

Stormwater pits Installation guide



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Precast stormwater pits

Humes manufacture a wide range of precast concrete stormwater pit base units and risers, suitable for junction pits, kerbs and grated inlets.

There are two types of stormwater pits available; modular and custom-made. Modular (also known as standard) stormwater pits come in a range of sizes and have knockouts on all four sides to provide easy installation of pipes. Custom-made pits come in a range of common footprints, to suit requirements of different authorities and are made to the exact height to suit project requirements.

Precast stormwater pits provide installation contractors with a number of significant benefits*:

- **Custom-made** – Manufactured to meet your design requirements of your stormwater network with exact heights and pipe penetrations.
- **Faster construction** – Precast manufacture reduces on-site construction times by around 75% compared to cast in-situ methods.
- **Cost benefits** – Reduced labour, propping, material storage costs and no on-site formwork.
- **Trafficable** – Designed in accordance with the Australian Standard for Bridge Design AS 5100.5 and SM 1600 traffic loading (other load classes available).
- **Extensive range of sizes** – Meeting local authorities' stormwater network specifications.
- **High quality durable product** – Manufactured using state of the art moulds and manufacturing techniques.

- **Reduced environmental impact** – Precast means less waste, construction noise and clutter on site.
- **In-house design capability** – Our built-for-purpose software generates detailed drawings for manufacturing and installation purposes.
- **Comprehensive support** – A detailed installation guide is available together with a team of experts who can assist with site support if required.
- **Highly versatile** – Fully compatible with Humes extensive range of stormwater pipes, kerb inlet systems and other stormwater drainage products. Custom-made pits can also be used as junction pits for electricity, gas and communication networks.

For effective stormwater drainage, Humes has an extensive range of concrete pipes and componentry consisting of a variety of pipe diameters, lengths and classes suited for both trench and micro tunnelling. Additionally, a selection of pits, kerb inlets and lintels are available to complement your project.

Humes also offer solutions for stormwater detention and infiltration and harvesting and reuse.

* Some of the benefits apply to custom-made pits only.

Specifications

Modular pits

Modular stormwater pits are available in sizes from 450 mm square to 1200 mm square, to suit a maximum pipe diameter of DN 900. Standard dimensions and masses are shown in Table 1 below.

The modular system includes a range of precast risers and lids to adjust heights and secure the grates.

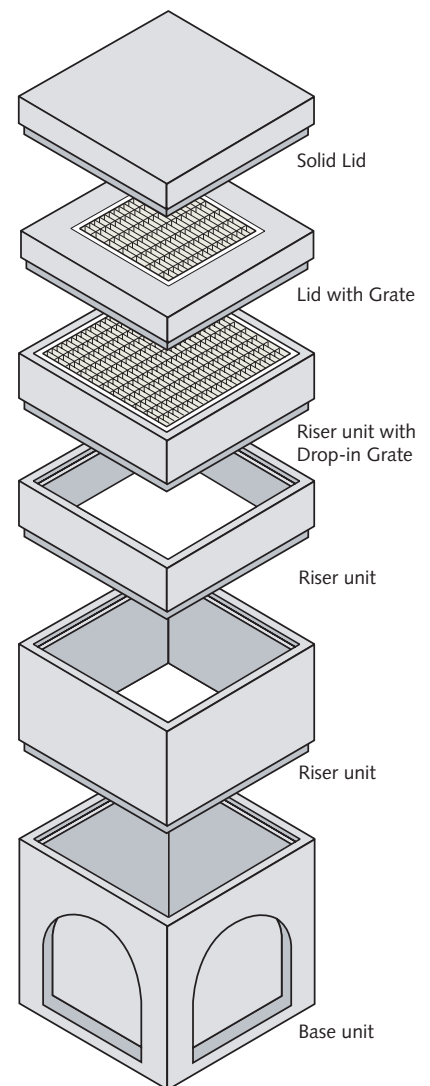


Table 1 – Modular stormwater pit masses and dimensions

Internal size Width x breadth x height (mm)	Mass (kg)	Max pipe diameter (mm)	Risers to suit (mm)
450 x 450 x 450	221	225	150, 300
600 x 600 x 600	370	450	150, 300, 600
900 x 600 x 600	540	450	150, 300, 600
900 x 600 x 900	745	450	150, 300, 600
900 x 750 x 600	830	450	
900 x 750 x 900	916	600	150, 300, 600
900 x 900 x 600	870	450	
900 x 900 x 900	930	600	150, 300, 600
900 x 900 x 1,200	1,213	600	
1,200 x 1,200 x 1,200	1,900	900	150, 300, 600

Custom-made pits

Custom-made stormwater pits can be made to suit a wide variety of stormwater drainage network requirements for road construction, newly established residential areas and commercial and industrial developments.

The height of the pits can be adjusted to suit individual depth (invert levels) requirements and can range from 500 mm to 3,750 mm. Common sizes to suit requirements of different transport authorities and local councils are shown in Table 2 below.

Street furniture

Humes offers an extensive range of gullies (inlets and lintels), kerbs and barriers for roadside entry points to meet the needs of local authorities. The range is designed to suit all modern kerb and gutter profiles, and to fit on top of Humes' range of precast pits.



Top:
Custom-made stormwater pit

Bottom:
Illustration of a stormwater network featuring a custom-made pit and precast street furniture

Opposite page:
Modular stormwater pit

Table 2 – Custom-made pit common dimensions

Width (mm)	Breadth (mm)	Height (mm)
700	700	Variable up to 3,750
850	675	
1,380	700	
1,540	700	
930	610	
930	710	
930	835	
900	900	
1,050	1,050	
2,100	600	



Note:
Please contact Humes for other sizes.

Handling and installation

Safety

Safety is a priority for Humes. It is important for all parties to observe safety requirements and regulations during transportation, handling, storage and installation, including wearing appropriate personal safety protection equipment.

It is the responsibility of the main contractor or installation contractor to produce a Safe Work Method Statement; we recommend that this statement complies with relevant codes of practice, standards and safety regulations. Personnel should follow any safety advice provided by the main contractor/installation contractor when on a non-Humes site.

The precast concrete component should only be lifted using the appropriate lifting clutches and from the designated lifting points which are shown in project specific drawings. Each stormwater pit is fitted with at least two Swiftlift® foot anchors. All lifting equipment must be certified to lift the specific mass and approved for lifting precast concrete componentry.

The mass of the stormwater pits units vary depending on its geometry; weights will be clearly marked on the units and on the relevant project drawings.

All lifting and placement must proceed with caution and strictly in accordance with all relevant occupational health and safety standards.

The advice in this publication is of a general nature only. Where any doubt exists as to the safety of a particular lift or installation procedure, seek the guidance of a professional engineer or contact Humes for advice.

Site preparation – excavation, foundation and bedding

Before the stormwater pit arrives on site, the site should be prepared accordingly, by excavating the site to provide clearance from all external faces and to ensure that there is enough room to work around the base of the pit. Additionally, the appropriate foundation must also be prepared.

Stormwater pits must be installed on a stable, well-compacted foundation to avoid future settlement (subsidence). The minimum allowable bearing capacities of the soil foundation are shown in Table 3.

These bearing capacities apply only to freshly-exposed foundation material. Should any softening or loosening occur following excavation, the soft/loose materials must be removed and replaced with a coarse single-size aggregate. The compacted depth of replacement material must be uniform and sufficient to ensure that the minimum specified bearing capacity is achieved.

Once the foundation has been stabilised, the bedding material of sand or gravel should be placed onto the foundation to a uniform depth. The bedding is designed to provide uniform support across the whole underside of the stormwater pit.

Bedding material and compaction should comply with the project specific drawings. Humes recommend consulting with the project engineer for bedding material and compaction requirements; especially where unusual ground conditions may occur.

General acceptance is an approved bedding material compacted to a thickness of not less than 80 mm on an earth foundation or 150 mm on a rock foundation. The invert level of the pipe and the base thickness of the pit have to be considered when preparing the bedding (placing, leveling and compacting).



Left:
Leveling the
bedding

Table 3 – Minimum bearing capacities

Depth to invert	Minimum allowable bearing capacity of soil
Up to 3.0 m	100 Kpa
3.0 to 6.0 m	150 Kpa

Right:
Spreader beam
used to lift a
custom-made pit

Delivery

Prior to delivery, especially for custom-made pits, a pre-installation site meeting will occur with the contractor to finalize shipping plans including the sequencing of deliveries and the order of unloading and installation of the unit.

The shipping plan will help to alleviate double-handling; save time and effort, make more efficient use of the crane, and reduce site congestion.

Lifting

All the precast units are supplied with cast-in lifting anchors to enable safe handling. To prevent stress and possible concrete cracking, all units must be handled using the cast-in lifting anchors and associated lifting clutches (lifting clutches can be purchased or hired from an approved source or supplied by the crane contractor). A spreader beam is recommended for lifting to prevent chipping (see photo). It is the contractor's responsibility to ensure an appropriate spreader beam is used.

Installers should use tagged lifting equipment only. It is the installation contractor's responsibility to ensure the lifting clutches are available on site. The lifting points are clearly shown on Humes' drawings.

Wherever possible, all components should be lifted from the delivery truck and set directly onto the prepared bedding material. If for some reason temporary storage is required on site, and especially for large sized pits, use timbers when placing the pit on the ground.



Pit installation

Stormwater pits are typically installed as follows:

1. Check that the foundation and bedding material have not been disturbed.
2. Prepare the stormwater pit for lifting using Swiftlift® clutches. Take care not to strike the pieces together when unloading and lowering them. Be aware of pinch hazards at all times and do not walk or work under suspended loads.
3. Lift the stormwater pit into position. Guide the pit onto the downstream pipe. Lift the pipe slightly to enable the joint to be made before the base touches the bedding. The end of the pipe should stop slightly short of the benching inside the base. Check that there is enough clearance underneath the pipe to allow for sealant application.



Top:
Checking the
foundation level

Bottom:
Attaching Swiftlift®
to the pit



Top:
Pipe diameter
marked on
knockout section

Bottom:
Hole created to
required diameter

4. It is essential that all levels are correct. Use a spirit level to check that the pit is level; place it on top of the rim. Also check the downstream and upstream invert levels are in accordance with the design.
5. For modular pits with knockout sections, mark the size and location of the pipe on the thin knockout section of the pit wall. Use a proper tool to slowly and gently break the pit wall. Use a small sledge hammer to make the initial break in the centre of the knockout.

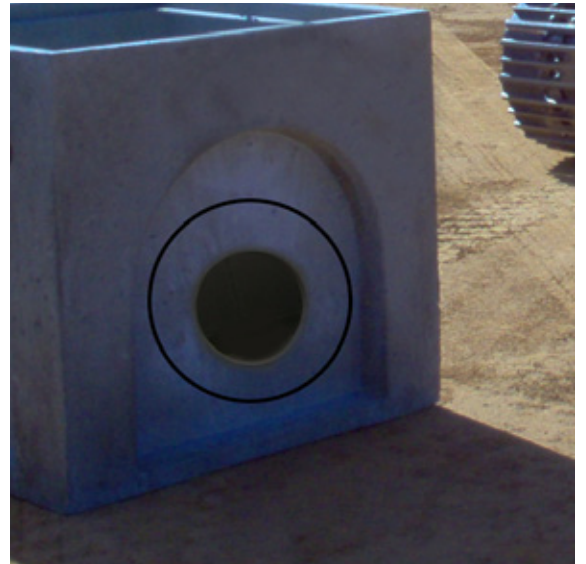
Use a small ball-peen hammer, or similar, in a circular pattern to knock the wall away to achieve the required hole for the outside of the pipe diameter. DO NOT oversize the knockout hole.



Pit installation (multiple segments)

Multiple segment pit installation requires the following steps:

1. Seal the segments together using a site-approved non-shrink grout or mastic-type product. Apply the sealant in accordance with the product manufacturer's requirements. Ensure that no gaps remain.
2. Place the second segment on top of the installed segment. Quality bond is achieved as a result of the weight of the unit.
3. Leave the segments undisturbed until the period of curing is completed in accordance with the grout or sealant product manufacturer's requirements.



Joining pipes to pits

Pipe jointing to pits requires the following steps:

1. Place the pipe into the penetration, cutting the pipe so that it is flush with the internal wall of the pit.
2. Seal the wall with a site-approved cement mix. It may be necessary to render around the pipe on the inside of the pit in order to achieve a quality flush finish with the pit wall. Other grouting materials might be required to suit harsh soil conditions, such grout can be specified by the project engineer or the site supervisor.



Top:
Pipe sealing
external

Bottom:
Pipe sealing
internal



Backfilling

Top:
Pit installed and
backfilled

Middle:
Installing a kerb
inlet system directly
onto the pit

Bottom:
Opening of the inlet
system installed
flush with the inner
surface of the pit

When the pits and pipes have been laid and sealed, backfilling can occur (as per approved drawings). The material used for backfilling the stormwater pit must be the same as the material used for backfilling the pipeline.

Evenly place and uniformly compact the material ensuring that components and joints are not displaced. Backfill with the aim of minimal or no subsidence after completion of the works.

Modular pits

If any of the knockout sides have not been utilised, then it is recommended that cement stabilised sand is used for the backfill.

Installing street furniture

Street furniture can be installed directly onto the pit. If required apply 5 to 10 mm of cement mortar to the top edge of the pit to level. Ensure that the opening of the inlet system is flush with the inner surface of the pit (see picture below).



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