

SECTION 15: GROUNDS AND LANDSCAPING

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15.1 INTRODUCTION

The University of Melbourne is recognised for the diversity and amenity of its landscapes. The purpose of this section of the Design Standards is to support project teams to help the University:

- understand and meet its legal obligations,
- preserve, enhance and expand its campus landscapes for future generations.
- align future development with University Strategy
- continue to deliver landscaped areas that provide practical and visually appealing places for campus users to meet, study and relax.

15.2 SCOPE

This section covers the following grounds and landscape requirements:

- Design principles
- Asset protection
- Hard and soft landscaping elements
- Services and,
- Establishment and maintenance

The following design considerations and elements are detailed elsewhere in the Design Standards:

- Bollards
- Water supply
- Security Help Points
- External drinking fountains
- External lighting

15.3 STANDARDS AND REGULATORY REQUIREMENTS

Design and documentation is to fully comply not only with the Design Standards but also with the latest edition of all relevant Acts, Codes, Regulations and Australian Standards.

The application of any other best-practice landscaping guidelines should also be discussed with the University's Project Manager.

Identification of any inconsistency between any relevant Acts, Codes, Regulations and Australian Standards and this standard must be communicated in writing to the University's Project Manager.

15.4 STRATEGIC CONTEXT

All Landscape designs should align with [University strategy](#)¹ including:

- [Advancing Melbourne](#)²
- [Diversity & Inclusion Strategy 2030](#)³
- [Sustainability Framework](#)⁴ and [Sustainability Plan 2030](#)⁵
- Healthy Ecosystems Management Plan (under development)
- [Estate Master Plan](#)⁶

15.5 DESIGN CONSULTATION PROCESS

On large university projects, the landscape architect should be engaged concurrently with other design and engineering professionals to ensure an integrated approach and design outcome.

During all stages of the projects, the proposed landscape design is to be presented to Key University Stakeholders. The University's Project Manager will advise the project team of the required attendees.

¹ <https://about.unimelb.edu.au/strategy>

² <https://about.unimelb.edu.au/strategy/advancing-melbourne>

³ <https://about.unimelb.edu.au/diversity-inclusion/strategy-and-policy>

⁴ <https://about.unimelb.edu.au/priorities-and-partnerships/sustainability/framework>

⁵ https://about.unimelb.edu.au/data/assets/pdf_file/0020/346214/Sustainability-Plan-2030.pdf

⁶ <https://www.unimelb.edu.au/master-planning>

15.6 SITE CONTEXT & APPRECIATION

The University of Melbourne has seven campuses and several other sites that contain landscaped areas. Each campus/ site has its own unique history and purpose that must be properly understood prior to design.

Prior to design, both a Biodiversity Assessment (refer to Biodiversity Assessment Guidance Note located on the Design Standards web page) and a Site Analysis of existing landscape and assets that will be impacted by the proposed project must be conducted. This is to be provided to the Project Manager who will arrange for review by key University stakeholders.

Depending on the location of the proposed project site existing 'as-builts' or 'surveys' of the landscape may exist. Project teams should contact the University's Space Management Team, Grounds Team & Biodiversity Officer to ascertain what existing information is available. If there are no pre-existing 'as-builts' or 'survey information' or what does exist is outdated or does not comply with the Landscape Survey Requirements, a new or supplementary survey will need to be conducted. Refer to the Landscape Survey & Drawing Requirements Guidance Note (located on the Design Standards web page) for more information.

15.7 DESIGN PRINCIPLES & REQUIREMENTS

The landscape is intrinsic to the identity of each of the University's campuses and sites. Designs should aspire to connect otherwise disparate buildings and structures.

The following design principles must be considered, and requirements adhered to. If the Project team wishes to alter or not adhere to any principle or requirement stated in these standards, a modification request form must be submitted.

Design drawings must be in AutoCAD .dwg file format, georeferenced (GDA2020) with a 1:1m scale and comply with the Landscape Survey & Drawing Requirements Guidance Note (refer Associated Documents section of the Design Standards web page).

15.7.1 Sustainability

1. All Landscape Designs must adhere to design requirements detailed in Section 3 (Sustainability) of these Design Standards.
2. Attention should be specifically given to those requirements relating to the Healthy Ecosystems, Healthy Water Cycles, Climate Resilience and Living Labs priority areas of the [Sustainability Plan 2030⁵](#). Designs must demonstrate how they have incorporated elements of these priority areas into their designs during design consultation and are encouraged to explore other priority areas of this Plan.

15.7.2 Protected Assets

1. All assets flagged for protection must be retained and protected during construction, see below.
2. Areas flagged for protection should be highlighted and enhanced within landscape designs e.g. building façade, significant tree, view lines etc.

15.7.3 Accessibility

1. All footpaths and surfaces must be compliant with the Disability Discrimination Act (DDA) and allow easy access into and out of adjacent buildings or areas.
2. Spaces to gather, such as table and chair settings, must not exclude those with mobility restrictions.

15.7.4 Wayfinding

1. Newly landscaped areas must provide intuitive pedestrian paths of travel between popular

destinations on campus.

2. Pedestrian desire lines should be identified and managed using design features to minimize impact of undesired pedestrian traffic on the landscape.

15.7.5 Safety

1. Sufficient & appropriate lighting should be provided to ensure the visibility of pedestrians and vehicles travelling through the landscape.
2. Where existing buildings are proposed to be demolished or new buildings constructed, an impact assessment must be undertaken to evaluate changes in wind direction/strength and the effect on existing tree, including canopy, safety.
3. Designs must not include vegetation that will obstruct the view line of existing or proposed CCTV cameras.
4. Landscape designs must consider where the closest point of emergency vehicle access is and the location of any existing emergency evacuation areas.
5. Designs must place plants an appropriate distance back from path and road edges to minimize future pruning requirements to keep walkways clear of trip hazards.
6. All service pit covers, meters, valve boxes, fire hydrants, hose reels etc. must be clearly visible and accessible.

15.7.6 Maintenance

1. All designs must consider maintenance requirements of desired design elements.
2. In general, design elements with low maintenance levels that are easy to clean and replace are preferred, except in areas identified as requiring a high biodiversity or a distinctive landscape character.
3. The number of different hardscape or outdoor infrastructure design elements such as furniture or surface types shall be minimized to reduce the variation in maintenance requirements and improve operational efficiency.
4. Maintenance regimes and requirements for softscape, hardscape and outdoor infrastructure design elements must be documented and outlined in the draft landscape design presentation (refer to section DESIGN CONSULTATION PROCESS15.5).

15.7.7 Amenity

1. The amenity and visual impact of softscape design elements throughout all stages of growth through to maturity must be considered. This includes foreseen amenity issues (e.g. if plant does not respond well to pruning or requires extensive dead-heading after flowering).
2. Soft landscape design elements should be selected such that a high level of amenity is retained throughout the year.

15.7.8 Functionality

1. Designs must delineate areas in the landscape that serve specific functions such as places for quiet reflection, spaces to socialize, adaptable spaces for seasonal events, spaces to study, and spaces that function as living laboratories in support of teaching, learning and research. Infrastructure required to support the desired functionality must be included in designs.

15.7.9 Softscape

The "Softscape" includes all horticultural assets in a landscape such as Garden Beds, Ponds, Lawns and Turf and the Plants and Trees they contain. In general, Designs for Softscape areas must:

1. Maximise the size of the Softscape to enable the University to achieve the targets in the Healthy Ecosystems & Healthy Water Cycles priority areas of the Sustainability Plan 2030.
2. Consider the needs of local biodiversity in Softscape design elements. See the Biodiversity Assessment Guidance Note and the Biodiversity Design Requirements Guidance Note (refer Associated Documents section of the Design Standards web page).

3. Be sympathetic to surrounding landscaped areas but where appropriate, develop new themes. Such themes might draw upon plant communities of a specific geographic region; be based on foliage / flower colour; plant forms, physiologies or properties; botanic classification; culinary etc. Any planting themes proposed must be included in the preliminary landscape design presentation.

A. Garden Beds (Soil, Mulch & Fertiliser)

1. Garden beds shall be edged to clearly define the extent of the garden bed, retain the mulch, and inhibit the encroachment of grasses and/or weeds from adjacent lawn areas. Refer to Appendix 1.
2. New garden beds shall be constructed by excavating to a minimum depth of 300mm. Existing topsoil shall be separated and kept aside.
3. Subgrade in areas for planting shall be ripped to a minimum depth of 150mm and cultivated with gypsum.
4. Subsoils shall then be graded and lightly and evenly compacted at 300mm below finished level.
5. Imported soils shall be blended with existing soil by first ripping and cultivating site subsoil to a depth of 300mm then thoroughly mixing through the new soil.
6. Retained and imported topsoil shall be blended before use.
7. 200mm topsoil shall be added uncompacted.
8. Imported garden soils are required to meet Australian Standard **AS4419:2018 Soils for Landscaping and Gardening Use**. Imported garden topsoil must be free of perennial weeds and their roots, bulbs, and rhizomes; building rubble and other contaminants which can adversely affect plant growth; and rocks and stones greater than 5mm or 5% by volume; of neutral pH (6.0 – 7.0); friable with a light to medium texture; free of silts and non-hydrophobic.
9. NATA accredited laboratory soil tests for physical properties and nutrient levels may be required.
10. Mulches shall be evenly spread at 75-100mm thickness over garden beds except for directly around the stems of all plants to avoid the possibility of rot. Valve boxes, drain covers or other landscape hardware or fixtures at surface level must not be covered by mulch.
11. All mulches must be free of weed material and seed, debris and other foreign matter or contaminants of any kind. No recycled building materials such as treated pine or chipboard are acceptable.
12. Organic mulches must be thoroughly aged, with a coarse texture comprising 80% of particles in the 20-35mm size range and 5-10mm in thickness, with no particles exceeding 50mm.
13. Organic mulches may be derived from weathered bark, chipped, or shredded plantation pine or other tree prunings, or wastes from native plantation operations. Such mulches should comply with Australian Standard **AS4454:2012 Composts, Soil Conditioners and Mulches**.
14. Any nitrogen drawdown, or likelihood of, resulting from the application of mulches must be counteracted by use of appropriate fertilisers.
15. Inorganic mulches may be suitable for some applications, and comprise gravels, stone, recycled brick or coarse sands. River cobbles, stone or pebbles are acceptable in small feature landscapes only, but preference should be given to alternative materials with less environmental impact. Samples must be submitted to the Grounds Manager for approval prior to application.
16. Where necessary to avoid ponding in garden beds, subsoil drainage shall be installed using 100mm PVC AG Drain/UPVC slotted drainpipe.
17. Fertilisers intended for use with establishing new plantings, including lawns, must be approved by the University's Grounds Manager prior to use.
18. Pelletised, low odour, slow-release organic fertilisers with a balanced NPK ratio are preferred. Low phosphorus fertilisers are to be used for native plantings. All fertilisers are only to be used at the manufacturer's prescribed rate.

B. Trees

1. The University's Sustainability Plan 2030 has committed to increasing the number of trees, tree species and tree canopy cover above baseline levels by 2030. The Biodiversity Assessment (refer to Biodiversity Assessment Guidance Note) will have calculated the necessary biodiversity baselines for the project site. Designs must demonstrate how they will

- exceed these calculated baselines.
2. Designs which impact either physically or visually on **Significant Trees** must be avoided. Significant Trees are on the [National Trust Significant Tree Register](#)⁷ and/ or a local government tree register such as the [City of Melbourne's Exceptional Tree Register](#)⁸. Those on a local government tree register will likely be protected under the planning scheme and these protection requirements must be understood prior to design. The University may also have Significant Trees not recognised by any external third party which will be identified as a part of the Biodiversity Assessment for Metric 2.
 3. Tree species selection must consider the projected site conditions once construction is completed. This includes but is not limited to aspect, sunlight levels, soil depth, soil conditions, drainage, wind, access to rainfall and or irrigation patterns, microclimate conditions, exposure to salt spray, frost, shade from other plants, future climate conditions (refer to paragraph 6 below) etc. The [Burnley Plant Guide](#)⁹ includes information on the tolerances of many commonly used landscape trees. Access to the Burnley Plant Guide can be organised through the University's Biodiversity Officer. If the desired tree species are not included in the Burnley Plant Guide research must be undertaken to decipher the likely tolerance of the species to any forecasted conditions, it may face and documented in the Planting Plan (refer to 15.7.9.C.2) below.
 4. Tree species selection should also:
 - a. avoid tree species known to cause allergies or regularly shed limbs.
 - b. favour deciduous tree species where winter sunlight penetration is a clear advantage for year-round amenity of any space.
 - c. consider pest or disease resistant tree varieties where available.
 - d. give preference to trees that are hardy, drought-tolerant, long-lived, and low maintenance.
 - e. consider any established tree planting themes of adjacent areas.
 - f. favour species known to provide habitat resources for fauna (e.g. nectar, fruit, hollows) (See Biodiversity Design Requirements Guidance Notes).
 5. Tree species listed as [noxious weeds](#)¹⁰ under any category of the Catchment and Land Protection Act 1994 or on the [Advisory list of environmental weeds in Victoria 2018](#)¹¹ must be avoided. Tree species known to be weedy must be avoided unless approved sterile varieties can be sourced.
 6. Tree species selection, especially for large specimen trees in prominent locations, must consider species' environmental tolerances under future climate conditions. Designs shall provide evidence of how they have done this by referencing resources and literature, and/or ensuring microclimate of the area differs from that of mean forecasted climate related impacts.
 - a. Refer to [Risks to Australia's urban forest from climate change and urban heat](#)¹².
 - b. Refer to [Botanic Gardens Conservation International Climate Assessment Tool](#)¹³.
 7. Trees must be included in the Planting Plan (refer to 15.7.9.C.2) below.
 8. Tree stock should be of an advanced size (at least a 40cm/27L pot, ~1.5-2m tall tree) unless otherwise authorised by the University's Ground's Manager. Tree stock must be sourced according to the Australian Standard **AS2303:2018 Tree Stock for Landscape Use**.
 9. Tree stock must always be treated and handled carefully to avoid damage to roots, stems and growing shoots.
 10. The University's Grounds Manager or Arborist has the right to, at random, destructively sample tree stock to confirm adherence to the Australian Standard as per **Section 6 of AS2303:2018**. Stock found to be non-compliant must be replaced at no additional cost to the University.
 11. Tree Installation Requirements for a 40cm potted tree:
 - a. All vegetation within a 1m radius of the desired planting location where practicable should be cleared.
 - b. Trees should preferably be planted between April to September or during cooler season weather as the seasons may shift year to year or due to climate change.

⁷ <https://www.trusttrees.org.au/>

⁸ <https://www.melbourne.vic.gov.au/community/greening-the-city/tree-protection-management/Pages/tree-protection.aspx>

⁹ <https://girg.science.unimelb.edu.au/2022/04/21/burnley-plant-guide-online/>

¹⁰ <https://agriculture.vic.gov.au/biosecurity/protecting-victoria/legislation-policy-and-permits/consolidated-lists-of-declared-noxious-weeds-and-pest-animals>

¹¹ https://www.ari.vic.gov.au/_data/assets/pdf_file/0027/125919/ARI-Technical-Report-287-Advisory-list-of-environmental-weeds-in-Victoria.pdf

¹² <https://apo.org.au/sites/default/files/resource-files/2017-11/apo-nid136871.pdf>

¹³ <https://www.bqci.org/resources/bqci-hosted-data-tools/climate-assessment-tool/>

- c. Soil must be inspected for suitability for tree planting. If soil may induce waterlogging during wet periods, soil should be remediated to be freely draining and if required appropriate drainage infrastructure should be installed particularly if tree is in a tree pit surrounded by impervious surfaces.
 - d. The planting hole is to be prepared by hand unless another methodology has been approved by the University's Ground Manager. Planting hole diameters should be 1.5 to 2 times the diameter of the tree's pot.
 - e. Root balls should be gently pruned (if required) by making 4 vertical 2cm deep incisions at 0, 90, 180 and 270 degrees around the edge of the root ball and up to 2.5cm off the base of the root ball, ensuring any circling or bent woody/ fleshy roots are cleanly cut.
 - f. Trees must be installed at the correct planting depth, so the top of the root ball is even with the finished soil level.
 - g. A suitable fertiliser shall be incorporated with topsoil for backfilling.
 - h. New trees must be watered in with a suitable liquid fertilizer.
 - i. The cleared 1m area around the tree shall be mulched to a depth of 75-100mm up until 150mm from the tree's base.
 - j. Where herbivorous pests such as rabbits, livestock, kangaroos, etc. are present on site an appropriately designed tree guard must be installed. Install tree guards to protect trees from being grazed on by these pest animals.
 - k. If the tree is installed in turf a Greenwell shall be installed around the base and mulched to a depth of 50mm. Once established either some form of whipper snipper protection should be installed at the trunk's base, or a formal turf edge shall be installed at a minimum of 500mm away from the edge of the trunk and mulched to a depth of 75-100mm to avoid the need to maintain grass adjacent to the base of the tree.
 - l. Any small bamboo or plastic stakes that come with the tree in the pot should be carefully removed after planting. Trees should be staked with three 50x50x1500-1800mm timber stakes at 0, 120 and 240 degrees around the tree's trunk at a distance of at least 500mm from the base of the trunk (or just outside the root ball). Stakes should be installed to a depth of around 300mm deep or until sturdy in the ground. Staple hessian tree tie to the back of the stake before loosely wrapping it around the trees' trunk before stapling it to the back of the same stake. Repeat for the remaining two stakes. Ensure all ties around trunk are within the middle third of the tree's trunk preferably close together. Take care to avoid making ties too loose or tight and rubbing any branch unions. Ties should be loose enough that the tree can still move +/- 25 degrees in the wind.
 - m. Newly planted trees must be watered and fed appropriately during their establishment period.
 - n. If a tree dies for whatever reason during the 12 months defects liability period, it must be replaced with the same species and stock unless otherwise directed at no additional cost to the University.
 - o. Trees incorrectly installed must be promptly re-planted or replaced at no additional cost to the University.
12. New trees shall not be planted within the canopy drip line of any mature existing tree. Trees that are intended to reach greater than 10m in height at maturity should be planted at least 5m apart unless the planting intent is to create a screen or hedge.
 13. All tree removals and newly planted trees must be recorded in the University's Tree Management System. This information must be either directly populated into the University's Tree Management System or provided in a spreadsheet conforming to a provided template. Access to the system or template can be organised by the University's Biodiversity Officer.
 14. Tree tags must be removed prior to tree removal so they can be reused. Removed tags should be given to the University's Biodiversity Officer.
 15. Trees must be assigned a unique tag number (for the site) engraved onto a round 32mm diameter, 1.2mm thick aluminum tree tag¹⁴ with a 3.2mm hole. Tags from trees removed on the same campus/ site can be reused if available or if required a new tag of the next highest sequential tag number on site. If the University has no more spare tags for the site, the Project must purchase a pack of tags marked with the next series of numbers. Contact the University's Biodiversity Officer to organise tree tags installation or ordering of tree tags.
 16. If tags of existing trees are lost during the Project, the Project must replace the tag with an

¹⁴ <https://www.forestrytools.com.au/collections/markings-equipment/products/aluminium-numbered-tree-tags-round>

identical tag. In this instance a blank tag must be purchased and custom engraved using the same font style as the existing suite of tags.

17. Trees less than 10cm in diameter at 1.4m above the ground shall have a tag installed using a loosely fitted cable tie around the lowest sturdy structural branch.
18. Trees above 10cm in diameter at 1.4m above the ground shall be installed with a 75mm long x 3.3mm wide with a 9.5mm in diameter flat head aluminum nail¹⁵ to a depth of 2-3cm.
19. All tree pots made from polyethylene (5) plastic must be reused or recycled. If quantity is <10 40cm pots, contact the University's Grounds Manager for assistance organizing reuse or recycling.

C. **Plants**

1. The University's Sustainability Plan 2030 has committed to increase the number of understory plant species above baseline levels by 2030. The Biodiversity Assessment (refer to section 15.5 and/or Biodiversity Assessment Guidance Note) will have calculated the necessary biodiversity baselines for the project site. Designs must demonstrate how they will exceed these calculated baselines.
2. All Designs must be accompanied by a detailed Planting Plan. Planting plans must be approved by the University's Grounds Manager and be included in the Draft Landscape Design presentation (refer to section 15.5). Planting Plans must include information on the selected plant species, their quantities and stock size, their spatial arrangement including the spacing and density of plants in each garden bed. A paragraph detailing the rationale for including each of the selected species in the design must be included. Rationale should demonstrate how the principles & requirements of this sub-section have been met and reference any resources or literature used to inform selection.
3. Plant species selection should also:
 - a. avoid ephemeral flowering annuals.
 - b. restrict the use of perennials and bulbs to use as accent plants only, and in limited number, to reinforce and expand on an adopted theme.
 - c. give preference to plants that are hardy, drought-tolerant, long-lived, low maintenance, resistant to pests and disease, rare, unusual, threatened or endangered, and free of potential hazards (e.g. poisonous or thorny).
 - d. consider any established planting themes of adjacent areas.
 - e. Provide habitat for on-campus fauna (see Biodiversity Design Requirements Guidance Notes).
4. Plant species listed as [noxious weeds](#)¹⁶ under any category of the Catchment and Land Protection Act 1994 or on the [Advisory list of environmental weeds in Victoria 2018](#)¹⁷ must be avoided. Plant species known to be weedy must be avoided unless approved sterile varieties can be sourced.
5. Plant species selection must consider the projected site conditions once construction is completed. This includes but is not limited to aspect, sunlight levels, soil depth, soil conditions, drainage, wind, access to rainfall and or irrigation patterns, microclimate conditions, exposure to salt spray, frost, shade from other plants etc. The [Burnley Plant Guide](#)¹⁸ includes information on the tolerances of many commonly used landscape plants. Access to the Burnley Plant Guide can be organised through the University's Biodiversity Officer. If the desired plant species are not included in the Burnley Plant Guide research must be undertaken to decipher the likely tolerance of the species to any forecasted conditions, it may face and documented in the Planting Plan.
6. Climbing plants intended to cover building walls or other structures must have durable and adequate support structures installed to provide for growth and maintain adhesion. Climbing species which are known to cause damage to building surfaces are not to be used. Climbing plants should only be used where there is sufficient access for appropriate equipment for on-going pruning and maintenance.
7. Any proposed species substitution or other changes to an already approved Planting Plan must be reapproved by the University's Grounds Manager prior to the procurement of the substitute species.

¹⁵ <https://www.forestrytools.com.au/collections/markings-equipment/products/aluminium-nails-75mm-x-3-3mm>

¹⁶ <https://agriculture.vic.gov.au/biosecurity/protecting-victoria/legislation-policy-and-permits/consolidated-lists-of-declared-noxious-weeds-and-pest-animals>

¹⁷ https://www.ari.vic.gov.au/_data/assets/pdf_file/0027/125919/ARI-Technical-Report-287-Advisory-list-of-environmental-weeds-in-Victoria.pdf

¹⁸ <https://girg.science.unimelb.edu.au/2022/04/21/burnley-plant-guide-online/>

8. Planting density must consider the mature size of all species selected so that each specimen has adequate space for growth and establishment.
9. New plantings must not be planted too closely and not inhibit proper growth, form or spread. Plants should be spaced an appropriate distance apart as per the recommended spacing on the plant's tag so that the empty space between plants will almost disappear once plants hit maturity. Plant spacing and positioning must also maintain visibility and access to any infrastructure and service pits within the boundary of any garden beds.
10. Plant stock for typical garden bed plantings must be in 150mm pots unless otherwise requested or approved by the University's Grounds Manager.
11. Plant stock must be sourced from an Australian Plant Production Standard (APPS) Nursery Industry Accreditation Scheme Australia (NIASA) accredited nursery unless otherwise requested or approved by the University's Grounds Manager.
12. Plants must be treated and handled carefully to avoid damage to roots, stems and growing shoots.
13. Plants must be installed at the correct planting depth, so the top of the root ball is even with the finished soil level. The planting hole, to be prepared by hand unless another methodology is approved, must be 75-100mm wider than the root ball. A suitable fertiliser shall be incorporated with topsoil for backfilling. Plants must be thoroughly watered in by hand with a suitable liquid fertilizer.
14. All plant pots and their tags made from polyethylene (5) plastic must be reused or recycled. If quantity is <100 150mm pots, contact the University's Grounds Manager for assistance organizing reuse or recycling.

D. Ponds

1. Ponds differ from water features in that they are designed to support biodiversity rather than just provide amenity. They can do this through several ways including having contact with the soil profile, housing aquatic life, containing aquatic plants etc.
2. Pond (or any water holding structure) designs should avoid vertical walls to ensure wildlife can escape. Gradual sloping sides are preferable.
3. Plant selection for ponds must be included in the Planting Plan (refer to section 15.7.9.C.2). Aquatic plants should cover no more than 60% of the pond's surface unless otherwise prescribed. Preference should be given to aquatic plant species that control algae growth and provide habitat for local aquatic fauna.
4. Fauna, flora or protist species that the pond is designed to support should be listed. Exotic aquatic life such as Koi fish can only be used if they can be contained and not access natural waterways.
5. Ponds must be designed to capture rainwater first and foremost but have access to non-potable or potable water top ups if required to maintain water levels to support species perseverance in periods of drought or extreme heat.
6. Some ponds could be designed to support research, teaching, and learning activities. If this is the case the intended activities should be documented in the preliminary design presentation.
7. Pond designs should detail how they will minimize the risk of increased mosquito breeding and algae blooms.
8. Advice on any relevant Australian Standards or legislation that a pond must comply with should be included in preliminary design presentation.
9. A process to monitor the water quality of ponds must be documented.
10. Maintenance regimes for any ponds and their associated flora and infrastructure must be documented and minimize negative impacts on wildlife.

E. Lawns

1. Pedestrian paths of travel should be intuitive around lawn areas to avoid concentrated wear and tear and the formation of 'goat tracks'.
2. Designs must understand that grass height of lawns should be kept to 30-65mm in height.
3. Designs must classify any lawn areas included in designs as high, medium or low standard.
 - a. High standard lawns have high amenity, sharp and crisp edges, are weed free, have even height and coverage and are irrigated. They are kept green all year round and mown to a high standard.
 - b. Medium standard lawns are kept green all year round but are not maintained to the

same standard as high amenity lawns. They may have minor weed creep, may not have as crisp edges and do not require striping.

- c. Low standard lawns are not irrigated and allowed to brown off in summer. They may have high weed volume. The main objective is to keep them short.

F. Sports Turf

1. Designs must respond to sporting code standards of the codes using the sports oval or field and ensure the playing surface will cope with the demands on the surface throughout the year.
2. Sports turf irrigation accounts for a large proportion of total water use at any site, especially over summer. The University has committed to reduce its total water consumption and increase the use of non-potable water sources by 2025. As such, any new or redeveloped sports turf areas must allow for the provision of mains recycled water and non-potable rainwater irrigation if possible.
3. Appropriate smart irrigation must be installed to allow remote control via a mobile device and all water inlet/ outlet points must travel through a pulsed meter to enable the volume of various water types used to be monitored remotely.
4. Irrigation designs must conform to the Irrigation related infrastructure standards below in section 15.7.11.F.

G. Other

1. Designers are encouraged to incorporate other elements into the softscape including but not limited to:
 - a. Habitat elements such as logs, rocks, constructed hollows or insect hotels refer to Biodiversity Design Requirements Guidance Note
 - b. Informational signage to educate landscape users about the design intent, sustainability initiatives and plants in the landscape. All informational signage must be approved by the University's Sustainability Manager.
 - c. Plant labels, where appropriate. All plant labels must adhere to the University's Plant Label requirements. Contact the University's Biodiversity Officer for this information.

15.7.10 Hardscape

In general, the University encourages the use of permeable surface treatments to maximise subsurface water storage and reduce irrigation demand as well as well-designed drainage & retention systems accompanying any sealed surface treatments to reduce the amount of stormwater entering waterways during periods of high intensity rainfall events and improve the quality of any stormwater entering waterways.

A. Sealed External Hard Surfaces

1. All external sealed hard surfaces must be DDA compliant.
2. The number of different sealed external hard surfaces should be minimized to provide a feeling of continuity and connectedness across campus.
3. Preference should be given to light-coloured surfaces to avoid exacerbation of the Urban Heat Island effect whilst also not being too reflective to be comfortable to look at.

B. Unsealed External Hard Surfaces

1. Unsealed External Hard Surfaces include but are not limited to gravel, granitic sand, brick, timber decking and exposed ground roads, paths, steel mesh, stairs and open areas including open gutters and channels.
2. Surfaces should be able to resist erosion from overland flow.
3. Preference should be given to readily available materials that are made from reused or recycled materials that have low maintenance, are easily replaced, and will not leach any undesirable compounds into stormwater.
4. Any timber decking must use FSC certified timber.
5. Open channels must be sufficiently sized and designed to avoid flash flooding and ponding during intense rainfall events.
6. All external unsealed hard surfaces must be DDA compliant.
7. The number of different unsealed external hard surfaces should be minimized to provide a feeling of continuity and connectedness across campus.
8. Unsealed external hard surfaces should be avoided for major pedestrian and cycling

thoroughfares.

9. Preference should be given to light-coloured surfaces to avoid exacerbation of the Urban Heat Island effect whilst also not being too reflective to be comfortable to look at.

C. Roads & Pathways

10. The University is moving towards pedestrianized campuses. As such considerations for pedestrian traffic and safety in hardscape designs are of the utmost importance. The hierarchy is pedestrian, cyclist and then vehicles.
11. Installation of vehicle routes into highly pedestrian trafficked areas should be minimized or avoided.
12. Road surfaces should be uniform and consistent, and all underground services concentrated in trenches to minimize the need to cut and resurface roads for access to underground services.
13. All vehicle roads shall be shared with cyclists. Bike lanes or shared roads must be clearly marked on the road surface and with road signage. Speed humps must contain gaps to enable cyclists to travel uninterrupted on roads.
14. Cycleways must be clearly segregated from pedestrian paths of travel through floor markings, signs, and/ or physical barriers such as raised kerbs.
15. Refer to Section 4 Structural and Civil and Section 14 Traffic and Parking for more requirements and information.

D. Drainage

1. Drainage designs should prioritise Water Sensitive Urban Design Principles.
2. Swales & Raingardens are encouraged to support gains in Biodiversity. Such designs must be included in Planting Plan as per section 15.7.9.C and required maintenance regimes documented.
3. Drainage designs should aim to capture stormwater and retain it for reuse or delayed release into the stormwater system by diverting runoff into plantable areas or temporary storage containers.
4. Refer to Appendix 2 at the end of this Section for specification on standard drainage elements.

E. Building Entrances & Walls

1. Designs must seamlessly integrate with building entrances.
2. Certain features of heritage building facades may need to be visible.
3. Creepers on heritage building facades should be avoided. Inclusion of creepers on such facades will require an engineering assessment to confirm walls structural integrity. To avoid damage to façade appropriate support infrastructure has been installed to minimize contact of creepers with façade or mortar.

F. Internal Courtyards

1. Internal Courtyards must consider accessibility of maintenance equipment to maintain the outdoor spaces.
2. Access to Internal Courtyards must be DDA compliant.
3. Internal Courtyards must include greenery of some form, ideally 25% of surface area should include 'plantable area'. Refer to table 3 in section 3.4.8 Healthy Ecosystems of Section 3: Sustainable Design for definition of Plantable Area.
4. Infrastructure within courtyards shall comply with section 15.7.11 below unless approved by the University's Grounds Manager.

G. Green Walls

1. Green walls are encouraged both inside and outside buildings.
2. Consideration of wall aspect and microclimate must be given to minimize the failure of green walls. Green walls must not be installed on north or west facing walls that receive direct sun.
3. Ongoing maintenance costs and requirements must be approved by the University's Grounds Manager prior to the draft design presentation.
4. Green Wall designs should be designed by a specialist consultant with demonstrated experience in green wall installation.
5. Plants for Green Walls must be included in the Planting Plan as per sub-section 15.7.9.C.
6. Green wall structures must be reviewed by a qualified engineer.
7. Green walls should, where possible, use non-potable water for irrigation.

8. Designs should consult the [Growing Green Guide](#)¹⁹.

H. Green Facades

1. Green facades are encouraged.
2. Consideration on structure or wall aspect, wind loadings and microclimate must be given to minimize the failure of green facades. Green facades must not be installed on west facing walls or structures that receive direct sun.
3. Facades can be evergreen or deciduous.
4. Ongoing maintenance requirements must be approved by the University's Grounds Manager prior to the draft design presentation.
5. Green facade designs should be designed by a specialist consultant with demonstrated experience in green façade installation.
6. Green facades that can access ground level soil are preferred. For green facades which are higher up and require containers, advice on appropriate substrate selection from a specialist consultant is to be obtained. An irrigation plan must be developed for any green facades not at ground level.
7. Plants for Green facades must be included in the Planting Plan as per sub-section 15.7.9.C.
8. Green facades that attach to structures rather than directly to walls are preferred. Surface integrity of walls intended to support green facades must be suitable and any wall or structures used to support green facades must be reviewed by a qualified engineer to ensure they can support the weight of the plant material.
9. Green facades should preferably use non-potable water for irrigation.
10. Designers should consult the [Growing Green Guide](#)¹⁹.

I. Green Roofs

1. Opportunities for additional public realm on roof tops is desirable. Designers are encouraged to explore additional options for greening on building roof tops particularly. The University's Grounds Manager must be consulted during the planning and design process for any green roof project.
2. The following points are to be adhered to when designing green roofs:
 - a. Only use waterproof membranes which incorporate a certified root barrier treatment which are specifically designed for roof gardens.
 - b. Include a separate root barrier layer must be considered if the design includes woody plants and the barrier must be compatible with the waterproof membrane.
 - c. When the membrane installation is complete, it must be tested by flooding and inspection.
 - d. Preferably use plants which are proven to survive in roof top environments, unless the roof is being used as a research space to test plants suitability for Australian conditions.
 - e. Plants with aggressive root systems are not to be used.
 - f. Plants planned for installation on a green roof must be included in the Planting Plan as per sub-section 15.7.9.C.
 - g. The growing medium/substrate should comprise a minimum of 75% inorganic materials.
 - h. Particular attention is to be paid to ensure that water drains freely and does not pond.
 - i. All the drainage and protection layers and irrigation components must adhere to relevant Australian standards.
 - j. Roof gardens should preferably be irrigated with non-potable water.
 - k. Any exposed components are to be UV stable.
 - l. Roof outlet drains are to be located, sized and protected to ensure that they never become covered or blocked.
3. Green roofs require specialist maintenance. Refer to Maintenance Guidelines for Australian Green Roofs (2022), Rayner JP, Lumsden E and Bathgate R (eds). A maintenance plan must be provided prior to practical completion.
4. Green roofs must be reviewed by a qualified engineer to ensure they can support the weight of the plant material and wet substrate.

¹⁹ <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/growing-green-guide.pdf>

5. Green roofs must not impede any other rooftop infrastructure such as HVAC equipment or solar panels.
6. Designers should consult the [Growing Green Guide](#)¹⁹ and the [Guidelines for Biodiverse Green Roofs](#)²⁰.

15.7.11 Outdoor Infrastructure

A. Outdoor Furniture

1. The number of different types of outdoor furniture must be minimized to maintain design cohesion across the site or campus. As such, designs shall conform with the existing suite of outdoor furniture as detailed in Appendix 3.
2. If designers want to propose an alternative suite of outdoor furniture it must be approved via the Modification Request Form. In such instances, University requirements include:
 - a. have low maintenance requirements.
 - b. be easily cleaned to remove graffiti and chewing gum.
 - c. be sturdy, durable and withstand weathering.
 - d. be made of sustainable materials e.g. recycled materials or FSC certified timber, with low embodied energy and that can be recycled.
 - e. provide documentation on the installation specifications, replacement costs, and ongoing maintenance requirements.
3. Outdoor furniture should be versatile and adaptable. In some circumstances unfixed furniture may be appropriate. The use of unfixed furniture in designs must be approved by the University's Grounds Manager.
4. At least 1 table in a suite of outdoor dining furniture must be accessible to use in a wheelchair.

B. Cycling related infrastructure

1. The University's Sustainability Plan 2030 commits to being Carbon Neutral by 2025 and certified Carbon Positive by 2030. As such the University is committed to providing state of the art active transport infrastructure and facilities, including cycling. For active transport requirements refer to 3.6.1 of Design Standards, Section 3: Sustainability.
2. Designs should consider if it is necessary or advantageous to incorporate any cycling related infrastructure. Usage rates of existing infrastructure nearby in the landscape or inside buildings should be considered prior to inclusion in designs.
3. Access to and from bike parks must be considered. Cyclists generally take the shortest route to a bike park. Designs should keep this in mind when deciding where to place bike parks to avoid cycling-pedestrian conflicts.
4. Desired routes for cyclists and no ride zones must be clearly marked with surface treatments or physical barriers where appropriate and accompanied with signage to reduce cyclists being endangered by vehicles or endangering pedestrians.
5. Large bike parks (>20 bike hoops) should have informational signage installed to communicate where cycling end of trip facilities and related services and infrastructure can be accessed.
6. Publicly Accessible Bike Repair Stations should be present every 150m and installed as per the specification in Appendix 1.
7. Bike Parks should be consolidated where possible to appropriate and safely rideable areas near where popular areas on campus are.
8. Bike Repair Stations must have a sign stand installed as per the specification in Appendix 1. The most recent University branded design for Bike Repair Station signs will be provided by the Sustainability Team, Campus Management.

C. Traffic & Parking related infrastructure

1. The University's Sustainability Plan 2030 commits to being Carbon Neutral by 2025 and certified Carbon Positive by 2030. As such the University is committed to reducing its emissions from all its vehicles including contractor and commuter owned vehicles.
2. 10% of any publicly accessible car park must have EV charging infrastructure installed.
3. At least one EV charging station should be provided wherever disability car spaces are designated.

²⁰ <https://www.melbourne.vic.gov.au/SiteCollectionDocuments/guidelines-for-biodiversity-green-roofs-2023.pdf>

4. See Section 7: Electrical Services, Electrical Vehicle Charging Stations for technical requirements.
5. Traffic related assets including traffic barriers, bollards (all types), boom gates, car park reserves, road signage etc. must comply with Section 14: Traffic & Parking.

D. Waste related infrastructure

All waste infrastructure must also comply with the requirements detailed in 3.6.5 of Section 3 Sustainability of these standards.

I. Waste Compounds

1. Designers must first consider if an existing Waste Compound exists nearby and can cope with volumes likely to be generated by the area in question. Any evidence and assumptions used to determine if an existing compound has capacity must be advised to the Project Manager in preliminary designs.
2. If an existing Waste Compound is not suitable or able to collect the waste generated from the area in question Designs must allow space for an appropriately sized Waste Compound that considers:
 - a. the waste streams, catchment area, volumes of waste and any necessary separation processes required so that the design of the new Waste Compound can be appropriately scoped. Waste Compound streams, catchment areas and estimated volumes and separation requirements must be informed by consultation with the University's Sustainability Manager.
 - b. transportation routes of small mobile waste vessels (e.g. wheelie bins) through the campus from buildings and landscape areas within the catchment area of a Waste Compound must be considered. In general, any building exit used by cleaners or standard landscape bin pairs shall be no more than 150m from a Waste Compound. Cleaners may use buggies to transport consolidated waste collected from certain areas. Waste Compounds must be accessible by small electric buggies.
 - c. how much space is required to store and safely access and maneuver waste collection vessels. Clearances for any vehicles or equipment required to lift or maneuver collection vessels must be considered. In general, Waste Compounds must allow:
 - i. at least 2.0m clearance at the rear of a waste collection vehicle to allow for bins to be emptied.
 - ii. at least 1.0m clearance at the sides of a waste collection vehicle to allow occupants of the vehicle to safely exit and enter the vehicle.
 - iii. at least 1.0m vertical clearance above the highest point on the collection vehicle (this may be higher than vehicle height if the vehicle includes machinery to lift skips or bins).
 - iv. sufficient clearance for manoeuvring collection vehicles into and out of position for collection. Turning circles of vehicles must be considered.
 - d. the provision of visual barriers to conceal waste compounds from public view for both amenity and safety purposes.
 - e. the provision of some form of access control so only inducted and appropriately trained staff can enter the Waste Compound. Preference is to allow for swipe card access.
 - f. Access to Waste Compounds must also comply with Section 13 Security and Section 14 Traffic and Parking of these standards.

II. Landscape Bins

1. No unlabeled or single bins are permitted in the landscape.
2. All defined outdoor areas must have at minimum one pair of Landfill & Recycling bins. In some situations, and locations, a third Organics bin may also be required. Consult the Sustainability Manager to confirm this requirement.
3. Only University approved bins are to be used, refer to Section 3: Sustainability Design.
4. In general, a set of landfill and recycling University approved bins shall be located every 50m in the landscape. A third organics bin may be requested depending on the location of the project.
5. Bin placement in the landscape must consider visibility and accessibility for cleaning staff to safely empty bins.
6. All Landscape bins will include by default a combination of 2 x 240L wheelie bins and a bin cage.

- a. Bin cages must:
 - i. be fixed in place on a level concrete slab.
 - ii. be lockable with a universal cleaning key.
 - iii. have an open top that is sufficiently sized to accept all types of waste materials in that stream, for example large plastic bottles, containers, and small cardboard boxes.
 - iv. have a cover that prevents bins filling with water when raining.
 - v. have compliant colouring and an A1 sign on every visible side of the bin cage. All signs must contain the designs supplied by the University's Sustainability Team.
 - vi. Conform with the specification in Appendix 3.
- b. Wheelie bins must have appropriately coloured lids and a compliant sticker sign on the front of the wheelie bin.

7. Landscape areas where regular seasonal events will take place should have an extended concrete pad next to bin cages to allow for additional temporary wheelie bins to be placed next to existing waste collection points during events.
8. Refer to Section 3: Sustainable Design, section 3.6.5 for more requirements relating to Waste.

E. Hydration Stations

1. A hydration station must be provided within 10m of any isolated retail provider or retail precinct.
2. Hydration stations must allow for bubbler, tap and bowl water dispensing. Bubblers for those without a bottle, tap for people to fill their reusable water bottles and bowls for pets (if permitted) and other wildlife to access fresh drinking water.
3. Hydration stations must also comply with Section 6: Hydraulic Services of these standards.

F. Irrigation related infrastructure

1. Irrigation is responsible for a large proportion of the University's water use. The University has committed to reducing its total water consumption and increasing the use of non-potable water sources. As such, it is preferred that irrigation systems connect to and use a non-potable water source.
2. Designs must include an Irrigation Plan. Irrigation plans must be approved by the University's Grounds Manager. Irrigation plans must include:
 - a. a diagram detailing the location/layout of irrigation system elements in context of the design.
 - b. a water flow diagram indicating direction of flows, water sources and catchment areas.
 - c. application footprints for each sprinkler head to demonstrate sufficient coverage.
 - d. a solenoid map to determine which solenoid serves which garden beds/ lawn areas.
3. Irrigation systems must comply with the following requirements:
 - a. All pipework and associated fittings are to be new Class 12 uPVC unless otherwise stated.
 - b. Trenching for pipework will be to a depth to allow for 300mm minimum cover over installed pipe unless agreement with the nominated University project manager is reached for alternative installation. Trenches are to be backfilled with soil, free of rock or other debris, to surface level. Trenches are not to be left open overnight.
 - c. Conduits under paving for wiring & pipework are to be 100mm sewer grade PVC, unless otherwise stated. Any lifting of paving for conduit placement will require reinstatement according to the University Design Standard for paving (refer Appendix 1).
 - d. Solenoid control wires are to be coded, poly coated valve wiring of 0.5mm diameter between controller and all solenoid valves where wire runs are less than 100m. Allow for 500mm loop at each valve connection to provide for valve removal for servicing. All wire runs must be continuous with no joints. All wiring joints in the field must be made using heat shrink connectors.
 - e. Two spare control wires must be left at the furthest solenoid in any direction from the controller, and at the master solenoid valve to allow for possible future extension of the irrigation system, or repair.
 - f. An external lockable power switch is to be fitted in line to the controller if exposed or a

- normal general power outlet if located inside a lockable cabinet.
- g. All irrigation systems will have a pulse meter fitted to supply line at the head of the system to measure flow inputs and an appropriate backflow prevention device after the water meter or master gate valve is required unless backflow prevention is otherwise already provided on the supply line.
 - h. Some form of sensing to calibrate volume application must be included in system design. Sensors may include rain, soil moisture or evapotranspiration sensors and/or dedicated weather stations. Sensors or stations must be able to connect to and be controlled by the Hydrawise software.
 - i. Irrigation systems utilising reclaimed water must use appropriately identifiable components (lilac colour).
 - j. Irrigation for garden beds will have sprays with Hunter MP rotator spray heads. Drip line will only be used where a garden bed is too narrow for sprays. This can be discussed with the University's Grounds Manager in the design stage.
 - k. The selection of components is required to achieve effective and reliable operation and sound functioning of the irrigation system.
 - l. All spray fittings must be installed to throw water away from building walls.
 - m. Applied water does not result in runoff or wasteful application.
 - n. Gate valves function as isolation valves, prior to the solenoid valve, are to be fitted on the discharge side of the water meter or mains supply point, and to irrigation lateral lines.
 - o. All control valves are to be placed below ground and housed in suitably sized commercial grade valve boxes. Valve boxes are to be set flush at finish level in lawn areas and 50mm above finished grade in garden beds with geotextile fabric inside and sitting on a timber base.
 - p. A Richdel master solenoid valve in line after the backflow prevention device (where fitted) or isolating gate valve, must be installed.
 - q. Irrigation system dispensing components must also achieve:
 - i. a Field Distribution Uniformity (DU) $\geq 75\%$ for spray areas and are required to meet industry best practice for effectiveness of application and uniformity.
 - ii. an Emission Uniformity (EU) $\geq 85\%$ for drip areas and are required to achieve high uniformity of emitter discharge.
4. The following components and arrangements are approved for use in irrigation systems:
- a. Micro/drip Systems:
 - i. Toro Drip Eze or Enviro-Drip 13mm pressure compensating
 - ii. Emitters at 30cm spacing
 - iii. When laid in grid pattern, line spacing 300mm apart in garden beds; 500mm apart under trees, unless otherwise specified.
 - b. Garden (and short-throw turf) Sprays:
 - i. Three quarter inch threaded PVC no-flex risers for standpipe use
 - ii. Rainbird 1800 spray bodies (pop up height to suit application) or equivalent
 - iii. Filter screens to be fitted to each spray
 - iv. Hunter MP Rotator spray heads appropriate to each application
 - c. Turf Sprays: Hunter PGP rotors or Hunter i25 (nozzles selected according to application)
 - d. Controllers
 - i. Smart automatic controller: Hunter HC Hydrawise controller
 - ii. Battery-operated programmable controller: Bluetooth Hunter Node
 - e. Flow sensor: Hunter Pulse Meter
 - f. Valves
 - i. Brass gate valves with a rated working pressure of 800 kPa, and 25mm BSP threaded female connection.
 - ii. Solenoid valves with 25mm Irritrol (Richdel) 205 series with flow control, Richdel 2500 mtf, or equivalent.
5. Irrigation infrastructure must be installed by a suitably qualified service provider whose work is compliant with all applicable Plumbing Regulations and Australian Standards. The University requires a Compliance Certificate to be provided as part of its project completion

documentation.

6. All materials and installation must comply with Section 6: Hydraulic Services of these Design Standards, conform to the manufacturer's recommendations, and meet the relevant Australian Standards including but not limited to:
 - a. AS1477: Unplasticised PVC (uPVC) pipes & fittings for pressure applications
 - b. AS3879: Solvent cements and priming fluids for use with unplasticized PVC (uPVC) pipes and fittings
 - c. AS1462: Methods for testing uPVC pipe & fittings
 - d. AS4130: Polyethylene Metric – PE80B – pipe for pressure applications
 - e. AS1432: Copper tubes for water, gas and sanitation
 - f. AS2032: Code of Practice for installation of PVC pipe systems
 - g. AS2698.1: Polyethylene micro irrigation pipe
 - h. AS2053: Non-metallic conduits and fittings
 - i. AS3000: Electrical installations
 - j. AS3500.1: National Plumbing and Drainage Code: Part 1 Water Supply
7. 'As built' drawings of the installed irrigation system as well as any operational manuals and keys for any controller box(es) must be provided.
8. A 12-month defects liability period for the system will apply from the commissioning date or date of practical completion, whichever is the latter, during which time the project Contractor will be responsible for maintenance of the system.
9. On completion of installation the system is to be tested, in the presence of the University's Grounds Manager.

G. Barbeques

1. Any new fixed outdoor barbeques must be electric.
2. Barbeques should be accompanied by manmade structural shade such as solar patios or shade sails to avoid leaf litter falling on the barbeque when in use.
3. Barbeques should be accompanied by other infrastructure to encourage all year usage such as outdoor furniture including tables & chairs, shelter, access to potable water (preferably a sink), electricity, and a secure place to store barbequing equipment.
4. Barbeques must have secure lids/covers to protect cooking surface from rust when not in use and secure cupboard space to store barbequing equipment.
5. The University Project Manager will ensure that all barbeques are added to SISfm to enable them to be booked through the University's booking system.

H. Signage

1. Refer to the University's Signage Guidelines (see Associated Documents section of the Design Standards web page) for protocols for University of Melbourne external signage.
2. Signage should assist wayfinding throughout the landscape and conform with the [University Naming and Memorial Policy \(MPF1201\)](#)²¹.
3. Plant label designs must be approved by the University's Grounds Manager and conform with industry best practice.
4. Informational signage to educate landscape users about the design intent, sustainability initiatives and plants in the landscape must be approved by the University's Grounds Manager.

I. Lighting

1. Lighting should be installed only if necessary to maintain safety and should also adhere to the strategies in Table 18 and checklist in Appendix E of the National Light Pollution Guidelines for Wildlife²².
2. In ground lighting is to be avoided.
3. The number of different light fittings must be minimized to maintain design cohesion across the site or campus. As such, designs should by default conform with existing lighting fittings in other areas of the landscape unless otherwise requested or approved by the University's Sustainability Manger & Ground's Manager.
4. Refer to Section 7: Electrical Services for external lighting requirements.

²¹ <https://policy.unimelb.edu.au/MPF1201/>

²² <https://www.dceew.gov.au/sites/default/files/documents/national-light-pollution-guidelines-wildlife.pdf>

15.8 LANDSCAPE PROTECTION

1. Any areas or assets to be retained during development must be sufficiently protected. Contractors will be liable for any foreseeable damage to assets.
2. Light pollution from external and internal lighting must be controlled and minimised throughout the entire Project lifecycle (i.e. from construction to completion)²².
3. If damage to any asset does occur, work in the vicinity of the damaged asset must cease. The incident must be documented in writing with photographic evidence attached and immediately reported to the University's Project Manager who will pass the incident report onto the University's Grounds Manager.
4. Contractors must await a response from the University's Grounds Manager regarding the required rectification. If required a University Occupational Health & Safety representative may also be notified and asked to give advice.
5. Excavations and earthworks should be limited to avoid disturbance to adjacent landscape.
6. Checks for underground services must be conducted during the design phase. Prior to any excavation Contractors must prove they have contacted Dial Before You Dig to ensure there are no known underground services that could be impacted by construction works.
7. Any underground services damaged during construction must be reported to the University appointed Project Manager and must be fixed at no additional cost to the University. Proposed fixes must be approved by the University appointed Project Manager.
8. Existing plants, irrigation and other landscape objects are to be removed prior to construction by the University's Grounds Contractor unless otherwise agreed by the Grounds Manager.
9. Depending on the scale and location of the project regular site inspections may be required by the University's Grounds Manager.

15.8.1 Softscape

1. Bank Guarantee or Bonds may be required for any tree or significant area within or adjacent to the project site by the University's Grounds Manager. Tree bonds will be calculated using the City of Melbourne's most recent Tree Valuation Methodology.
2. The contractor must notify the Grounds Manager at least 2 working days prior to the commencement of any excavation and / or construction in garden areas and tree root zones.
3. Note that any works which could adversely impact a registered significant tree (as listed on the City of Melbourne Register of Exceptional Trees or other council significant tree register) will require a planning permit.
4. Construction works and activities shall ensure appropriate hygiene practices are carried out to avoid transmission of soil borne disease which can threaten plant health. Contaminated material must be removed from site and all materials brought in must be clean. The University's Grounds Manager will give advice on any specific disease concerns for an area of the campus, and appropriate control measures are to be implemented by the Project.
5. Subsoils must not be mixed with topsoil when backfilling trenches or used as a finishing layer.
6. Heavy clays and rocks shall be discarded and removed from site as waste unless otherwise agreed. No contaminants of any description are to be buried or remain on site.
7. Stockpiled topsoil is to be reused to a minimum depth of 100mm.
8. Fresh soils, sands and aggregates brought to site for reinstatement must comply with Australian Standard **AS 4419:2018, Soils for landscaping and garden use**.
9. Any additional topsoil required must be of consistent physical and chemical properties to existing topsoil, and complimentary to the intended planting.
10. Soil orders greater than 5 cubic meters must be approved by the University's Grounds Manager. A soil analysis may be requested by the University's Grounds Manager for soil quantities to determine if the physical and chemical properties of the soil product are appropriate.
11. Topsoil must be set aside separately from other soil and kept clean of contaminants.
12. Geotextiles where used shall be new, comply with the relevant Australian Standard, be fit for purpose and installed correctly.

A. Significant Areas

1. Any area identified as having ecological or environmental significance on the Areas of Significance [Map](#) and [Register](#) must be protected

throughout the project lifetime and cannot be offset. Refer to the Biodiversity Assessment Guidance Note (see Associated Documents section of the Design Standards web page) for more information.

2. Protection Plans must be created for any significant areas within or adjacent to the project site that may be impacted during development. Protection Plans must include pre, during and post construction protection recommendations and be approved by the University's Grounds Manager prior to any development on site.
3. Any damage to areas that contravenes the recommendations in Protection Plans must be reported immediately to the University's Grounds Manager and rectified as soon as possible.
4. Failure or inability to remediate any damage caused by construction will result in a non-compliance and consequences to the Contractor may include bond retention or additional remediation works at no-cost to the University.

B. Garden Beds

1. Any garden beds earmarked to be retained that are impacted during construction works must be reinstated to pre-development condition. To ensure this Contractors must:
 - a. seek advice on which plants to reinstate from the University's Grounds Manager.
 - b. ensure any soil compaction is alleviated by the application of compost/mulch or other soil amendments as requested by the University's Grounds Manager.
2. Any excavation works within existing garden beds must be approved by the University's Grounds Manager.
3. Any damage to garden areas must be reported immediately to the University's Grounds Manager and rectified as soon as possible.
4. Failure or inability to remediate any damage caused by construction will result in a non-compliance and consequences to Contractors may include bond retention or additional remediation works at no-cost to the University.
5. Heavy compaction of new or reinstated garden beds from construction activities must be avoided.
6. All reinstated or new garden beds should be designed to avoid slumping and erosion of exposed soil.
7. Garden beds must be protected during construction and until plants establish to ensure soils or mulches do not erode or wash onto adjacent paths or hard surfaces or contaminate drains following rain.

C. Trees

1. The design team is to appoint a University approved arborist to inspect all trees within the project site.
 - a. The Arborist engaged must have an AQF L5 qualification or above or equivalent and be [ISA TRAQ](#)²³ qualified.
 - b. The University has a list of preferred arboricultural consultants. Contractors should contact the University's Grounds Manager for contact information of these service providers.
 - c. Ideally, the same Arborist will be used throughout the duration of the project.
2. All Trees to be retained during development must be protected according to the Australian Standards AS 4970 Protection of trees on development sites.
3. Tree Protection Zone(s) (TPZ)
 - a. must be fenced off with a 1.8m or higher fixed hoarding or chain-link fence. Fences must have an access gate. The fence shall be placed at the outer edge of the TPZ or drip line of the tree(s) (whichever is larger) and shall serve as an exclusion zone for all construction activity.
 - b. Include signage fixed to the fence containing the project name, tree ID, tag and species and contact information of the University's Grounds Manager, as well as shade cloth if stipulated.
 - c. Be kept free of any stored building or construction material or liquid waste.
4. There must be no parking of vehicles, storage of plant equipment, refueling, installation of pits or hatches, wash down and cleaning of equipment, soil level changes or attachment of power

²³ <https://www.isa-arbor.com/Credentials/ISA-Tree-Risk-Assessment-Qualification>

- lines, stays, guys and the like within the TPZ.
5. When fencing cannot adequately protect the TPZ and access is required for construction purposes then additional ground protection will be required as per **AS4970-2007, Protection of trees on development sites**. This will help adequately disperse any loads and avoid soil compaction and root damage. Ground protection must only be removed once all building and works have been completed.
 6. Ground protection measures may include mulching, irrigation and/or a geotextile will be laid beneath a 75-100mm layer of mulch or 100mm layer of 20mm rock, with no fines. 290mm x 35mm Light Organic Solvent Preservative treated pine rumble boards, spaced with blocks and hoop iron to restrict lateral movement are to be laid over the mulch or rocks. Or a grated steel material, capable of supporting the weight of the heaviest vehicle used on site can be utilized.
 7. The contractor must provide the University's Grounds Manager with a project Tree Protection Management Plan. Tree Protection Management Plans must:
 - a. comply with **AS 4970 Protection of trees on development sites**.
 - b. be conducted by an external, suitably qualified, (Australian Qualifications Framework, (AQF) Level 5, Diploma in Horticulture (Arboriculture) and /or equivalent experience).
 - c. include protection measures for all trees within or adjacent to the project site that may be impacted by development. Consultants are encouraged to recommend protection measures that exceed the requirements of the Australian Standard. Such additional or alternative measures may be founded upon professional judgement, recent scientific research, new technology, industry best practice or consideration of the individual tree species and its relative tolerance to development impacts.
 - d. identify any trees that may be impacted by modified wind patterns caused by the removal of any structure or building.
 - e. quantify all costs of recommended protection measures. Costs associated with Tree Protection measures will be borne by the contractor.
 8. Contractors must not commence construction until the Tree Protection Management Plan has been approved by the University's Grounds Manager.
 9. Contractors must seek approval from the University Grounds Manager and/or Arborist to:
 - a. modify a Tree Protection Zone.
 - b. undertake any work or activities within a Tree Protection Zone including any excavation works required to install signage or underground services.
 - i. Installation of underground services are to be bored, if encroaching on the Tree Protection Zone (TPZ) of any tree. Entry and exit pits are to be positioned outside the designated TPZ of each tree. This requirement should apply unless a non-destructive root investigation, such as Ground Penetrating Radar, has mapped out essential roots that allows for a route to be determined that does not damage any root that will significantly affect the tree.
 - ii. Boring depth will depend on the size of the tree. If a DBH (diameter at breast height) is <100cm boring depth must be at minimum 800mm. If a DBH is 100-150cm, boring depth must be at minimum 950mm. If a DBH is >150cm, boring depth must be at minimum 1100mm.
 - iii. When boring is not possible, excavation shall be done by hand, or a non-destructive method such as hydro excavation at low pressure.
 - c. not implement any recommendations in the Tree Protection Management Plan.
 - d. undertaking any unplanned pruning of roots or branches.
 - i. Pruning of roots and branches will be in accordance with **AS 4373, Pruning of Amenity Trees**.
 - ii. Use of tree wound sealant is prohibited. There is no scientific evidence that tree wound sealants work, in fact they can promote rot and decay by trapping moisture in and can negatively affect the process of compartmentalisation.
 - iii. No branches or roots greater than 30mm can be cut without consent from the University Grounds Manager. The Grounds Manager may stop works until a suitably qualified arborist can attend site to conduct any necessary unplanned pruning works.
 - e. remove any structure or building that will modify the wind patterns a tree marked for retention is exposed to.

10. All injuries to trees must be documented in writing with photographic evidence and submitted to the University's Grounds Manager. These injuries must be recorded in the University's Tree Management System. The Grounds Manager may request works to cease until the Project Arborist has inspected the tree is safe to work around and/or remediation works have been completed.
11. Installation of underground services are to utilise directional drilling (boring), if encroaching on the Tree Protection Zone (TPZ) of any tree.
Entry and exit pits are to be positioned outside the designated TPZ of each tree. This requirement should apply unless a non-destructive root investigation, such as Ground Penetrating Radar, has mapped out essential roots that allows for a route to be determined that does not damage any root that will significantly affect the tree.
The depth of boring will depend on the size of the tree. If a DBH (diameter at breast height) is < 100cm a minimum depth of boring needs to be 800mm. If a DBH (diameter at breast height) is 100cm -150cm, a minimum depth of boring needs to be 950mm. If a DBH (diameter at breast height) is >150cm, a minimum depth of boring needs to be 1100mm.
When boring is not possible, excavation shall be done by hand, or a non-destructive method such as hydro-excavation at low pressure. No roots greater than 30mm are to cut without consent from the University or their representative.

15.8.2 Hardscape

1. Hard surface materials to be salvaged shall be removed without damage by the Project and put aside or into storage.
2. The site shall be cleared of all soil and hard surfaces and left clean at completion of the Project.

15.8.3 Outdoor Infrastructure

1. Any outdoor infrastructure temporarily removed to allow the construction work to proceed will be reinstated by the Project.
2. The Project may be required to salvage valuable landscape items and materials for storage or reuse.

A. Irrigation

If the supply of water to either the landscape or, specifically, to irrigation systems, including landscape areas beyond the project site itself is to be disrupted for longer than one week, arrangements will be made by the Project to install and manage a suitable temporary water supply system until such time as the infrastructure is repaired or replaced.

B. Cultural Artifacts

1. The University of Melbourne's buildings and grounds contain many objects of cultural importance such as sculptures, facades, mosaics, heritage items etc. These belong to the various cultural collections of the University and are to be protected during works.
2. Protection and care of objects of cultural significance during works will be based on advice sought by the University's Project Manager from the University's Potter Museum of Art, the custodian of the University's cultural objects.
3. Individual objects of cultural significance are to be identified in tender documents and the specific nature of their protection and care during works is to be documented prior to construction.

15.9 DEFECTS LIABILITY PERIOD

1. During the defects liability period the contractor will be responsible for the full establishment and maintenance of installed softscape, hardscape and outdoor infrastructure.
2. The default defects liability period will be 12 months unless a longer timeframe is advised by the University.
3. On completion of the defect's liability period:
 - a. Any planting failures, equipment breakdowns or other repairs associated with installations delivered as part of the project works is to be made good by the Project.
 - b. Trees and garden plantings shall be healthy and well presented.

- c. The density and composition of the planting shall comply with section 15.7.9.C.
 - d. Garden beds shall be free of weeds and litter and have an appropriate covering and depth of mulch or other specified surface dressing.
 - e. All landscape surfaces, fixtures, fittings, furniture and equipment shall be in proper order as per their specification.
4. General cleaning of external areas within the project precinct during the Defects Liability Period will be the responsibility of the University.

15.10 DESIGN CHANGE AUTHORISATION

All requests for changes to the requirements of these Design Standards must be made on the Modification Request Form. No design work is to proceed based on the proposed modification until the modification request has been approved in writing.

A copy of all signed design change request forms together with a schedule of all approved changes are to be submitted as part of the project handover documentation.

15.11 AS-BUILTS, WARRANTIES AND MANUALS

In addition to the normal items required to be provided to a building owner at project completion, all requirements noted in this section of the Design Standards are to be provided to the University's Project Manager. Draft documentation is required four weeks prior to practical completion and final documentation no later than four weeks after practical completion.

15.12 PERFORMANCE EVALUATION

A template for performance evaluation must be included in the project specifications.

15.13 APPENDICES

Note that the information in the below appendices generally applies to all campuses however some adjustments may be appropriate for the non-Parkville campuses. Any such changes are to be approved via the Modification Request Form noted in 15.10 above.

- Appendix 1 - Hard Landscaping
- Appendix 2 – Drainage
- Appendix 3 – Furniture

APPENDIX 1 – Hard Landscaping

This Appendix comprises the following data sheets:

- Brick Paving - Pedestrian Footpaths
- Brick Paving – Vehicle Roads
- Bluestone Pavers - Pedestrian Footpaths
- Bluestone Pavers – Vehicle Roads
- Tactile Indicators
- Handrails
- Fences
- Edges – Paved Brick
- Edges – Steel Strip
- Edges – Bluestone

Paving Element –Brick Paving for Pedestrian Footpaths

Description

University Grey brick paving is one of the two standard materials used for pedestrian paving treatment at the University of Melbourne. The pavers used are Austral University Grey and their dimensions are approx. 230 x 110x 76mm. The arrangement of pavers for pedestrian access only areas is detailed below.



Technical Details

Pedestrian Pathways

Base Course

Thickness of pedestrian footpath base course depth is 150mm with a rating of 20mm class 2 wet mix crushed rock compacted to Aust. Standards.

If the design team wishes to lay a concrete slab base they must obtain written approval from the Grounds Manager.

Bedding Course (Wet Mortar)

The bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement. The wet consistency should be firm and hold together when squeezed in the hand.

Bedding should not exceed 50mm depth and not less than 25mm depth. The mortar must not dry out whilst laying is in progress.

Brick Paving

Bricks are laid normally in stretcher bond pattern. Bricks must be laid to levels and lines as per drawing supplied but should always have a minimum fall of 1:80 to allow for adequate drainage.

Large colour or size variation between deliveries from the brick supplier are not acceptable. Colour blending, to avoid patches of light and dark colours can be resolved by working off three paver pellets at the same time, is the responsibility of the layer. Using a rubber mallet the bricks should be hand-tapped down into the mortar, with a gap of approximately 3mm between courses and verticals. No mechanical vibrators are to be used. The final surface profile shall be without hollows that would allow water to pond.

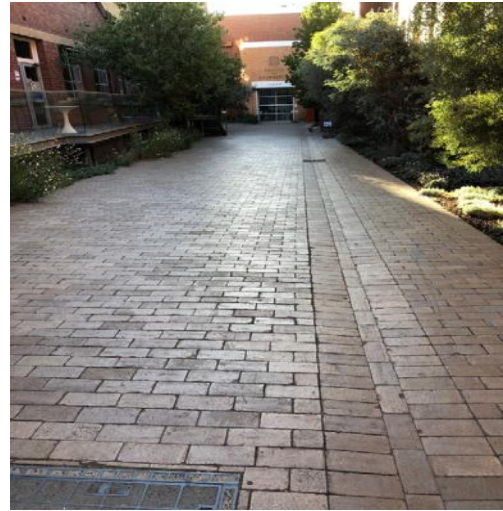
Joint Filling

After each section of the area is completed fine white dry washed sand must be brushed into the spaces between the bricks and some sand allowed to remain on the surface. The latter must be swept off when the works are completed and joints completely filled.

Paving Element – Brick Paving for Vehicle Roads

Description

University Grey brick paving is one of the two standard materials used for road access treatment at the University of Melbourne. The pavers used are Austral Brick – University Grey and their dimensions are approx. 230 x 110 x 76mm. The arrangement of pavers for roads or shared (pedestrian and vehicular) access are detailed below.



Technical Details

Vehicle Roads

Base Course

Thickness of road base course is 300 mm thick of 20mm crushed rock compacted to Aust. Standards or no less than 150mm concrete slab minimum 25 mpa with SL62 steel with a sub base of 80mm of 20mm crushed rock compacted to Aust. Standards.

Bedding Course (Wet Mortar)

The bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement. The wet consistency should be firm and hold together when squeezed in the hand. Bedding should not exceed 50mm depth and not less than 25mm depth. The mortar must not dry out whilst laying is in progress.

Brick Paving

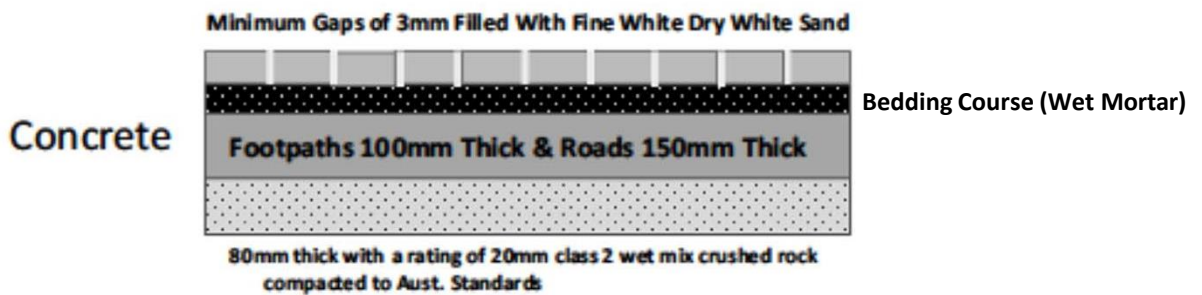
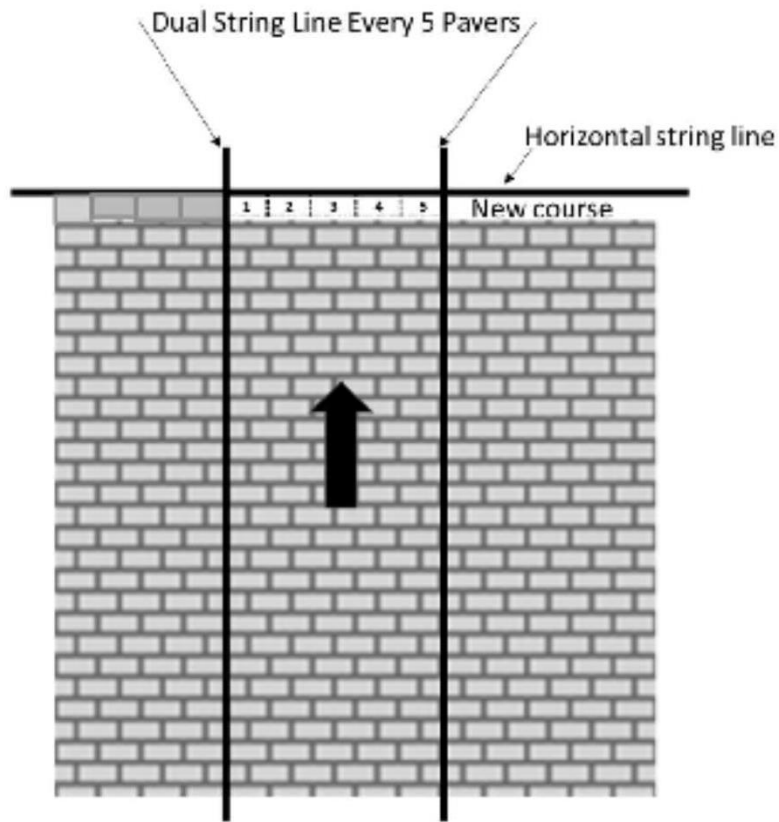
Bricks are laid normally in stretcher bond pattern. Bricks must be laid to levels and lines as per drawing supplied but should always have a minimum fall of 1:80 to allow for adequate drainage. Large colour or size variation between deliveries from the brick supplier are not acceptable. Colour blending, to avoid patches of light and dark colours can be resolved by working off three paver pellets at the same time, is the responsibility of the layer. Using a rubber mallet the bricks should be hand-tapped down into the mortar, with a gap of approximately 3mm between courses and verticals. No mechanical vibrators are to be used. The final surface profile shall be without hollows that would allow water to pond.

Joint Filling

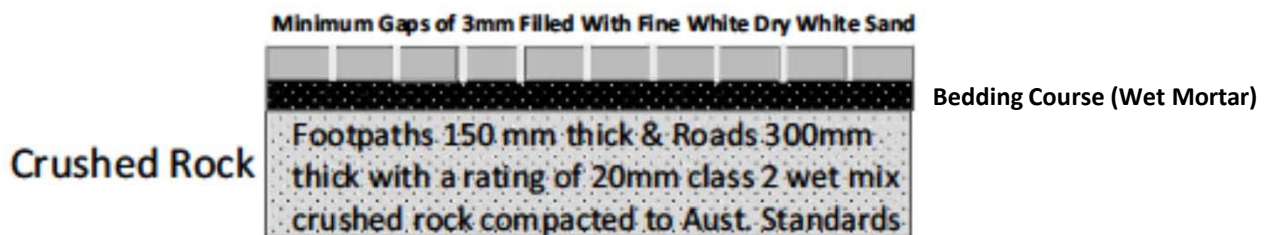
After each section of the area is completed fine white dry washed sand must be brushed into the spaces between the bricks and some sand allowed to remain on the surface. The latter must be swept off when the works are completed and joints completely filled.

Paving Element – In-situ Bricks Paving Roads & Footpaths

Technical Details



OR



Paving Element – Bluestone Pavers

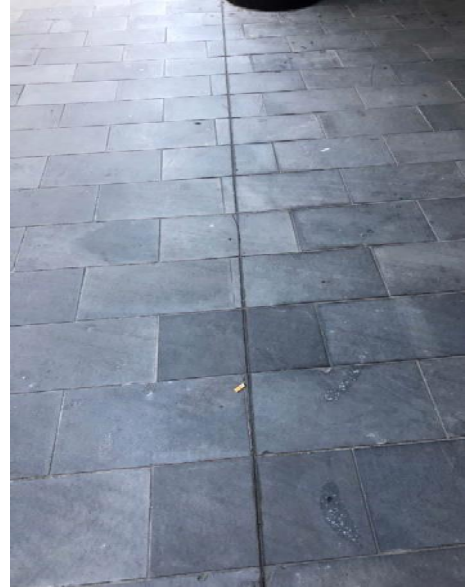
Bluestone Pavers For Roads

Description

Bluestone pavers are one of the two standard materials used for vehicle access treatment at the University of Melbourne.

The bluestone paver dimensions are of various lengths and widths with a minimum depth of 80mm.

The type of bluestone used is diamond sawn with an approved sandblasted finish. The arrangement of pavers for roads and for shared (pedestrian and vehicular) access are detailed below.



Technical Details

Vehicle Road Ways

Sub Base Course

Thickness of the sub base for roadways is at a minimum depth of 80mm with a rating of 20mm class 2 wet mix crushed rock compacted to Aust. Standards

Base Course

Thickness of the base concrete slab for roadways is at a minimum depth of 200mm with a minimum rating of 32 mpa with SL82 steel.

Bedding Course (Wet Mortar)

The bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement. The wet consistency should be firm and hold together when squeezed in the hand. Bedding should not exceed 50mm depth and not be less than 25mm depth. The mortar must not dry out whilst laying is in progress.

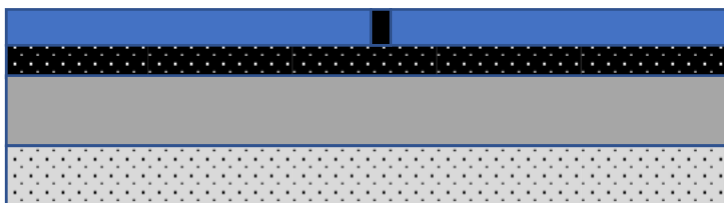
Bluestone Paving

Pavers shall be 80mm thick (nominal) diamond sawn bluestone with an approved sandblasted finish. no more than 20% "cats paws" (blotches) and/or vented streaks on the face of the pavers is permissible.

Grouts/Joints

Grouts/Joints between pavers shall be a maximum 2.5mm wide. Grout joints with an approved non shrink cementitious grout (Lanko 702 Durabed or equivalent which is equal and approved). Mix and apply in accordance with manufacturer's recommendations. Ensure that no residue grout remains on paver surface.

Max 2.5mm Grout Joint



Min. Width 80mm Bluestone Paver

Min. 25 to 50mm Depth Bedding Course

Min. depth 200mm Concrete Slab

Min. depth 80mm - 20mm class 2 wet mix crushed rock compacted

Paving Element – Bluestone

In-situ Bluestone Pavers For Pedestrian Footpaths

Description

Bluestone pavers are one of two standard materials used for pedestrian footpaths at the University of Melbourne.

The bluestone paving dimensions are of various lengths, widths with a minimum thickness of 40mm.

The type of bluestone used is a diamond sawn with an approved sandblasted finish. The arrangement of pavers for pedestrian footpaths is detailed below.



Technical Details

Pedestrian Footpaths

Sub Base Course

Thickness of the sub base for footpaths is at a minimum depth of 80mm with a rating of 20mm class 2 wet mix crushed rock compacted to Aust. Standards.

Base Course

Thickness of the concrete slab base for footpaths is at a minimum depth of 100mm with a minimum rating of 32 mpa with SL82 steel.

Bedding Course (Wet Mortar)

The bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement. The wet consistency should be firm and hold together when squeezed in the hand. Bedding should not exceed 50mm depth and not be less than 25mm depth. The mortar must not dry out whilst laying is in progress.

Bluestone Paving

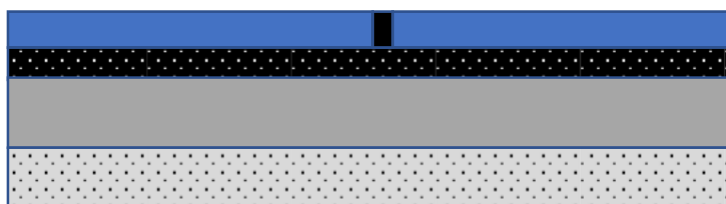
Pavers shall be 40mm thick (nominal) diamond sawn bluestone with an approved sandblasted finish.

No more than 20% "cats paws" (blotches) and/or vented streaks on the face of the pavers is permissible.

Grouts/Joints

Grouts/Joints between pavers shall be a maximum 2.5mm wide. Grout joints with an approved non shrink cementitious grout (Durabed or equivalent which is equal and approved). Mix and apply in accordance with manufacturer's recommendations. Ensure that no residue grout remains on paver surface.

Max 2.5mm Grout Joint



Min. Width 40mm Bluestone Paver
Min. 25 to 50mm Depth Bedding Course
Min. depth 100mm Concrete Slab
Min. depth 80mm - 20mm class 2 wet mix crushed rock compacted

Tactile Indicators

Bluestone tactile Pavers For Pedestrian Footpaths

Description

Bluestone tiles with granite tactile indicators are a standard material used in the University. They are used to assist visually impaired pedestrians in hazardous areas and for directional access treatment. The tactile tile comes in multiple dimensions sizes 300sq, 400sq and 600sq and is 40mm thick. The tactile tile must be installed compliant with DDA Standards.



Technical Detail:

Pedestrian Footpaths

Sub Base Course

Thickness of the sub base for footpaths is at a minimum depth of 80mm with a rating of 20mm class 2 wet mix crushed rock compacted to Aust. Standards.

Base Course

Thickness of the concrete slab base for footpaths is at a minimum depth of 100mm with a minimum rating of 32 mpa with SL82 steel.

Bedding Course (Wet Mortar)

The bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement. The wet consistency should be firm and hold together when squeezed in the hand. Bedding should not exceed 50mm depth and not be less than 25mm depth. The mortar must not dry out whilst laying is in progress.

Bluestone Paving

Pavers shall be 40mm thick (nominal) diamond sawn bluestone with an approved sandblasted finish.

No more than 20% "cats paws" (blotches) and/or vented streaks on the face of the pavers is permissible.

Grouts/Joints

Grouts/Joints between pavers shall be a maximum 2.5mm wide. Grout joints with an approved non shrink cementitious grout (Durabed or equivalent which is equal and approved). Mix and apply in accordance with manufacturer's recommendations. Ensure that no residue grout remains on paver surface.

Handrails

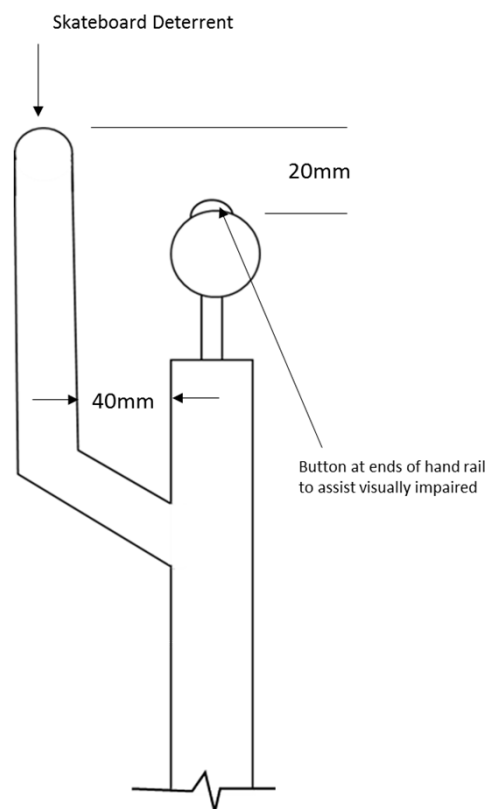
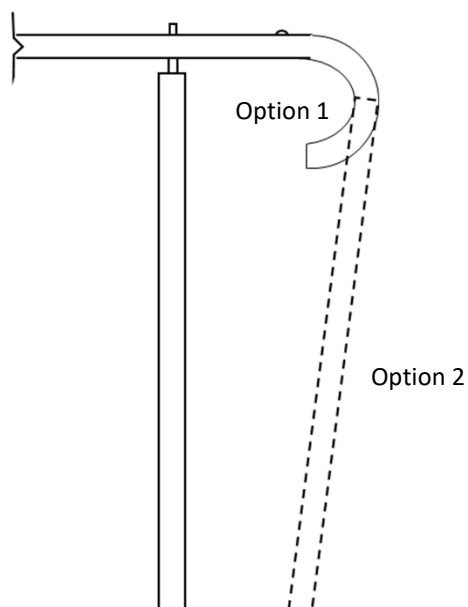
The University preferred external type of handrail is stainless steel or galvanized steel and must be compliant with DDA Standards.

All external handrails must have skateboard deterrent components and a button on either end of the hand rail to assist the visually impaired as per drawing below. The end of the handrail must be finished with a curved end or end post as per drawing and photo.



Technical Details

All handrail components, dimensions and installations must be compliant with DDA standards.



Fences

Description:

University border fencing.

A



B



Technical Details

The University has two preferred fences.

Top Rail (Tube)	50x25x3mm	Top Rail D Section	50x6mm
Posts (Tube)	40x40x3mm	Posts (Tube)	75x75x3mm
Pickets / Baluster (Round)	12mm ϕ	Pickets / Baluster	40x5mm
Bottom Rail	40x12x3mm	Bottom Rail	75x50x3mm

Fence (A & B) components either galvanized steel or hot dip galvanized.

Fence (A & B) Pickets / Balusters maximum spacing is 115 mm.

Fence posts must have a minimum depth of 300 mm into a concrete footing.

Maximum span between post 1300 mm.

Concrete footings 300x300x450 depending on soil condition .

University preferred colour and paint type is : Dulux 'PG1A7 TICKING' - Super Enamel High Gloss

Edges

Paved Brick Garden Edges

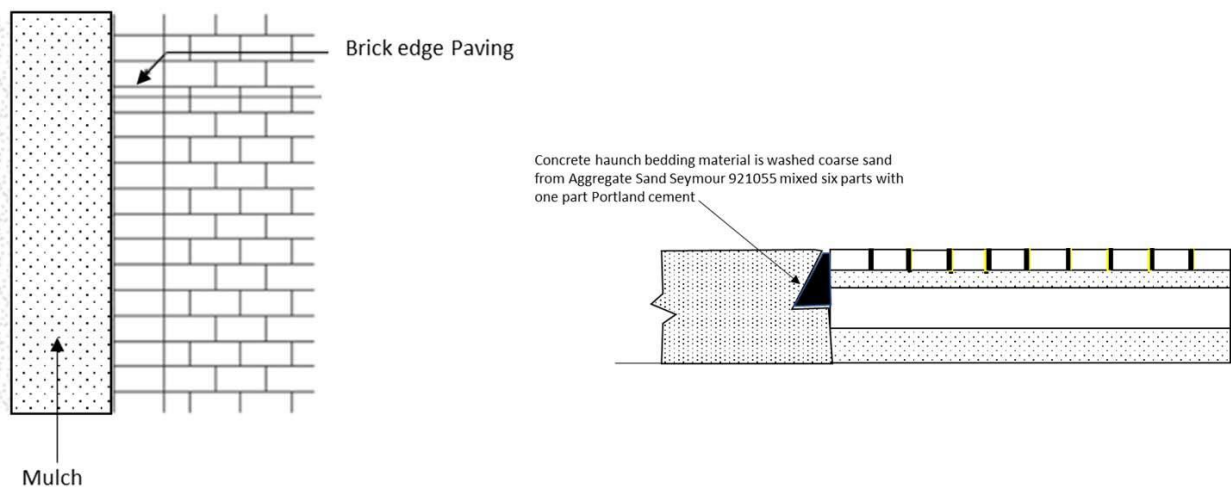


Product Description

Garden edges are used in instances where garden beds are adjacent to University Grey brick pedestrian paving. Pavers adjacent to mulch are to be laid in a repetitive, offset fashion with a concrete haunch on the end of the paver to prevent movement. This arrangement also applies with bluestone paving.

Installation

Garden edges are to be installed in all instances where university grey paving or bluestone paving and garden beds are adjacent.



Edges

Steel Garden Edges



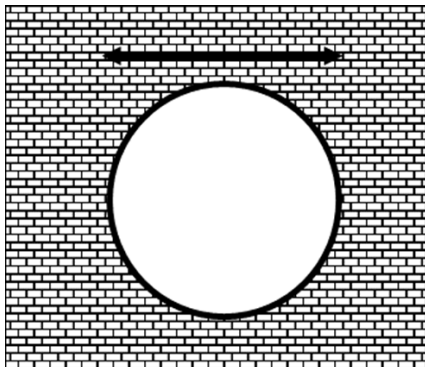
Product Description

Mild steel or stainless steel edges are used for separating paved or asphalted paths from garden beds and lawn. These edges are to be used where separation for tight or curved areas is required.

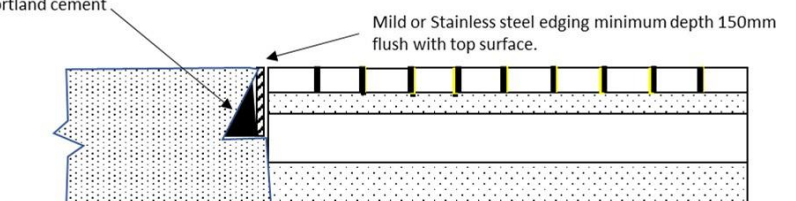
Installation

When a hard course of bricks cannot be laid e.g. around trees, then steel edges are to be installed flush with paving finished level.

The minimum dimension of mulch area for trees is governed by the drip line of the tree foliage.

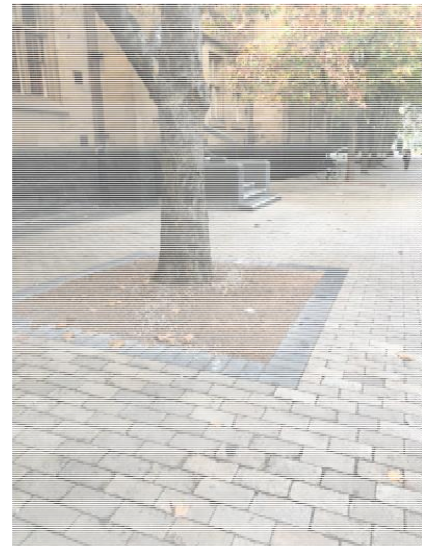


Concrete haunch bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement



Edges

Paved Bluestone Garden Edges

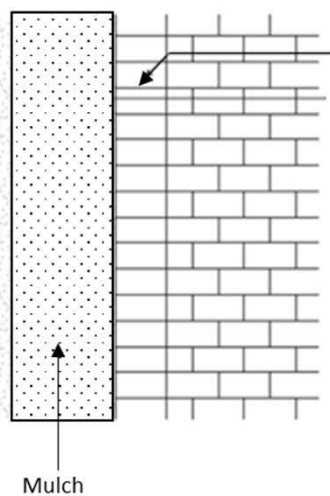


Product Description

Garden edges are used in instances where garden beds are adjacent to University Grey brick pedestrian paving. Pavers adjacent to mulch areas are laid in a repetitive, offset fashion with a concrete haunch on the end of the paver to prevent movement. This also applies with bluestone paving.

Installation

Garden edges are to be installed in all instances where University Grey paving or bluestone paving and garden beds are adjacent.



Bluestone Edging

Concrete haunch bedding material is washed coarse sand from Aggregate Sand Seymour 921055 mixed six parts with one part Portland cement



APPENDIX 2– Drainage

This Appendix comprises the following data sheets:

- Bluestone Kerb and Channel
- Brick Channel Drains
- Side Entry Pits
- Stainless Steel Grates
- Galvanised Grates
- Pits and Lids

Kerbs

Bluestone Pitcher Kerb and Channel

Product Description

Sawn bluestone kerbs are one of the two standard kerbing materials used at the University.



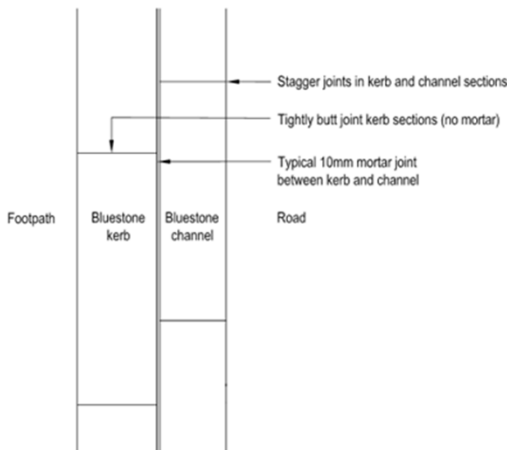
Technical Details

Sawn bluestone kerbstones are 300 x 300mm with a 25mm bullnose. Their length is typically 1000mm and a minimum of 800mm. Adjacent channel (gutter stone) is typically 250mm wide by 100mm thick, with a typical length of 900mm.

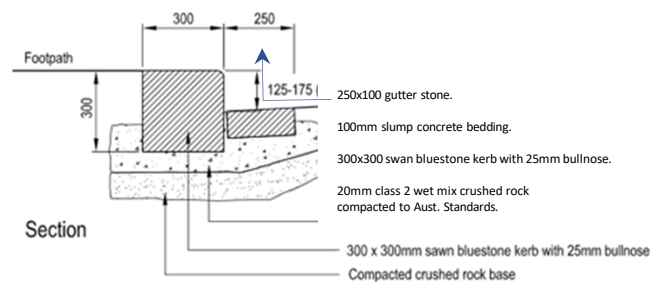
The bedding sub base for the bluestone kerbing is a bed of 80mm thick 20mm class 2 wet mix crushed rock compacted to Aust. Standards and a 100mm slump concrete bedding.

The butt joints in the kerb and channel must be staggered and the butt joints in the kerb sections need to be tight (no mortar).

A typical 10mm joint between the curb and channel is mortared. Refer to drawings below



Plan



University Grey Brick Channel Drains

Description

University Grey paver spoon channels provide natural drainage in paved areas. It is the preferred detail within the University of Melbourne



Technical Details

Base Course

Refer to paving details for either footpath or roads.

Bedding Course (Wet Mortar)

Refer to paving details for either footpath or roads.

Brick Paving

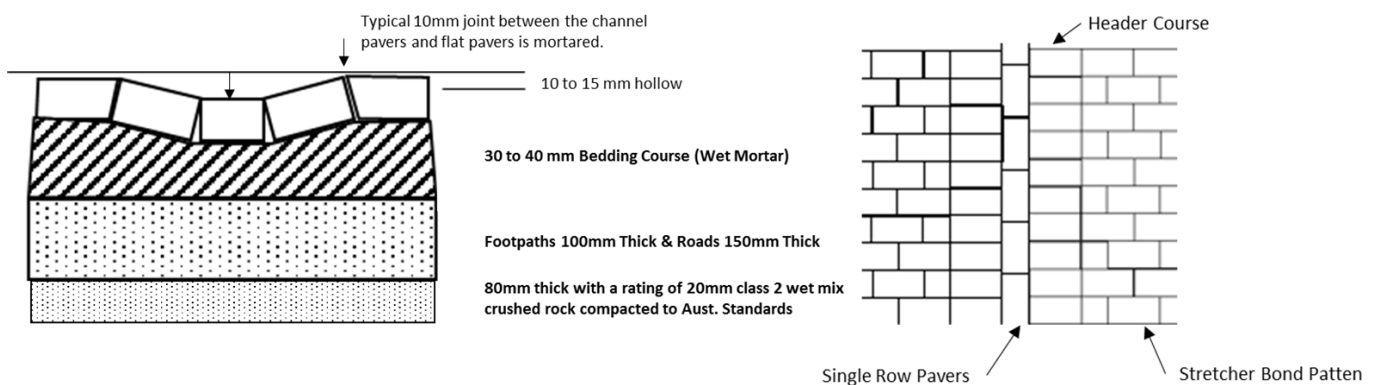
Bricks must be laid to achieve a 10 to 15mm hollow at the deepest point in the channel to allow for adequate drainage.

Using a rubber mallet the bricks should be hand-tapped down into the mortar, with a gap of approximately 3mm between courses and verticals.

No mechanical vibrators are to be used. The final surface profile shall be without hollows that would allow water to pond.

Joint Filling

After each section of the channel is completed apply wet mortar into the joint spaces between the bricks within the channel until completely filled.



Road Drainage Pit Side Entry

Product Description

Sawn bluestone overflow kerbs with a Class D bike proof steel grate is one of the two standard arrangements used in the University.

Depending on surrounding surfaces, a concrete side entry pit may be used.



Technical Details

The sawn bluestone overflow kerb is 300 square with a 25mm bullnose. Length is typically 1300 mm to suit a standard grate.

Adjacent channel (gutter stone) is typically 250mm wide by 100mm thick, with a typical length of 900mm.

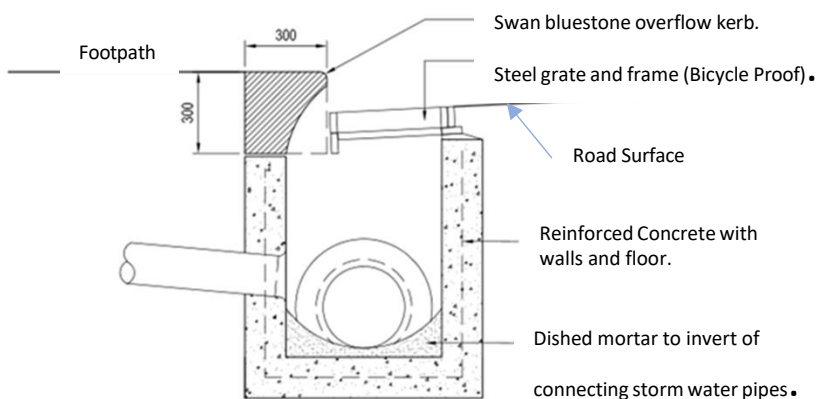
The bedding sub base for the bluestone kerbing is a bed of 80mm thick 20mm class 2 wet mix crushed rock compacted to Aust. Standards and a 100mm slump concrete bedding. The butt joints in the kerb and channel must be staggered and the butt joints in the kerb sections need to be tight (no mortar).

A typical 10mm joint between the curb and channel is mortared.

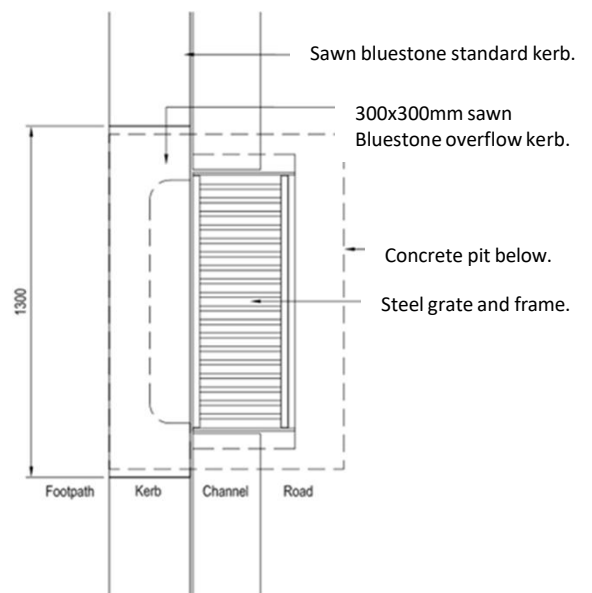
The pit depth, pipe entry and drain details are to be designed according to site conditions.

The grate should be Class D rating (heavy duty) with a bike proof grate design.

Refer to drawings below



Section



Plan

Stormwater and Strip Drain Grates / Pits

Stainless steel

Stainless steel heelguard grate pit covers are one of two preferred types of pit cover used in University grounds. The pit covers must have minimum strength rating of class D for all roads, pathways and other areas. The minimum requirement for precast concrete pits is class D and for in-situ pits the concrete must be 40 mpa with reinforcement steel.



Technical Details

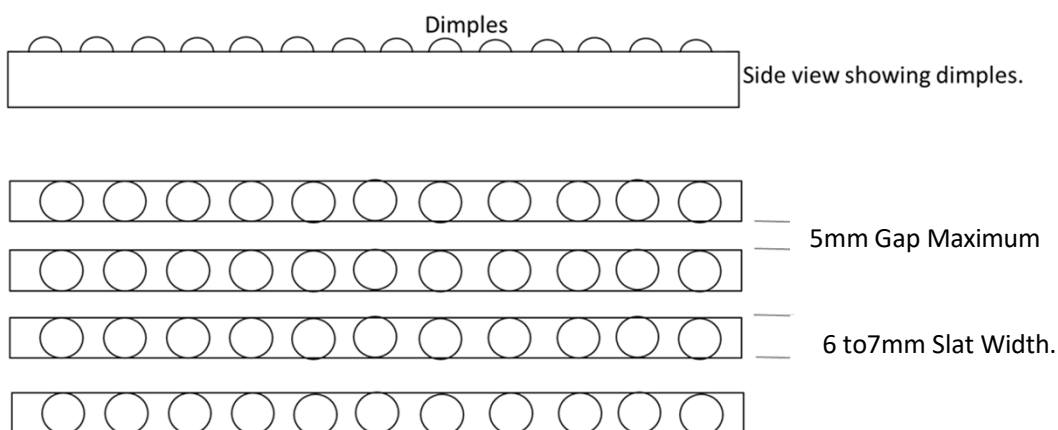
Grates

Stainless steel grates should be class D rating (heavy duty) with 5mm maximum gaps between slats for every heel proof grate design. Stainless steel grates must have dimples on face surface as per drawing below.

Pits

Refer to Pits and Lids details sheet.

Stainless Steel Heel Proof Grate



Note: Pits & Grates must be rated class D

Stormwater and Strip Drain Grates / Pits

Galvanized Steel

Galvanized steel heelguard grate pit covers are one of two preferred types of pit cover in the University grounds. The pit covers must have minimum strength rating of class D for all roads, pathways and other areas. The minimum requirement for precast concrete pits is class D and for the in - situ pits the concrete must be 40 mpa with reinforcement steel.



Technical Details

Grates

Galvanized steel grates shall be Class D rating (heavy duty) with 5mm maximum gaps between slats for heel proof grate design.

Pits

Refer to Pits and Lids details sheet.

Pits and Lids

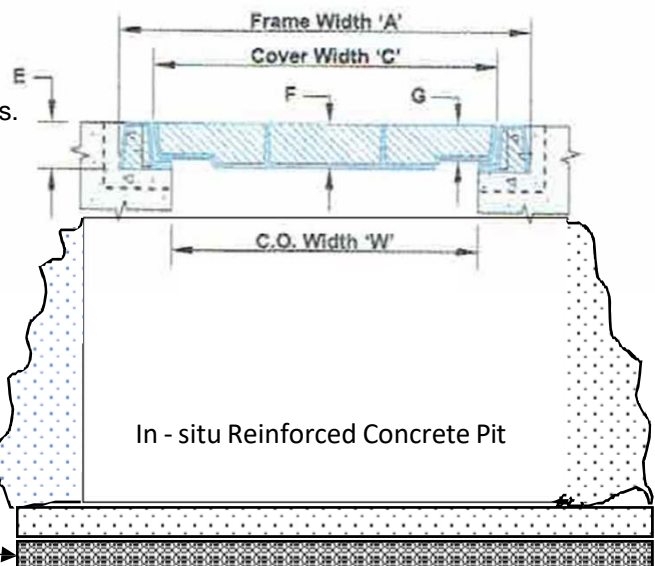
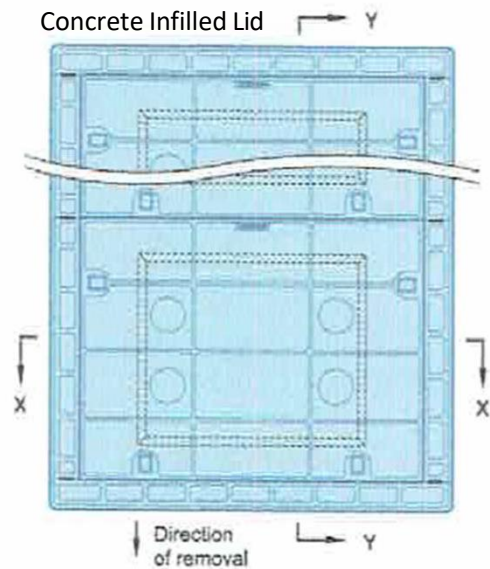
Concrete infilled access pit covers are the preferred type of pit cover in the University grounds. The pit covers must have minimum strength rating of class D for all roads and pathways. The concrete infilled access cover is to be used for all under ground services pits.

The preferred minimum requirement for precast concrete pits is class D and for in-situ pits the concrete must be 40 mpa with reinforcement steel.



Precast pits Class D

The pre cast pit to be installed to manufacturer guidelines.



Reinforced Concrete

In - situ Reinforced Concrete Pit

80mm thick with a rating of 20mm class 2 wet mix crushed rock compacted to Aust. Standards

APPENDIX 3 – Furniture

This Appendix comprises the following data sheets:

- University Timber and Concrete Bench/Seat
- Loose Outdoor Table and Chairs
- Metro Town and Park Seats
- External Bin Enclosures
- Bike Hoops
- Service Meter Enclosures

Seating

Timber Bench /Seat on concrete legs

Description

Timber and concrete Bench/Seat units are one of the standard types of seating used throughout the University. The seat is made of Spotted Gum with galvanised mild steel brackets bolted onto concrete columns. Note - This type of seating comes with or without back rests.



Technical Detail:

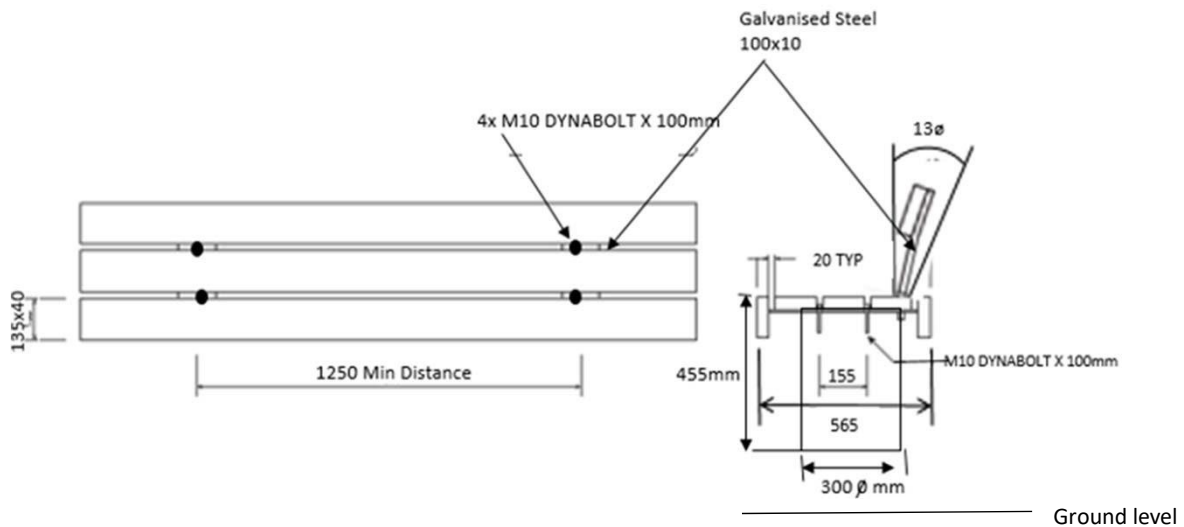
Base frame is hot dip galvanised steel 100x10mm.
Timber battens are kiln dried Spotted Gum hardwood sized 132x40mm.
The concrete columns are 300mm diameter
4x M10 Dynabolt at 100mm are used to fix the seat to the concrete columns.

Installation:

Seats must be made level and 455 mm above natural surface level. Sub-surface mounts are preferable.
Wooden seat to be bolted down to concrete column.
Concrete columns installed by contractors on site.

Finish

Timber Slats – 3 coats of Sikken's Cetol HLSe



Loose Furniture

Loose outdoor table and chair sets

Description:

Powder coated mild steel framed tables and chairs in a range of colours for use across all campuses.

Jak Chair

- 555w x 565d x 795h mm
5.

Jil Table (with spun metal top)

- '2 Seater Patio Table'
mm
be located to use with existing bench ordered), otherwise suggest 2 chairs
- '4 Seater Dining Table'
mm
ordered with this table size.
- '4-6 Seater Dining Table'
730h mm
ordered with this table size.



600w x 600d x 730h
This table size can
seating (no chairs
ordered.
900w x 900d x 730h
Suggest 4 chairs

1150w x 1150d x
Suggest 6 chairs

Detail:

The location, colour, table size and number of tables and chairs is to be approved by Campus Management prior to ordering.

The approach to colour is to specify one colour for tables and chairs for one area. For example 'Ochre' coloured tables and chairs are located at Professor's Walk.

Installation:

Loose furniture is assigned to specific areas on each campus. It may not be appropriate to use these tables and chairs where there is a high risk of theft eg. close to campus boundaries.

Supplier:

Tait.

Seating

Metro - Town & Park BSE Seat

Product Description:

The timber and steel 'Metro' seat comes with or without a back rest is a marine grade aluminium unit with stainless steel fixing and its design allows up to 4 metres of continuous FSC 100% hardwood. This seat is one of three types of Metro seat used in the University.



Technical Detail:

The Metro seats to be bolted down by 4 x 10M Dynabolts x200mm.

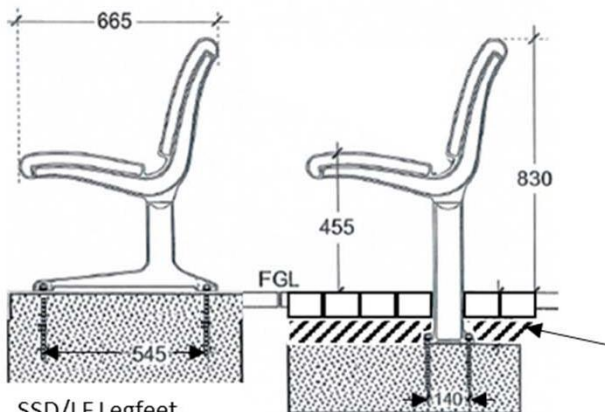
Installation:

There are many different types of Metro seats but they are all installed the same way as per drawings.

Metro seating SSD/SS - If installed in paving areas and in asphalt areas must be bolted down on 300 X 700 X 450mm deep concrete footing, as per drawings below.

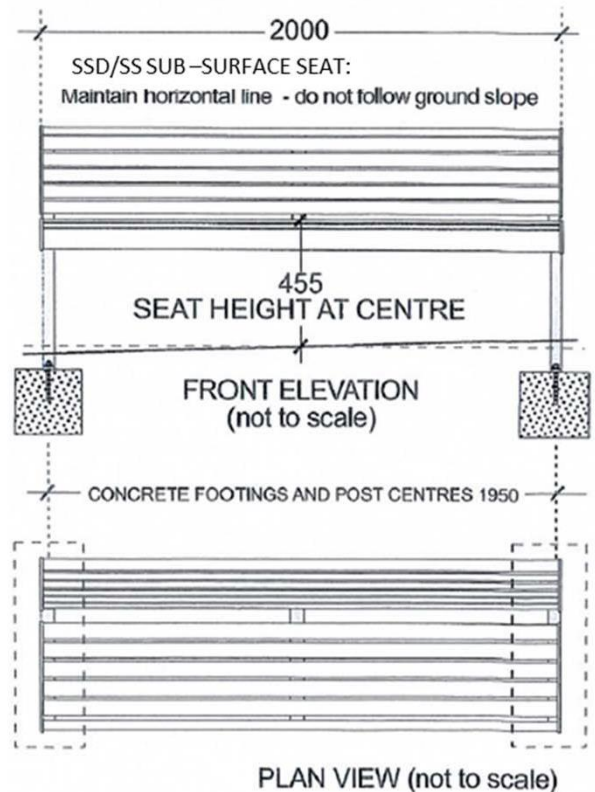
Supplier:

Stoddart Town & Park.



SSD/LF Legfeet (bolt down). For established concrete areas.

SSD/SS Sub-surface post. For paved and asphalt areas.



Pavers shown on mortar bed over concrete footing.

External Bin Enclosures

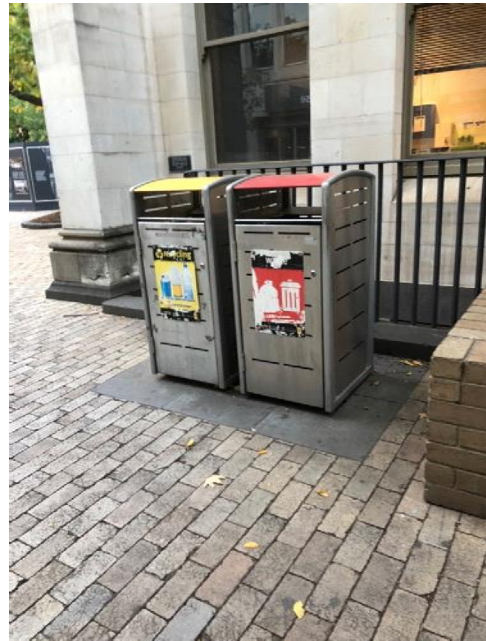
Litter & Recycling Receptacle Bins

Description

Metro bins are a standard stainless steel bin enclosure used throughout the university. They are installed as sets of two bins. One being red for litter and the other being yellow for recycling. The bins must have University approved signage affixed..

There are two standards for installing the bins:

1. Concrete areas
2. Paved areas



Technical Detail:

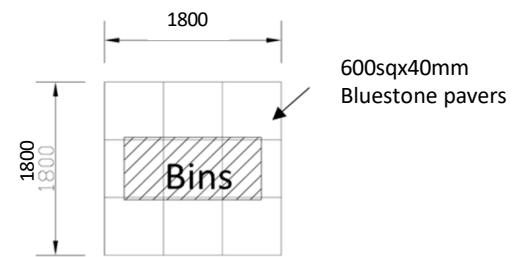
The Metro stainless steel bins are designed to encase a 110 litre wheelie bin.

Installation:

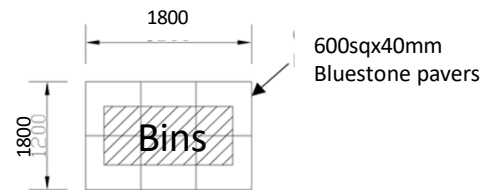
The bins are only to be installed on hard surfaces ie. concrete surface or bluestone pavers. For both options, bins are to be secured with 4 x 12M Dynabolts x 150mm.

When installing bins on bluestone pavers, the pavers must be installed as per drawing below.

Signs to be installed on both sides of stand-alone bins ie. on the door and on the back of the bin. For one sided access bins, signage is only fixed to the door.



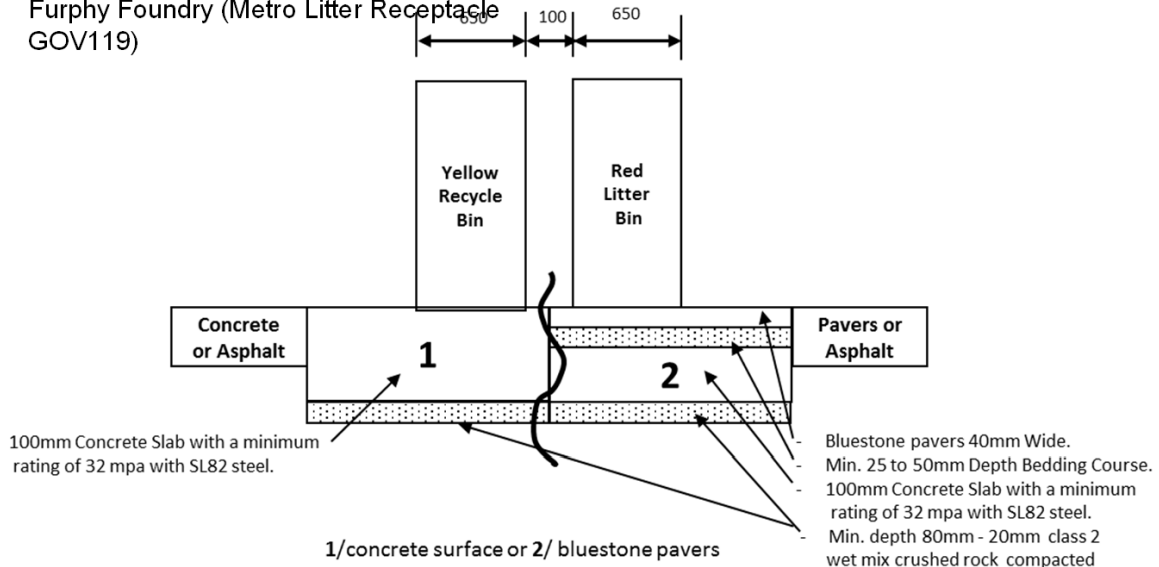
Option A
For stand alone bins access on both sides.



Option B
For bins up against walls fences, etc.

Supplier:

Furphy Foundry (Metro Litter Receptacle GOV119)



Bike Hoops

Individual Hoops Bluestone Edge

Description:

The individual bike hoops are 40NB 48.26x2.77 grade 304 finished stainless steel pipe with a 304 grade stainless steel base plate (65x200x20mm) fillet welded to the hoop.

Base plates to have 20mm bolt holes.



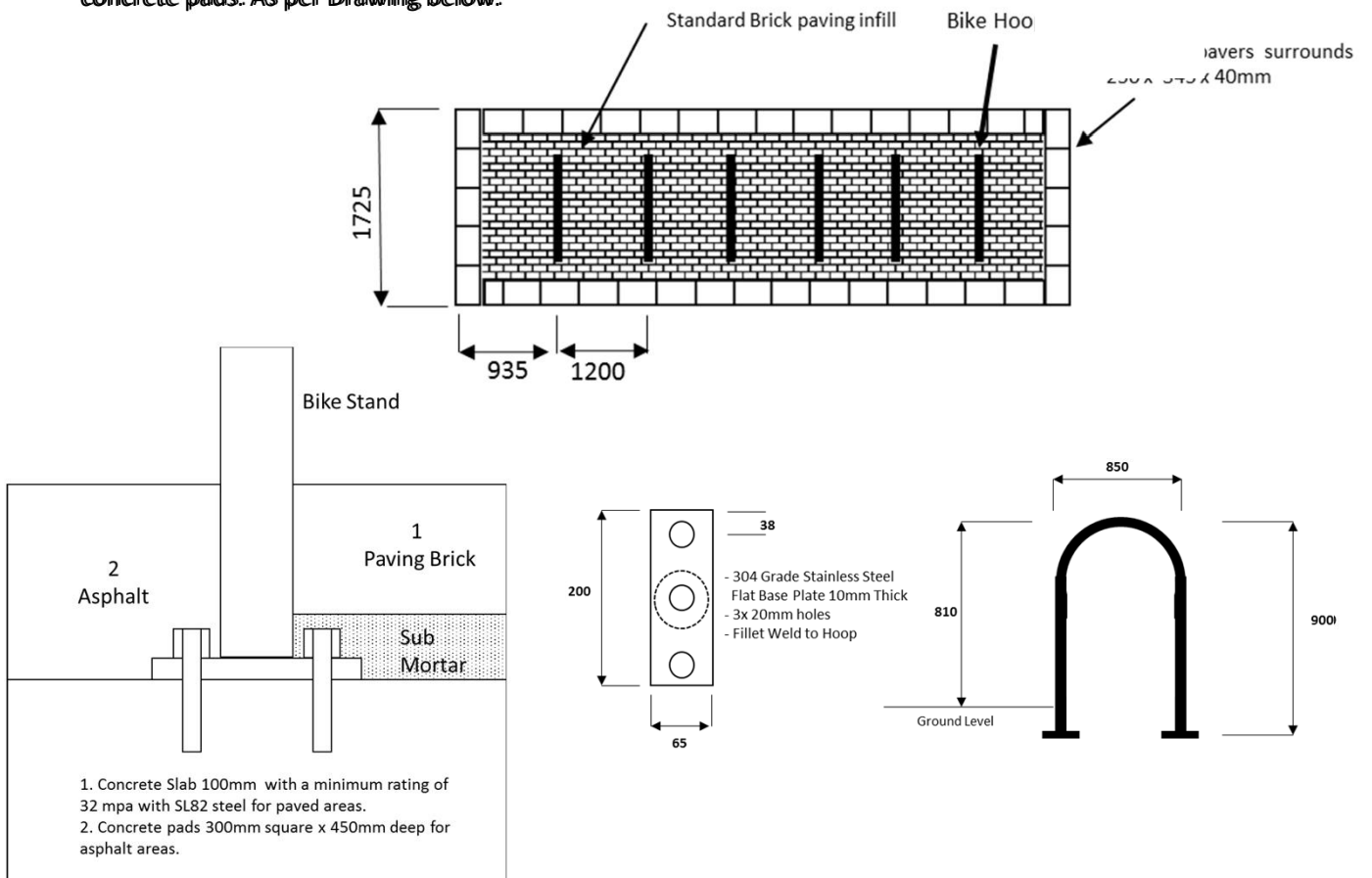
Technical Detail:

The stainless steel bike hoops are to be bolted down with 4 x 12M Dynabolts x100mm.

Installation:

1. Bike hoops in brick paved areas must be bolted down on a concrete slab 100mm thick with a minimum rating of 32 mpa with SL82 steel . Note concrete base is the same size as the whole bike parking paved area

2. Bike hoops installed in asphalt areas are to be bolted down on 300mm square by 450mm deep concrete pads. As per Drawing below.



Service Meter Enclosures

Service meter enclosures are the required for all services meters and fire equipment.

Doors must open outwards and be lockable by a padlock. Type of padlock is determined by the services enclosed e.g. gas, water and fire services.

The cage must be secured down on a 75mm concrete slab.



Technical Details

Gates & enclosure framing is 50x50x3mm steel angle.

Internal 9mm perforated galvanized steel sheeting 2mm thick.

Gates & enclosure middle internal bracing railing is 25x25x3mm square tubing.

Padlock plates – 50x75x3mm flat bar with 15mm \varnothing diameter hole for padlock.

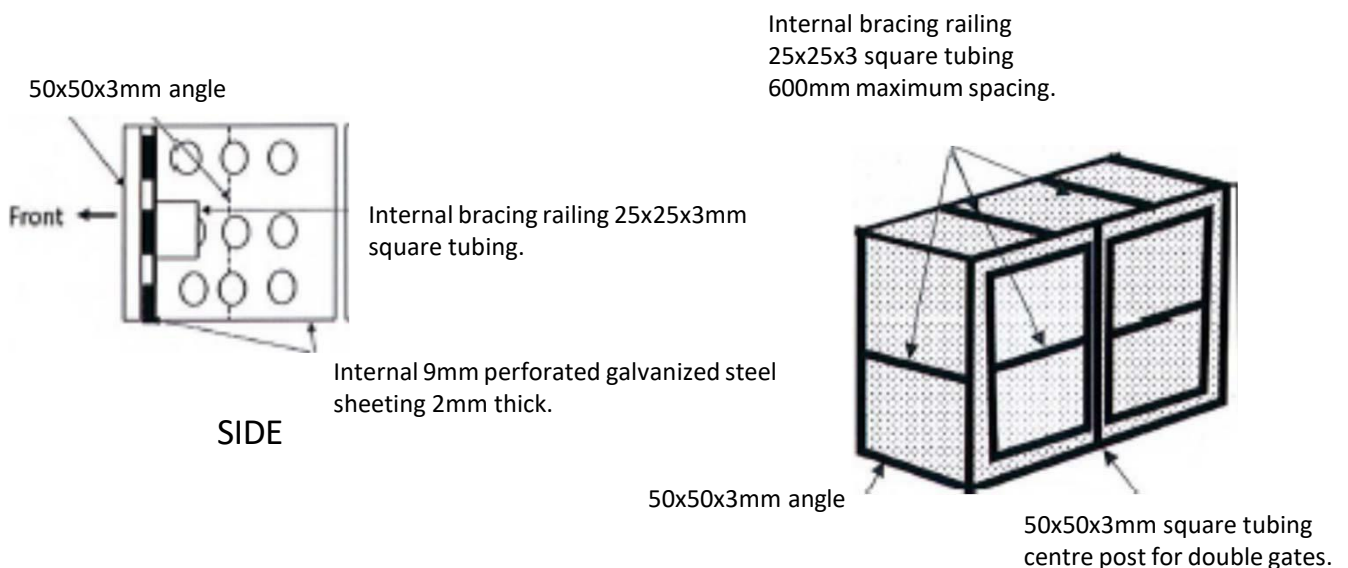
Mounting by 10mm dyna bolts galvanized.

Ball pin lift off welded gate hinges galvanized.

Centre post for double gate units is 50x50x3mm.

ALL components must be either DuraGal or hot dip galvanized steel.

University preferred colour and paint type is Dulux 'PG1A7 TICKING' - Super Enamel High Gloss.



Sled Bike Hoops

4 x Galvanized bike hoops attached to galvanized steel sleds.

Description:

Galvanized bike sleds can accommodate 8 parked bikes per unit.



Technical Detail:

The bike sled hoops are to be bolted down by 4 x 16M Dynabolts x100mm or screw bolts 16Mx100mm.

Installation:

Bike sled hoops can be surface mounted on paved, concrete and asphalt areas.

