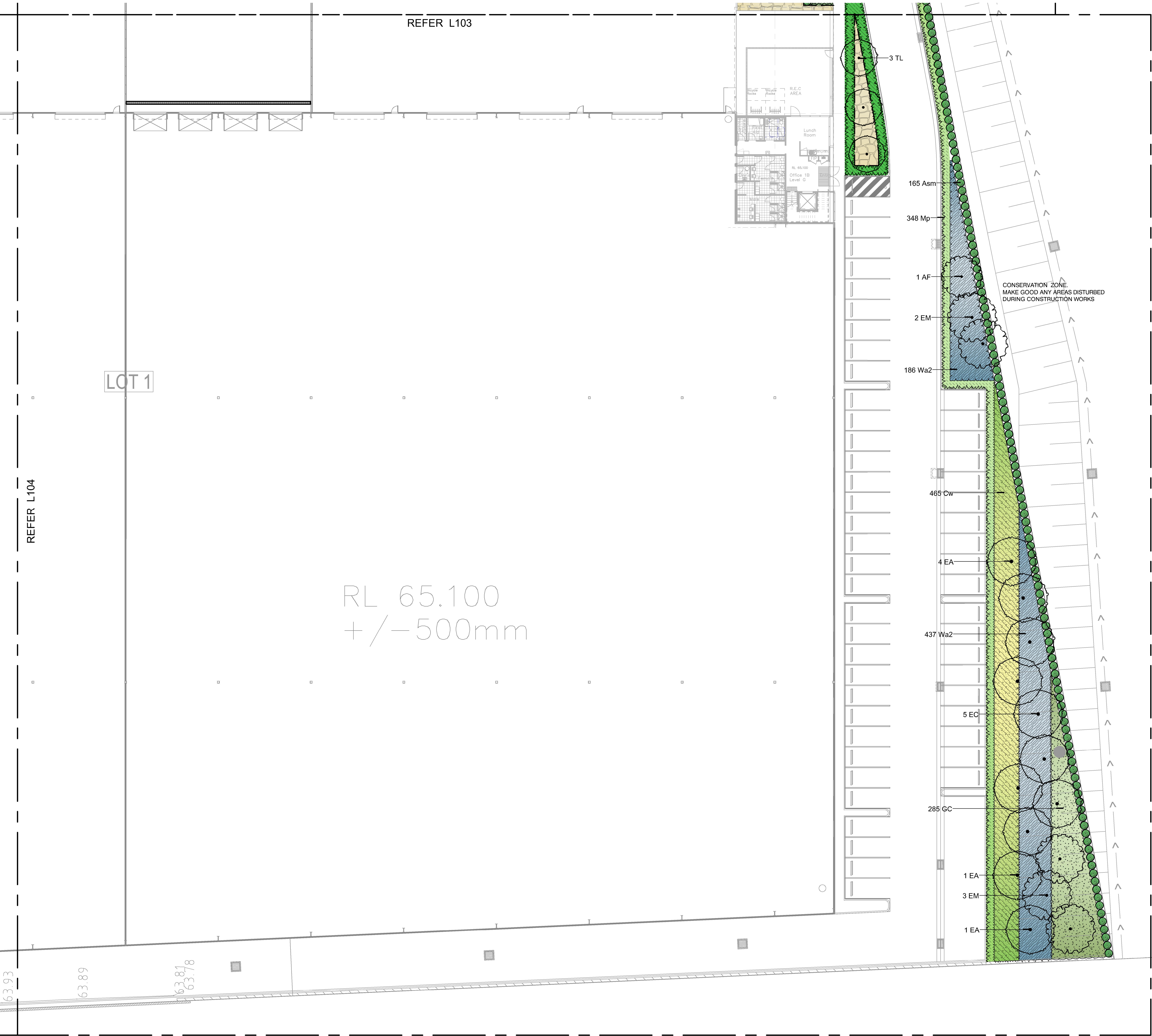












ISSUE REV DESCRIPTION DATE

Irrigation Specification

Scope of Work

A fully certified specialist irrigation contractor is required to design and install, balance, adjust and commission a fully automatic irrigation system that will deliver even, sufficient water to all new trees, shrubs, groundcovers, turf and other plants in all garden beds, pots and planters to maintain healthy growth continuously throughout the year.

Standards

- Irrigation system to comply with:
- Local or regional Council By-laws, regulations and policies
 - Local or regional Water By-laws, regulations and policies
 - AS/NZS 3500.1 - Plumbing and Drainage - Water Services
 - AS 2033 - Installation of Polyethylene Pipe Systems
 - AS 4130 - Polyethylene Pipe for Pressure applications
 - AS/NZS 4129 - Fittings for Polyethylene (PE) Pipe for Pressure Applications
 - AS/NZS 2053.1 - Conduit and fittings for Electrical installations - General Requirements
 - AS/NZS 3000 Electrical installations
 - AS 2698 - Plastics Pipes And Fittings For Irrigation And Rural Applications (all parts)
 - AS 1415 - Unplasticized PVC (UPVC) pipes and fittings for soil, waste and vent (SWV) applications (all parts)
 - AS 1477 - PVC Pipes And Fittings For Pressure Applications
 - AS 1332 - Copper Tubes For Plumbing, Gas fitting And Drainage Applications

All materials and workmanship shall comply with the requirements of relevant Australian Standards, Government regulations, Council conditions, and Authority Requirements including water and electricity. Where any discrepancy arises between this specification and that of the relevant Authorities, ensure that the system complies with all regulations. Install materials in accordance with the manufacturers specifications .

Performance

The Irrigation Contractor shall be responsible for establishing the number and locations of drip emitters, zones, solenoid valves, filters etc required to provide a satisfactory performance of the system. Irrigation contractor is to provide enough solenoid valves for effective micro-zones based for groups of plants and turf with similar water requirements and microclimates.

The Irrigation Contractor must have the system operational and properly tested before the planting is commenced in each area. Contractor is to ensure any irrigation that is damaged during the course of construction is repaired and or re-installed prior to practical completion. Any planted areas specifically not nominated for irrigation are to be hand watered as part of the plant establishment/ maintenance period.

Shop drawings

- Submit drawings and schedules showing the layout and details of the system, including but not limited to:
- Water take offs / backflow prevention devices
 - Pressure regulating valves
 - Booster box as required
 - Irrigation controller cabinet
 - Irrigation lines and conduits
 - Solenoid valve locations / valve boxes
 - Cable and conduit routes
 - Drip irrigation line layout
 - Popup and spray locations
 - Micro-irrigation stake layout
 - Sensor, rain and weather station locations

Technical Data

All technical data relating to the equipment tendered shall be included and neatly bound in a folder with all relevant warranties. All guarantees for materials shall be supplied to the client on practical completion and commissioning.

Operational Manual

- Provide an operational manual containing details of the following:
- Complete operating instructions for the system
 - Complete programming and operating instructions for the control system and irrigation controllers
 - Full details of all equipment used in the system
 - Full maintenance and servicing instructions and maintenance program
 - 2 laminated colour coded copies of as built drawings, one copy framed, indicating dimensions of pipes from the building or other permanent features, numbered and colour coded irrigated areas referring to particular stations. The drawing shall be fixed next to irrigation controller.

Materials & Components

Water Supply / Water Take Off Point

The source of water shall be from a town water take off point if there is no on-site retention tank provided for irrigation. Refer to Hydraulic Engineer's Drawings and Specification and confirm and co- ordinate with Head Contractor. Co-ordinate with Hydraulic Consultant to connect irrigation take off point to the retention tank or closest existing water supply.

Backflow Prevention Device

A licenced plumber must install a backflow prevention device at the potable water irrigation take off point. The device must meet requirements of development and the Local Water Authority

Pressure Regulating Valves

Supply and install pressure-regulating valves at take-off points, which are

adjustable between 100 - 600KPa, to ensure the accurate amount of water is supplied to each zone and for long term performance of the irrigation system. Provide filters and mesh filter screens to suit irrigation lines and emitters. Typically for drip irrigation provide a 40mm filter with 120 mesh filter screen (130 microns) sized to suit the flow immediately upstream from the pressure-regulating valve. Provide gate valves upstream from the filter and downstream from the pressure-regulating valve. Mount the assembly in an accessible position in a valve box, access pit or adjacent building, and provide backflow prevention, if not connected to the central backflow prevention device. Supply pressure regulation specific to the irrigation requirements of each zone.

Automatic Control Valves (Solenoid Valves)

24 V solenoid actuated hydraulic valves with flow control and a maximum operating pressure rating 1MPa. Provide stainless steel bonnet holding down bolts and internal metal parts of stainless steel, able to be serviced without removal from the line. Provide a gate valve of the same size immediately upstream of each automatic control valve. House valves in an accessible position in a high impact plastic valve box, and provide backflow prevention, if not connected to the central backflow prevention device. Each valve must be provided with numbers identical with station number and corresponding with as built plan.

Valve Boxes

Supply and install high impact plastic valve boxes with snap lock covers at finished ground level. House all valves in valve boxes. The size shall be the minimal size practical. The exact positions must be proposed by Irrigation Contractor on the Shop Drawings for approval of the Principle. As a rule do not install in conspicuous locations. Top of the box shall finish flush with ground and the box shall be installed over the drainage aggregate. If two or more boxes are used in one location, they shall neatly line up. All boxes shall be located within garden beds wherever possible. When non potable water is use Valve box lids are to be lilac. Support the box on bricks at each side as required.

Conduits

Provide protective Metric PVC Pipe conduits of sufficient diameter where piping runs under or penetrates paving, retaining walls, slabs or similar objects.

Irrigation pipes

Irrigation mainline is to be PE 100 MDPE pipe rated PN 12.5. Ensure pipes are suitable for applicable pressure. Confirm pressure ratings during Tender. All pipes must carry clear stamp referring to class and supplier. Irrigation lines using non potable water must colour coded to Australian Standards. Install to manufacturer's instructions. Use copper pipes where required by Local Water Authority. Ensure irrigation lines are fully concealed and pipework is installed in the least visible position possible. Pipes in trenches with rock or concrete bases shall be laid on a minimum 75mm thickness of bedding material.

Fittings

Supply and install Metric Polyethylene fittings as appropriate. Install to manufacturer's instructions. Copper shall be used in situations as defined by the Local Water Authority.

All pipe and fittings are to be installed in accordance with the manufacturer's specification.

When installing the pipe in either hot or cold weather the Contractor is to allow for expansion or contraction of the pipe.

Handling

Pipes are to be supplied in the longest practical lengths. The Contractor is to ensure that the pipe is handled, stored and installed in accordance with the pipe manufactures requirements.

Bending

Where the pipe is to be bent, the Contractor must ensure that the radius, of which the pipe is bending, does not exceed the manufactures specification. The minimum radius must not be tighter than 20 times the pipe diameter.

Where pipes are to be installed below paving only factory supplied straight lengths are to be used.

Tapping saddles

Tapping Saddles are to be MDPE rated to a minimum PN 16 with tight fittings stainless steel retaining rings fitted to the branch. All saddles are to have 304 stainless steel set bolts and nuts.

Anti-seize is to be used on all threads prior to tightening

PVC pipe

PVC pipe is to be used for the popup sprinkler laterals. The pipe is to be a minimum pn12 with solvent welded fittings.

Thread sealing

All threads are to be cleaned prior to wrapping with single density commercial grade PTFE Teflon thread tape.

The use of sealing compound is acceptable unless specified otherwise. The Contractor must ensure that the use of liquid sealers does not affect the operation of any other compound of the system or is in breach of any warranty terms associated with the products installed.

Contractors are to ensure threads remain clean while installing.

SPRINKLERS

Location: Turf areas

Sprinklers are to be popup type, with check valves and adjustable nozzles. Arcs are to be set to limit overthrow onto the surrounding hardstand areas. Sprinklers are to installed level to the surrounding undisturbed ground.

The Contractor will be required to rectify any subsidence of more than 20 mm. Refer to detail for installation.

Articulated risers

All popup sprinklers are to be fitted with schedule 40 articulated riser assemblies consisting of:

- 3 x 15 DN M & F Elbows
- 1 x 15 DN x 200 mm riser
- All threads to be sealed using thread tape.

DRIP TUBE

Location: Garden Beds

All drip tube is to be suitable for sub-surface installation and be:

- Minimum 13 mm OD
- Pressure regulated to either 2 l/hr or 2.3 l/hr

Have a root inhibitor extruded in the tube

Have emitters set at 400 mm or 300 mm apart.

Irrigation lines using non potable water must be clearly marked "Caution Not For Drinking" and colour coded to Australian Standards. Install to manufacturer's instructions.

Installation: Lay driplines on finished ground surface under planting bed mulch. Exposed lines are not acceptable. All trees are to be provided with triple rings over the rootball. Connect micro-tube laterals with proprietary push in or screw in fittings. Saturate the soil with hose water prior to commencing use of the dripline irrigation system and continue hose watering supplementation during plant establishment as required.

Header and footer manifold pipe

Manifolds may be fabricated using either 25 DN LDPE pipe.

Tube fittings

All barbed fittings are to match the ID of the pipe and match the manufacture's specification.

All connections are to be fitted with a form of external locking clamp or ring.

Air relief valves

Air relief valves are to be fitted onto the manifold pipe.

The final location is to be determined by the Contractor to allow easy of maintenance in the future as plants grow and the need for special safety equipment.

Irrigation Controller

Supply and install an automatic digital irrigation controller, with the option of snap in modules to extend capacity. The controller must:

- be capable of running drip, spray, micro spray and popup irrigation programs on all required stations
- be capable of linking with sensors installed in all planters
- be programmable for up to 4 start times per day
- provide schedules of min 7 days duration

Location: Contractor to select appropriate location and indicate on shop drawings

Electrical Connection: Head contractor to provide electrical connection from existing or proposed power source for connection of irrigation Controller.

Rain Sensor

Supply and install a rain sensor to prevent irrigation during rainfall. This unit is to be set to turn the irrigation system off after a min. 3mm of rain has occurred.

Control Wires

Connect the automatic control valves to the controller with double insulated underground cables laid inside dedicated conduit piping where possible. Lay intertwined for their full length without joints except at valves, sensors and branches off common wires. Provide waterproof connections. Provide expansion loops at changes of direction and at joints.

All wiring for 24V AC control of solenoid valves shall be sized to ensure a minimum of 20 volts at the valve when calculated on the inrush amperage of the valve solenoid. All wiring shall be a minimum size of 7/050 building wire of 1/0.8 multi-core cable. All wires shall be run in min. 20mm conduits. Electrical conduits shall be also used under paving and other permanent surfaces. Jointing of cable will be a continuous length between the irrigation controller and the solenoid valve. All wire jointing will be carried out in such a way as to ensure a completely waterproof seal. It is recommended to install spare wires alongside the main irrigation circuits.

Operation and Maintenance

Guarantee all workmanship for a period of 12 months from commissioning and be responsible for the rectification of any works that have been carried out in an unworthy manner. During the Defects and Liability Period and Maintenance Period the contractor shall maintain the system in full working order and operate the system at least once a week.

Landscape Specification

General

The Landscape Contractor shall check all relevant dimensions on site before proceeding with the work. Under no circumstances shall dimensions be scaled from the drawings.

Weed Eradication

Eradicate weeds using environmentally acceptable methods, such as a non-residual glyphosate herbicide in any of its registered formulae, at the recommended maximum rate.

Continue eradication throughout the course of the works and during the planting establishment period.

Hardscape elements

Feature Gravel - Sandstone spill

Before placing gravel ensure that subgrade depths are correct and that the surface is even and ready to receive gravel as a consistent layer within the steel edge frame. Ballast rock is to be placed by hand at the base of any tree trunk and its immediate surrounds. A 50mm layer of mulch will be laid under rock ballast areas.

Gravel shall be equal to "Sandstone Spall" (Min 75mm - Max 150mm)

Produce an even surface and finish flush with the adjoining surfaces and edges.

Decomposed Granite Paving

Decomposed granite shall be of uniform colour and low plasticity. Particle size shall be graded up to 10mm maximum with between 30-40% less than 5mm.

Colour: Brown

Lay paving compacted to a thickness of not less than 100mm. Mix gravel with ool white cement at a proportion of 5% off white cement to gravel. The mix shall be damp but not wet when placed. Compact with vibrating roller generally and in accessible areas by other approved mechanical means. Produce an even surface and finish flush with the adjoining surfaces and edges. Ensure that the granite does not come in contact with trunk/stem of plantings.

Edging

Edging shall be used as a separation between gardens and lawns and areas of sandstone spill.

Concrete Edge

- Location: Between gardens and nature strip as shown on Plans.
- Type: 150mm x 150mm "Square" Profile
- Colour: Charcoal

Galvanised steel edging

- Location: Between gardens and internal turf areas and gardens and gravel areas
- Type: 100 x 4mm flats
- Installation: Install with 600mm long galvanised rods 12mm in dia. Welded to steel flat. Rods to be installed no further than 1m apart and 300mm from joins. Joins are to be butt welded. All welds are to be cleaned and coated with Galmet Cold Gal[®] or similar.

Softscape elements

Subsoil

Excavate all garden beds to bring the subsoil to at least 275mm below finished design levels. Excavate all turf and grass areas to bring the subsoil to at least 100mm below finished design levels. Shape the subsoil to fall to subsoil drains where applicable. Do not excavate within the drip line of trees to be retained.

Cultivate the subsoil to a further depth of 100mm. Trim the surface to design levels after cultivation.

Topsoil

Import topsoil for the garden and turf areas. All imported soils are to conform to AS 4419.

Spread the topsoil on the prepared subsoil and grade evenly, compact lightly and uniformly ensuring topsoil is finished to design levels, allowing for mulch or turf, which is to finish flush with adjoining hard surfaces. Grade soil to drain freely, without ponding, to catchment points.

Spread topsoil to the following typical depths:

- Garden Beds: 225mm
- Turf areas: 100mm

Fertiliser

Provide proprietary fertilisers, delivered to the site in sealed bags marked to show manufacturer or vendor, weight, fertiliser type, N:P:K ratio, recommended uses and application rates.

Trees: Apply two (2) 20g tree tablets / 500mm of height (maximum 8/tree)

Mass planted areas: Apply slow release fertiliser (with N:P:K ratio of 16:4:8:3) or equivalent to individual plants at manufacturers recommended rates.

Turf : Apply a Turf starter fertiliser to manufacturer's recommendations

Embankment Stabilisation

Where necessary to prevent soil erosion or soil movement, stabilise embankments, where slopes are greater (steeper) than 1 in 3 (slope >1 in 3). Stabilise embankments using biodegradable Jute mesh. Install in accordance with manufacturer's specification, including 300 x 300 mm anchor trenches at top and bottom, backfilled with soil and compacted, and U-shaped galvanised steel pegs at 1000 x 1000 mm intervals generally and 250mm at overlaps.

Plants

Supply plants in accordance with the landscape drawings and schedules, which have the following characteristics:

Large healthy root systems, with no evidence of root curl, restriction or damage.

Vigorous, well established, free from disease and pests, of good form consistent with the species or variety.

Hardened off, not soft or forced, and suitable for planting in the natural climatic conditions prevailing at the site.

Grown in their final containers for not less than twelve weeks.

Trees, unless required to be multi-stemmed, shall have a single leading shoot.

All plant specimens are to be true to name and variety listed in the plant schedules on the landscape drawings. Make no substitutions of species type or container size unless approved by the Principle.

Installation of Plants

Do not plant in unsuitable weather conditions such as extreme heat, cold, wind or rain.

Do not vary the plant locations from those shown on the drawings unless otherwise directed.

For tree plantings, excavate a hole to twice the diameter of the root ball and at least 200mm deeper than the root ball. Break up the base of the hole to a further depth of 100mm and loosen compacted sides of the hole.

Thoroughly water the plants before planting, immediately after planting, and as required to maintain growth rates free of stress. No plant material shall show signs of water stress at any time.

Mulching

Garden mulch shall conform to AS4454 and be free of deleterious and extraneous matter such as soil, weeds, sticks, wood slivers, rubbish, litter, stones and vegetative reproductive parts of undesirable plants.

Before placing mulch ensure that soil depths are correct and that the soil surface is even and ready to receive mulch as a consistent layer.

Place mulch in all garden beds to a depth of 75mm, when all specified plants are installed, clear of all plant stems, and rake to an even surface flush with the surrounding finished levels and evenly graded between design surface levels. The specified depth shall be achieved after the mulch has settled.

Type: ANL Forest Blend or equivalent

Stakes and Ties

Stakes shall be durable hardwood, straight, free from knots or twists, pointed at one end, in the following minimum quantities and sizes for each of the various plant pot sizes:

- Plants (>25L): One (1) of 38 x 38 x 1200mm;
- Semi-advanced plants (>75L): Two (2) of 50 x 50 x 1800mm; or
- Advanced (>100L): Three (3) of 50 x 50 x 2400mm.

Drive stakes into the ground a minimum one third of their length, making sure they are plumb, equal in height and avoids damage to the plants root system.

Provide ties fixed securely to the stakes as necessary to stabilise the plant, allowing a small degree of movement but not affording any damage to the stem. Ties shall be 50 mm hessian webbing installed around the stake and stem in a figure of eight pattern and stapled to the stake.

Turf

Turf: Couch

Turf to be delivered to site as 25mm minimum thick cut rolls.

Obtain turf from a specialist grower of cultivated turf. Provide turf of even thickness, free from weeds and other foreign matter. Deliver turf to the site within 24 hours of being cut, and lay it within 24 hours of delivery. Prevent it from drying out between cutting and laying.

Lay the turf as follows:

- In stretcher pattern with the joints staggered and close buttet.
- Parallel with the long sides of level areas, and with contours on slopes, and
- To finish flush, after tamping, with adjacent finished surfaces of ground, paving edges, and timber edges. Lightly tamp to an even surface immediately after laying.

Water immediately after placement as necessary to keep the topsoil moist. Protect newly turf areas against pedestrian and vehicular traffic until grass is established.

Plant establishment and maintenance

The Landscape Contractor shall rectify defects during installation and those that become apparent in the works under normal use for the duration of the contract Defects Liability Period.

The Landscape Contractor shall maintain the contract areas by using industry accepted horticultural practices for 52 weeks. The landscape maintenance works shall include, but not be limited to, the following:

- Replacing failed plants
- Pruning
- Insect and pest control
- Fertilising
- Maintaining mulch
- Mowing
- Watering
- Weeding
- Rubbish removal
- Top dressing of lawns as required.

Logbook

Keep a Maintenance Logbook recording when and what maintenance work has been done and what materials, including chemical materials, have been used.

Submit the initial logbook for inspection prior to Practical Completion and again at the end of the Defects Liability Period. M


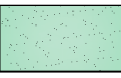
PLANT SCHEDULE				
TREES	BOTANICAL / COMMON NAME	SIZE		QTY
AF	Angophora floribunda / Rough Barked Apple	45 litre		1
CM	Corymbia maculata / Spotted Gum	100 litre		45
CA	Cupaniopsis anacardioides / Carrot Wood	100 litre		10
EA	Eucalyptus amplifolia / Cabbage Gum	45 litre		6
EC	Eucalyptus crebra / Narrow-leaved Ironbark	45 litre		5
EM	Eucalyptus moluccana / Gum-topped Box	45 litre		5
ME	Magnolia grandiflora 'Exmouth' / Exmouth Southern Magnolia	200 litre		3
TL	Tristaniopsis laurina 'Luscious' TM / Luscious Water Gum	45 litre		6

SHRUBS	BOTANICAL / COMMON NAME	SIZE		QTY
Asm	Acmena smithii minor / Dwarf Lilly Pilly	200mm		232
Pr	Photinia x fraseri 'Red Robin' / Christmas Berry	200mm		273
Vo	Viburnum odoratissimum / Sweet Viburnum	200mm		190

SHRUB AREAS	BOTANICAL / COMMON NAME	SIZE	DENSITY	QTY
Cw	Callistemon citrinus 'White Anzac' / White Anzac Bottlebrush	150mm	3/m²	466
GC	Grevillea x 'Canberra Gem' / Canberra Gem Grevillea	150mm	3/m²	286
Rr	Rhaphiolepis indica Snow Maiden / Indian Hawthorn	200mm	3/m²	433
Rx	Rhaphiolepis x Oriental Pearl / Indian Hawthorn	300mm	3/m²	296
Wa2	Westringia fruticosa 'WES08' TM / Aussie Box Coast Rosemary	150mm	3/m²	623

GROUND COVERS	BOTANICAL / COMMON NAME	SIZE	DENSITY	QTY
Cp	Carpobrotus glaucescens / Pig Face	150mm	3/m²	139
	Carpobrotus glaucescens / Pig Face	150mm	3/m²	139
Mp	Myoporum parvifolium / Trailing Myoporum	150mm	3/m²	348
	Myoporum parvifolium / Trailing Myoporum	150mm	3/m²	348
Tj	Trachelospermum jasminoides / Chinese Star Jasmine	150mm	3/m²	486
Tl	Trachelospermum jasminoides 'Tricolor' / Variegated Star Jasmine	140mm	3/m²	1,063

REFERENCE NOTES SCHEDULE

CODE	01 GENERAL DESCRIPTION
	01-01 75 -150mm SandstoneSpalls. Depth: 150mm deep over 50mm forest fines Location: As shown on landscape plans Min size: 100mm, max 200mm
	01-03 Turf Species: Couch Location: As shown Turf to be delivered to site as minimum 25mm mm Thick cut rolls. Turf to be laid in a stretcher pattern. Finished surface to be flush with adjacent levels.
	01-05 Galvanised Steel Edging Sizes: 100 x 4mm Location: As shown on landscape plans. Between all ballast and garden areas. Internal turf and garden areas. Along eastern boundary.
	01-06 Concrete Edge Location: Between garden turf areas and along boundary Type: 150mm x 100mm Square Profile Colour: Charcoal

