



## 0224 Stormwater - Site

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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).

The drainage systems within school facilities includes all the associated pipework and services for the removal and disposal of sanitary drainage and stormwater management in two separated systems. This section covers the Stormwater drainage system.

The stormwater drainage services are to be designed from a “Whole of Life” (WOL) perspective as per [00 PLANNING AND DESIGN/0001R - DESIGN REFERENCE](#) and, in particular, provide:

- Drainage is to be designed to prevent flash flooding entering into buildings and covered ways and to ensure that site facilities are available for students use in all weather conditions up to a 1:100 ARI storm event.
- Design Drainage to channel stormwater away from buildings and facilities and to provide a backup system in case of blockages.
- Ensure that stormwater is designed to ensure the safety of students and staff.
- Design the stormwater system to compensate for movements in the foundations caused by moisture variations and subsidence.
- Ensure electrical pits and slabs beneath sprung timber floors, are graded to outlets connected to the stormwater system, to remove moisture/seepage. Incorporate reflux valves to prevent backflow.
- A Water Cycle Management Study is to be included with the design documents for all education facility developments.
- Stormwater drainage is not to effect adjacent properties.
- Treat stormwater to remove foreign matter.
- Generally, all underground drainage systems within the site area are to be CCTV inspected after installation and submitted as part of the work as executed submission.
- Avoid placing grated drainage pits to the centre of grassed free play areas where they can become a safety hazard.
- Support sustainable design principles including reducing water consumption and waste production.

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- Appropriately treat any waste to ensure minimal environmental impact
  - Be accessible and serviceable - easy to maintain with minimal impact on school use when maintenance is being performed
  - Use products with a long life span – many drainage services are concealed so durability is essential.

## 0.02 Standards

Refer to [08 HYDRAULIC/0821 STORMWATER - BUILDINGS](#) for Australian Standards and relevant cross sections.

- Integrate the storm water system with the requirements set by all relevant authorities especially the local Council and Water Authority, and in accordance with the “Australian Rainfall and Runoff ” Guide.
- Comply with all relevant Australian Standards, but design to the higher standard where called for in this Design Guide.
- Comply with the requirements of the site Geotechnical Report.
- Determine legal points of discharge from relevant authority and undertake all relevant connection approvals.

## 0.03 Stormwater Design Principles

- Design a reticulated primary in ground piped stormwater and subsoil drainage system to collect and dispose of stormwater running onto and off the developed site.
- Design a secondary stormwater drainage overland flow system to safely and effectively dispose of stormwater, preferably over finished and natural ground, in the event of partial or complete blockage of the primary system.
- Design the in ground drainage piped system for a 20 year ARI Storm event or to the requirements of the Local Council whichever is more severe. Provide above ground overland flow paths for 100-year ARI storm events in accordance with the current [NSW Floodplain Development Manual](#).
- Provide scour protection to head walls, pipe outlets and overflows.

Refer to [08 HYDRAULIC/0821 STORMWATER - BUILDINGS](#) for acoustic treatment of piping.

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## 0.04 Future Works

Design the stormwater system to allow for known future stages of the development of the site, including the use of demountable buildings.

## 0.05 Detention/Retention System

Refer to [08 HYDRAULIC/0821 STORMWATER - BUILDINGS](#) for Stormwater detention tanks & pumps requirements

- Design a drainage on-site detention/retention system (OSD) for the site to the requirements of the Local Council. An above ground OSD or adsorption system is preferred, where practical.
- Design a discharge control pit with an orifice plate and trash screen to be incorporated into the above ground OSD system
- Design a silt arrestor pit to be incorporated into the adsorption system.
- Water level height for OSD basin above ground is a maximum 200mm

## 0.06 Existing Stormwater Drainage

GUIDE NOTE: Existing Stormwater to be investigated and assessed by the project's civil & hydraulic engineers prior to commencing work.

- Incorporate into the new drainage system existing stormwater intercepted or disturbed by the proposed works.
- Evaluate the existing services on the site to ensure that they are adequate for incorporation into the works.

## 0.07 Subsoil Drainage

GUIDE NOTE: Refer to [08 HYDRAULIC/0821 STORMWATER - BUILDINGS](#) for trenching, bedding & surrounds requirements.

- Connect all subsoil drainage lines to stormwater system.
- Minimum fall of the subsoil drainage system should be 1%
- Provide a Geotextile sleeve to all subsoil drainage lines.

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- Where soil conditions are expansive, provide subsoil drains to the high side of flexible pavements.
  - Provide subsoil drains to drain boggy ground.
  - Provide subsoil drains to all retaining walls above 300mm in height.

## 0.08 Pipes under Slabs

Avoid locating pipes under building slabs. Where this is unavoidable:

- Minimise the extent of pipe runs under building slabs.
- Ensure pipe runs in a straight line.
- Provide pits each side of building to allow for cleaning.
- Provide concrete encasing.

## Pipework

Prior to stormwater pipeline design confirm soil classification from the Geotechnical Report.

Pipeline design to provide minimum cover relevant to selected material.

Trench, pipe bedding and surround shall consider ground conditions.

Minimum Pipe sizes shall be:

- DN 100 for subsoil drainage
- DN 225 downstream of any grated pit
- DN 225 downstream of any side entry pit

## 0.09 Pits

Provide:

- Pits at changes of direction of pipe runs carrying ground surface water.
- Ensure that debris cannot enter the stormwater system.
- A pit along straight pipe runs at 100 metres max.
- 225mm-diameter minimum size of outflow pipe from grated pits.
- Scour protection to head walls, pipe outlets and over flows.
- Section of subsoil drainage line to all stormwater pits, on the upstream face, to remove sub-ground moisture from the trenches.

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- Flap type or duckbill type reflux valves to stop stormwater back flow into the trenches.
  - Litter baskets to carpark and driveway stormwater gullies.
  - Where possible, avoid locating in circulation and play areas in order to prevent trip hazards

## 0.10 Electrical Pits

GUIDE NOTE: Refer to [08 HYDRAULIC/0882 HYDRAULIC ELECTRICAL - MINOR](#) for all Electrical Installations requirements.

- Ensure all electrical pits are adequately drained, preferably by gravity.
- Connect electrical pit drainage lines to the stormwater system.
- Incorporate a reflux valve and inspection opening terminating at surface level in the line to prevent stormwater back flow into the electrical pit.

## 0.11 Stability of Adjacent Structures

GUIDE NOTE: Provide dilapidation report prior to the commencement of work.

- Provide suitable methods to maintain existing structures adjacent to new works in a stable condition.
- Provide for safe access to occupied buildings adjacent to new work.

## Water Cycle Management Study

The Water Cycle Management Study is to include the following considerations:

- Rainwater reuse
- On Site Retention and Detention
- Erosion Control
- Litter, pollution and sediment control
- Maintenance requirements

## 0.12 Documentation

GUIDE NOTE: Refer to [08 HYDRAULIC/0821 STORMWATER - BUILDINGS](#) for testing, commissioning & as built requirements. Documentation must comprise final construction

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drawings to be used in conjunction with the technical specification in current NATSPEC format.

Include the following on drawings:

- Note Soil Classification
- Pipe inverts and ground levels at all pits and changes of slope
- Pipe gradients
- Design Flows (litres / sec)
- Maintenance schedule

## Specification

### 01 General

As per current NATSPEC.

### 02 Product

As per current NATSPEC.

### 03 Execution

As per current NATSPEC.

### 04 Selections

As per current NATSPEC.