

SECTION 31

LANDSCAPE

TABLE OF CONTENTS

31.0	LANDSCAPE	2
31.1	Design Process Requirements	2
31.1.1	Approvals Required during Design	2
31.1.2	Design and Documentation Report and Reviews	2
31.1.3	Construction Requirements.....	3
31.1.4	Defects liability, Establishment and Maintenance period.....	3
31.2	Reference material	4
31.3	Site appreciation and investigations	4
31.4	Landscape Scope	5
31.5	Landscape design.....	5
31.6	Earthworks.....	5
31.7	Elements	6
31.8	Drainage.....	6
31.9	Water supply	6
31.10	Irrigation	6
31.11	Gardens	7
31.11.1	Soils.....	7
31.11.2	Plants	8
31.11.3	Mulch.....	9
31.12	Grass	9
31.13	Lighting	10
31.14	Landscape furniture.....	10
31.15	Entertainment Areas	11

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	05/05/15	Manager, Infrastructure Services	Updated with Manager, Environment comments and cross referenced with new sections
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31.0 LANDSCAPE

This document is a section of the James Cook University (JCU) Design Guidelines and is not to be read in isolation. Consultants and Contractors are required to comply with all sections of the JCU Design Guidelines.

These guidelines relate to the JCU Townsville and Cairns campuses. Each campus has its own intrinsic quality and character, which is important to capture consistently in design & development to preserve community.

Landscape architectural consultants are to provide design/documentation/contract administration services to building and infrastructure projects as part of a project consultant team or for specific campus enhancement/development projects.

31.1 Design Process Requirements

Ensure that all works necessary for the complete installation and successful operation are advised to other consultants and specified as interface with other engineering disciplines, professions or specialists. Ensure that information required to accurately design the services is obtained from other consultants as required. The Manager, Infrastructure Services shall approve all connections to existing infrastructure.

31.1.1 Approvals Required during Design

Approval shall be obtained from the JCU Estate Directorate, Deputy Director, Planning and Development for:

- Any changes to, or deviations from these requirements,
- All reports and drawings submitted at SD, DD and CD,
- Tree selection,
- Mulch type,
- The species of grass proposed for each situation,
- Any seats and tables type (including custom seating) with/without external GPO's,
- The location of bin enclosures,
- Any new memorial plaques,
- Any ornamental water fountains, and the
- The location and type of statues and ornaments, and the
- Maintenance of the JCU exclusion zones to all infrastructure and installation of root barriers.

31.1.2 Design and Documentation Report and Reviews

The design reports and reviews give a high level understanding to JCU of the requirements for the project. At SD, DD and CD, the following are required to be submitted for approval by the JCU Estate Directorate, Deputy Director, Planning and Development

Provide scaled drawings at 1:100 indicating all finishes, levels including planting plans, landscape plans, tree protection plan, details and sections, set out plans, irrigation plans, specification etc.

Subsequent design phases not to proceed without approval. Cross checking with other consultants and JCU Estate Directorate are required for:-

- Bulk earthworks for sub grade levels.
- Location and level of stormwater and sewerage sumps/inspection/chambers in the landscape with paving infill of lids required in pathways.
- Location and levels of ORGs in external areas with required falls away and location of hose cocks over.
- Location of RPZV, other valves, electrical substations, fire hose reel cabinets and other service elements to be located in the landscape.
- Maintenance of JCU exclusion zones around all major infrastructure and installation of root barriers as required.
- Location of lights and power supply in landscape areas.
- Type and extent of light available in interior landscapes.
- Collection and use of rainwater or grey water.
- Water features and fountains equipment.
- Review design verification.
- Check Bill of Quantities.

31.1.3 Construction Requirements

Inspections are during construction, with certification of the work at practical completion, the end of completion of establishment and maintenance and the end of defects liability period.

31.1.4 Defects liability, Establishment and Maintenance period

All soft landscape work and irrigation to be maintained during an establishment and maintenance period of a minimum of 12 weeks after practical completion.

After satisfactory completion of this period, arrangements are to be made for a formal handover and familiarisation to the JCU Estate Directorate personnel, arranged through the JCU Project Manager.

All hard landscape work is to have a warranty period for 12 months after practical completion.

The landscape architectural consultant is required to provide the JCU Project Manager with:

- As Built drawings (refer to Section 34 – Documentation).
- Warranties for equipment and workmanship.
- Commissioning data for the irrigation system.
- Handover information.

31.2 Reference material

Designs produced for JCU should respond to the reference documents listed:

- Current University Strategy and/or Master Plans
- World Heritage Listings – Cairns Campus
- Identification of profile areas culturally significant trees and other elements for protection/retention including plants required for special purpose e.g. Biological classes.
- Campus Vegetation Listings
Cairns <https://www.jcu.edu.au/discover-nature-at-jcu/plants/plants-on-cairns-campus> and <https://www.jcu.edu.au/discover-nature-at-jcu/plants/sheet1>
Townsville <https://www.jcu.edu.au/discover-nature-at-jcu/plants/plants-on-townsville-campus2>, <https://www.jcu.edu.au/discover-nature-at-jcu/plants/douglas-campus-plant-species> and <https://www.jcu.edu.au/discover-nature-at-jcu/plants/grass-genera-in-townsville>
- Choosing Plants for Areas Prone to Cyclones <https://www.jcu.edu.au/discover-nature-at-jcu/plants/choosing-plants-for-areas-prone-to-cyclones>
- Areas of vegetation restoration as designated by the Queensland vegetation Management Act 1999. Particular focus on the Cairns Campus for the regrowth vegetation map version 2.1 as produced by DERM.
- Bushfire Risk Analysis Mapping as produced by QFES.
- Signage in Section 17 and in The JCU Campus Wayfinding Package available on the JCU Estate Directorate website

31.3 Site appreciation and investigations

Investigation of the site for each proposed project needs to be undertaken and include:-

An appreciation of site conditions with:-

- A survey of topographic conditions, aspect, overland flows and run off, rock and soil types.
- An identification and study of circulation, movement predictors, animal habitats, heritage, biological and visual values, access ways and legibility.
- Identification of site vegetation and existing trees in consultation with the Grounds Supervisor and/or a specialist arborist to report on condition and significance of the trees on site and

procedures for removal/transplantation and/or protection and maintenance of trees and other vegetation proposed to be retained during the design process.

- On site consultation with JCU Directorate Manager, Infrastructure Services, project, maintenance and operations personnel for special considerations, existing services, future maintenance, soil conditions, water collection, the presence of Yellow Crazy ants in Townsville and Electric Ants in Cairns.
- Significant weed identification
- Memorials.

31.4 Landscape Scope

The scope for landscape design for external work includes hard and soft landscape elements, minor earthworks, erosion control, external furniture, signage, drainage and irrigation.

Co-ordination with specialist services, structural, civil engineers for gradients and levels, external lighting, hydraulic services (drainage and water supply).

Scope includes establishment and maintenance of plants for a specified period before handover to the University and where the development adjoins a public road co-ordination with the relevant authority for streetscape design.

31.5 Landscape design

Landscape design and documentation to be complimentary to and integrated with the building and services design and documentation.

The landscape design to conform to Campus landscape principles, strategies and management held in reference documents and, in particular, to design continuity, sustainability, legibility, safety, expression and functionality and ongoing maintenance requirements, specifically:

- Cairns- Maintain visibility from the highway
- Townsville- Consider the landscape enrichment of James Cook Drive as the campus development shop front. Consideration should be made to locating designated “shading areas” outside buildings but clear of entrances/ air intakes.

31.6 Earthworks

Generally bulk earthworks are designed and documented by the civil engineering consultant.

It is important that all aspects of: -

- Protection of existing trees and vegetation
- Maintenance measures for vegetation adjacent to construction – continuity of water supply
- Removal of trees and plants not required on or adjacent to the project site, chipping and stockpiling for reuse as mulch.
- Erosion and sediment control measures
- Stripping and treatment (removal of stone for reuse as mulch) and removal of other extraneous material, stock piling of topsoil; and

- Locations of major infrastructure and maintenance of exclusion zones and installation of required root barriers as required are co-ordinated with the landscape architect.

31.7 Elements

Generally landscape elements and materials will vary between each campus site, and proposed materials will be required to be submitted for approval by the JCU Estate Directorate, Deputy Director, Planning and Development.

31.8 Drainage

Surface

Where appropriate, and in conjunction with JCU's erosion and sediment control requirements detailed in sections 24 and 32 these design guidelines, all stormwater runoff is to be captured and/or integrated into ground water. This to be determined in conjunction with the JCU Manager, Infrastructure Services.

Sub Surface

Install sub surface drainage in all garden areas adjacent to paths, buildings and turf.

Install sub surface drainage adjacent to paths and buildings in all turfed areas.

Corrugated, slotted pipe to be encased in 150mm gravel surround.

Solid pipe connections to be used under paved areas.

High end of pipe to be turned up and capped 75 mm above mulch or level with turf for flushing.

Connect sub surface pipe to stormwater system.

31.9 Water supply

Water is to be supplied to the site for irrigation of designated turf and gardens, for hose points and for drinking fountains adjacent to the building with appropriate backflow prevention units.

Hose points are to be located for ease of access on building and at approximately 40 metres apart, 800 mm above ground.

Field gullies are to be located under hose cocks, and waste water from drinking fountains discharged in accordance with the relevant standards.

Water specific for irrigation should utilize recycled/bore water where available.

31.10 Irrigation

All designated grass and gardens are to be irrigated through an automatically controlled irrigation system and connected to the campus CBUS system.

Systems to be water efficient, low maintenance and are to be designed by an authorized irrigation designer with plans and specification included in landscape documentation and/or specified for design and construction to JCU standards. All systems to be fitted to Manufacturer's design specifications, in their entirety.

All irrigation piping and equipment are to be installed at a maximum depth of 200mm.

Landscape Architect and Irrigation designer to meet on site with JCU Project Manager and Townsville Grounds Supervisor or Cairns Maintenance Supervisor before undertaking design.

Equipment to be located for ease of access for maintenance staff, including sprinklers, valves, valve boxes etc to be used.

“Hunter Irrigation Systems” used generally.

Generally systems to use are Micro sprinklers spinners, no drippers.

All pipe work to be MDPE. Main lines are to be buried to a minimum of 300mm.

Shop and As Built drawings are to be provided to the client with a demonstration at handover to the client at the completion of the establishment and maintenance period.

Materials to have a minimum 12-month warranty.

31.11 Gardens

Categories for Gardens are to be allocated.

Category	Type	Location
Garden G1	Feature Gardens	High Profile Areas
Garden G2	Medium Profile Gardens	Older Gardens. Areas to be demolished for new buildings
Garden G3	Bush or Screen Plantings	Bushland plantings around perimeter of campus
Garden G4	Revegetation Area	Plantings to assist with revegetation, particularly in zones adjacent to creek

Category	Irrigation Status
Garden G1	Irrigated with an automatic system
Garden G2	Where no irrigation system exists, gardens to be watered by hose/sprinklers during establishment.
Garden G3	Irrigation may be required to establish plantings
Garden G4	Irrigation may be required to establish plantings

31.11.1 Soils

Generally Soils are to be screened. Existing soils, which may be amended with additives to comply with AS4419 (1988). Any imported soil mixes to be supplied with a current soil analysis for the soil being supplied and to be certified nut grass, ant free. Site topsoil is not to be used in G1 gardens.

Site Topsoil to be used provided that:-

- All emergent weeds are progressively removed from site stockpile.
- All sticks, clods, stones over 50 mm are removed.
- Soil pH is in the 6.5 – 7.0 range, and

- Soil additives may be used to improve water holding capacity and available nutrients.

Imported Topsoil may be used to make up quantities in gardens and for back filling planting holes to assist in the establishment of plants and turf.

New Gardens	Approved imported premium quality soil mix pH 6.5 – 7.0
Under Turf	Mineral under turf mix in poorly drained soils. pH6.5 – 7.0 elsewhere
Top dressing for Turf	Sandy fine textured soil pH 6.5 – 7.0

Sub Grades under planted and turfed areas to be scarified to a minimum depth of 150 mm. Unless otherwise specified gypsum to be worked into sub grade at rate of 250 gm/m².

Top Soil Depths

Gardens	Minimum 300mm at edges, mound to centre.
Under Turf	100mm
Planters	Minimum of 600mm at edges, mound to centre.
Trees in Paved areas	Minimum of 1000mm

31.11.2 Plants

Existing Trees Designated For Retention

A number of trees on site have been identified as significant and where possible are to be retained – Refer (List of plants used for Teaching). Refer to Section 21 of these design guidelines for Tree Protection requirements.

Proposed New Trees

Tree selection to be dependent on location and considered for local suitability to conditions including tolerance to cyclones, potential to provide shade, and/or cause nuisance through aggressive root growth, flower seed or limb shedding on to paths or into roof gutters. Tree selection subject to approvals of the JCU Estate Directorate, Deputy Director, Planning and Development, in line with approved planting list unless otherwise specified. Preference for shade trees with substantial spread and branching above 3m.

New trees in paved areas to be advanced stock, protected/staked, with planting holes a minimum of 200 mm all round larger than the root ball, drained and provided with irrigation, and root barriers, if required. Tree grates to be provided for trees in paved areas.

Generally trees to be planted in clumps in gardens. Avoid individual trees in grassed areas. Any new trees planted in grassed areas to be staked with one metre diameter surrounds, mulched/maintained free of grass.

Proposed New Plantings

Single species gardens should be considered

All plants should be sun hardened nursery stock, growing soil to be free from weeds.

Special consideration to be given to planting around fire hydrants and any signage, manholes, and any path areas etc requiring maintenance and visual access for security.

Consideration should be given to sustainability and the use of plantings in specific environments and for teaching and attraction of wild life especially butterflies and birds.

Consideration should be given to plant densities pot sizes and growth potential for site coverage to prevent soil erosion and competition from weeds and to minimize the incidence of wild fires.

Consideration should be given to safe planting distances to buildings depending on tree species / heights. Trees with a potential height of 12m should be planted 12m from the building, trees with potential height greater than the roof line should be located 1.5 times its height from the building.

Fertilising

Fertilise each plant at time of planting with long lasting fertiliser suitable for plant species to manufacturer's recommendation.

Fertilise during establishment period with liquid fertilisers.

31.11.3 Mulch

Mulch type is required to be approved by JCU Estate Directorate, Deputy Director, Planning and Development.

Mulch shall be free from soil, weed growth and green material. Mulch shall be applied to the surface of all gardens unless otherwise approved and finish 25 mm below contiguous paths.

Organic mulch shall be well matured, with type suitable for application:-Hoop pine bark to 100 mm long strips for steep slopes, and pine bark 25 mm elsewhere. Mulch to finish flush with edge retainer or adjoining surfaces. Fines to be used only in feature garden situations. Mulch generally 75 mm thick.

Gravel mulch to be gravel screened from topsoil washed and spread to a depth of 75mm or other approved.

Where gravel is used in surface watercourse for stormwater, overland flow gravel to be LOR with a 10% proportion of larger spalls and geofabric underlay.

Keep mulch away from plant stems.

Do not use fine mulch, which may cover crowns, particularly for tussock type plants such as Lomandra.

31.12 Grass

Grass Categories

Category	Type	Species	Location
Grass 1	High profile lawns	Selected Buffalo	Open sunny situations
	Mown Lawns	Hybrid Buffalo	
	Turf laid edge to edge	- 'Sir Walter'	
	'A' Grade 100% weed free monoculture	- 'Palmetto'	
		Carpet Grass	Shaded situations and under trees
	Sweet Smother Grass		
Grass 2	Lawn as ground cover mown/slashed turf laid edge to edge Nut grass and noxious weed free 80% monoculture specified grass	As above	As above

Grass 3	Grass seeded/or Hydromulched	Selected Species	Where specified
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Species of grass proposed for each situation to be approved by the JCU Estate Directorate, Deputy Director, Planning and Development.

Grass Q1 high profile lawns to be irrigated through popup sprinklers automatically controlled system.

Grass Q2 low profile open grassed areas to be watered through broad spread irrigation system automatically controlled.

Grass Q3 to be hand watered until established.

Turf shall be laid along contours with joints staggered.

Top soil underlay to be spread to ensure that the grass finishes level with adjoining paths.

Cultivated mown turf Q1 and Q2 to be laid on banks at gradients no steeper than 1:4 (avoided as possible to comply Workplace Health and Safety Standards).

Top dress and fertilise grass, NPK 22.1.6.12 @ 40gn m2 in September and October. In April apply 15.0.0.

31.13 Lighting

See Section 25 of these Design Guidelines.

31.14 Landscape furniture

Furniture, including seats, tables, bins, drinking fountains, bike racks, bollards, fences, signs, and plaques are to be selected and approved for each campus site. Generally consideration is to be given to matching adjacent, existing furniture and suitability. Preference for furniture using recycled materials. Furniture to incorporate external power outlets as detailed in Section 25 of these Design Guidelines wherever possible.

Furniture to be placed clear of paths so the use of furniture does not affect use of paths.

Seats and tables are to be located with consideration for shade and seasonal conditions. Type (including custom seating) with the incorporation of external GPO's to be approved by JCU Estate Directorate, Deputy Director, Planning and Development. All seating to be fixed.

Drinking Fountains are to be weld steel fountain body, stainless steel water dish, handle and bubbler mechanism with bottle filler and gunmetal cap all powder coated, approved colour, suitable for people with disabilities and fixed in accordance to manufacturers recommendation and relevant codes. Preference to have drink fountains located adjacent to buildings in sheltered positions in pedestrian areas. Ensure water supply has sufficient soil coverage to not heat up with the sun. Preference for use of chilled fountains within building extents.

Bins are to be enclosures to fit 240L or 120L wheelie bins set on concrete base. Location of bin enclosures to be approved by JCU Estate Directorate, Deputy Director, Planning and Development and appropriate to maximise ease of bin services use without detriment to visual values.

General and recycled waste bins to be included as a minimum. Waste receptacle must contain only red or neutral colours (metal, grey, silver) and general recycling must contain only yellow or neutral colours (metal, grey, silver). Side panels should allow for specified signage to be installed to indicate waste type and should have a flat area of 420mm (H) x 300mm (W) on at least two visible sides for

signage. Keys for access must be provided to the Cleaning Supervisor with a minimum of three sets per receptacle.

Bike Racks are to be coathanger or single hoop style, galvanised or stainless steel finish only, located adjacent to building entrances, preferably covered and located in well lit areas.

Removable and or fixed bollards are to be used depending on application. Types and finishes are to match existing, and shall be fixed to manufacturer's detail.

Tree guards are to be provided to individual trees planted into pavements where guards are to be secured and integral with tree grates.

Any new memorial plaques to be approved by JCU Estate Directorate, Deputy Director, Planning and Development. Existing plaques to be retained unless otherwise advised.

Ornamental water fountains are to be approved by JCU Estate Directorate, Deputy Director, Planning and Development. Waterworks strategy for water use are to be designed by an authorized hydraulic/pool specialist

Location type of statues and ornaments are to be approved by JCU Estate Directorate, Deputy Director, Planning and Development. No potted plants will be accepted.

Provide "wireless" and provision of wireless data on landscape structures/buildings to ensure full coverage of external landscape areas. Consult with ICT through the JCU Project Manager on locations required to achieve coverage.

31.15 Entertainment Areas

All areas within the Landscape where functions could be hosted will require a drivable route for standard vehicles to access and service the areas. The route shall be clear of services and irrigation piping. The route and type of hard stand shall be approved by JCU Estate Directorate, Deputy Director, Planning and Development.