0001c Design Checklist - Civil Works

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00 Design Principles

0.01 Main Considerations

It is a requirement to undertake the 00 PLANNING AND DESIGN/ 0001R - DESIGN REFERENCE and GLOSSARY OF TERMS information into all aspects of design, detailing and delivery when developing the content here within. Clear demonstration of adherence to these requirements is part of the services and will be called upon at key points in the project and during at the discretion of the Department of Education (DoE).

0.02 Civil Works

Civil works is a general term for hard surface areas outside of the building on the site that includes roads, parking areas, bus bays, paths and hard-standing areas and games courts.

Design of civil works needs to be from a “Whole of Life” perspective and provide:

- Value for Money
- Fit for purpose
- Long term reliability
- Durability and serviceability
- Minimal maintenance requirements
- Low maintenance costs
- Having minimal impact on the site and environment from contamination, erosion, sedimentation, dust and noise both on completion and during construction.

Standards

Compliance is meeting the standards of the Educational Facilities Standards and Guidelines (EFSG) which is above, but inclusive of, all relevant authority’s and regulation’s including:

- Local Council
- Environmental Protection Authority (EPA)
- Roads and Maritime Services (RMS)
- Mine Subsidence Board (if applicable)
- Relevant Australian Standards (AS) but design to school standards where called for in the EFSG.

- Geotechnical Report on the site
- “AUSTROADS Guide to Pavement Technology” for pavement design.

Pavement Design

- All pavements to be designed for a 25-year life.
- All pavements trafficked by buses and trucks to be designed for a minimum 5 x 105 repetitions of a standard axle load, as defined by AUSTROADS.
- For other vehicular traffic areas design for 1.0 x 105 repetitions of a standard axle load, as defined by AUSTROADS.
- Allow for movements in the foundations caused by moisture variations and mine subsidence.
- Design rigid pavements so there is no vertical differential movement between panels at joints.
- For truck turning areas pavements shall be rigid in construction and finished with a reinforced concrete surface.
- For other areas pavements may be either flexible or rigid in construction. For flexible construction finish with a surface coat of asphaltic concrete.
- Breccia or dolerite is not to be used in road base or concrete mix.

Grades

- Fall all paving away from the buildings and covered areas.
- Finished vertical grades to be limited to < 1 in 10. Provide vertical curves where change of grade exceeds 3%. Provide cross-falls, as required.

Finishes

- Non-skid finish for vehicular trafficked pavements
- Non-slip finish for pedestrian trafficked pavements, including carpark

Drainage

Refer to 02 SITE URBAN AND OPEN SPACES/0224 STORMWATER - SITE

- Design for subsoil moisture movements/seepage
- Provide sub-soil drainage to cut side of road or ramp pavements and to the back face of retaining walls
- Provide subsoil drains at all low points to remove water trapped in the base/sub-base course of road and paving formation

Stability

- Keep structures adjacent to the new works in a stable condition
- Provide safe access to existing structures for when new work is adjacent to occupied buildings

Edging

- Provide continuous edging of concrete or kerbs to free perimeter of roads and parking areas to ensure the stability of roadworks
- Timber edging is acceptable for footpaths only
- Provide a minimum 1 metre clearance between road edging and buildings, retaining walls and other obstructions

0.03 Materials

Filling

- General filling shall be graded material, maximum particle size 75mm
- Hardcore: Inorganic hard material capable of being compacted to an even stable surface
- Granular material: Maximum particle size 75mm; percentage passing 0.075mm sieve – 25% max; plasticity index not greater than 15% and not less than 2%

Road Base

Road Base to comply with Roads and Maritime Services Standards

Asphaltic Concrete (AC)

- AC for roads and parking to be AC10 and have minimum thickness of 40mm or greater as the design requires
- AC for games courts to be AC5 and have minimum thickness of 25mm levelling course plus 25mm surface course or greater as the design requires

Concrete

- Limit fly ash content to 20% of cementitious content of mix by weight
- For roads and parking areas concrete shall have minimum 32 MPa characteristic compressive strength

For Rigid Construction

- For rigid method of construction finish with a reinforced concrete surface
- Concrete pavements for vehicles shall be a minimum 150mm thick and reinforced with not less than SL92 mesh at top and 100 mm thick road base
- Other concrete pavements shall be a minimum 100mm thick and reinforced with not less than SL72 mesh at top
- Provide a thicker pavement and heavier mesh as the design requires and to meet durability requirements for minimum cover to reinforcement

For Flexible Construction

- For flexible construction finish with a surface coat of asphaltic concrete

Joints

- Provide joints to concrete pavements to prevent shrinkage cracks and to allow for temperature movements
- Prevent vertical differential movement between panels at joints
- Hot-dip galvanise all dowels in joints

0.04 Hard Works

Heavy Duty Service Roads

Heavy Duty Service roads are to be of:

- Drainage to swale and perimeter subsoil drains
- Kerb and gutter with piped stormwater drains
- Heavy Duty reinforced concrete. Colour to reduce glare

And include the following Fixtures

- Lockable bollards may be necessary to restrict vehicle movement on the site
- Speed Humps may be required to reduce speed within the site
- Where Speed Humps are provided; one should be placed close to the site entrance and then approximately 30m apart

Light Duty Service Roads

Light Duty Service Road are to be of:

- Asphaltic concrete

- Kerb and gutter and stormwater drainage as necessary

And include the following Fixtures

- Lockable bollards may be necessary to restrict vehicle movement on site
- Speed Humps may be required to reduce speed within the site
- Where Speed Humps are provided, one should be placed close to the site entrance and then approximately 30m apart

Service Road Access

Service access roads are to be of:

- Road metal base with bitumen flush seal
- Hose cock within 10m

Car Parking

Car Parking areas are to be of:

- Reinforced concrete – broomed finish, or
- 40mm asphaltic concrete on minimum 100 DGB 20 plus sub-base as per design
- Drainage to swale and perimeter subsoil drains, or
- Kerb and gutter with piped stormwater drains
- Fall carpark to drains

And include the following fixtures:

- Line markings and wheel stops to be provided to parking bays
- A wheel stop cannot function as a vehicle barrier. Appropriate vehicle impact barriers shall be provided and designed as per requirements of relevant Australian Standards

Bus Zone

Bus zone paving areas are to be:

- Road in Bus Zone; heavy duty reinforced concrete
- Kerb and gutter as necessary
- Student Waiting Zone; broomed and coloured concrete

Truck Turning Areas

Truck turning paving areas are to be of rigid construction, reinforced concrete slab

Bulk Waste Pad

A bulk waste pad surface is to be:

- Reinforced concrete slab. Colour to reduce glare when linked to heavy duty service road
- Screened by planting as a preference as Masonry walling may impede access by bulk waste removal vehicles

Crossovers

Crossovers to be of Reinforced Concrete, Complying with Local Council, RMS and Austroads Publications

Pedestrian Areas / Courts - Paved

Pedestrian paved areas and paved courts to be;

- Paving generally to reduce glare will be broomed or coloured concrete
- No exposed aggregate is to be used in paving of school projects
- Gravel is not an allowable alternative as it represents a safety risk
- Unit paving is appropriate around trees

Games Court

- Games court surface is to be of Asphaltic concrete for resilience, non-slip, low maintenance and non-glare properties
- Minimum fall 1:100 to minimise ponding
- Maximum fall 1:40
- Chain wire on pipe frame for fence and gates
- A Ball wall included as part of fence

Services

- Perimeter subsoil drainage to be provided

Cricket Practice Nets

Cricket Practice nets are to be of the following;

- Pitch: Concrete slab with bituminous covering
- Surrounds: Grassed, fall away from pitch
- Enclosure: Chain wire on pipe frame
- Security: Two lockable gates to serve openings at wicket end