

Hynds Twin U-Underpass

(South Island Only)

Technical Guide R4.3

Hynds precast concrete Twin U culvert units are designed to be used as stormwater culverts, stock underpasses for rural highway crossings and pedestrian tunnels.



0725 | RURAL | R4.3 HYNDS TWIN U CULVERT UNDERPASS SYSTEM

Applications

Stock underpass

Pedestrian tunnels

Roading culverts

Product Attributes

Cost effective installation method

Longer life and smooth surface when compared with steel culverts

Lower fill covers possible above the precast unit

Optional precast wingwalls and headwalls available to match

Quality/Environment/Health & Safety

Hynds management systems are certified to ISO 9001:2015, 45001:2015, and 14001:2018 standards

Hynds precast concrete Twin U culvert units are designed to be used as stormwater culverts, stock underpasses for rural highway crossings, pedestrian tunnels.

Precast Twin U culvert units simplify the construction process, allowing for the rapid completion of works. This option is often more cost effective than the in-situ construction process required to achieve the same results. Hynds pre-cast concrete Twin U-culvert units and bases come in standard sizes with precast wingwall and headwall units. Any variance to the standard sizes will need to be discussed at the time of enquiry.

Features

- Large variety of strengths and opening sizes
Span and height can be varied
- Speed of installation
- Cost Effective installation method
- Purpose designed for various load configurations up to HN:HO-72
- Longer life and smooth surface when compared with steel culverts
- Lower fill covers possible above the precast unit
- Able to be customised for special conditions or shapes
- Simplifies preparation of site plans for council approval
- Optional precast wingwalls and headwalls available to match
- Various joint sealing options available
- Designed for 50-100 year life
- Suitable for high water table instillation issues
- Individual units reduce lifting costs

Stormwater Culverts

Opening width and height is determined by the hydraulic requirements of the specific site. Hydraulic calculations can be performed by referring to the CPAA "Hydraulics of Precast Concrete Conduits Manual".

Pedestrian Tunnels

Opening size is to be determined by the tunnel space desired. For pedestrian tunnels, this is usually dependant on the NZ Building Code.

Stock Underpasses for Rural Highway Crossings

The size of stock underpasses are normally determined by the size of the herd that will use the underpass or the machinery that will be moved through the underpass.

* **Note:** All sizes are span x height.



Sizes Of Culverts

A variety of opening sizes are available which suit most farm types and stock quantities.

Culvert Strength

Culvert strength is dependent on earth loads, highway loads and cover to the finished culvert. Hynds Technical Services Department will design the precast concrete U culverts to suit the specified highway loading and cover. Traffic loading is to HN-HO-72 Transit New Zealand load criteria.

Concrete Surface Finishes

Hynds Twin U Culverts are generally manufactured to F3/F4 finish as detailed in NZS3114:1987 – Specification for Concrete Surface Finishes. This finish is typical of structures which will not be seen or are only going to be observed from a distance.

Higher classes of finish may be required in elements subject to frequent observation (F4), subject to frequent close scrutiny (F5) or elements with painted surfaces. In these instances the finish required must be advised at time of quotation. Units are designed to corrosion protection exposure classification B2 (refer to NZS:3101).

Consult Engineer where exposure classification C or U is required (seawater tidal/splash zone or similar aggressive environment).

Wingwall Options

Hynds supply wingwall panels with fixing holes and fixing sets so that the panels can be fixed to the box culvert. Each panel has reinforcing starter bars protruding at the bottom of the panel that are then fixed to the base reinforcing mat. The base is then poured in-situ on site by the contractor if required.

Headwall Options

Hynds will supply the end units of the conduit structure with suitable kerb block as part of the twin U culvert unit if requested to do so.

Handling

Twin U culvert units are normally supplied with lifting anchors cast into the top of each unit. Appropriately rated chains and lifting beam must always be used. Lifting anchor positioning and lifting equipment specifications can be supplied upon request.

Installation

As per NZ Building Code, please check with local council for present building requirements. Culvert and wingwall units are delivered to site by our trucks. Off-loading can be arranged if required.

Culvert installation should be done by an experienced contractor who understands the necessity of jointing, bedding and backfilling the structure properly as well as the highway safety requirements applicable to such an installation.

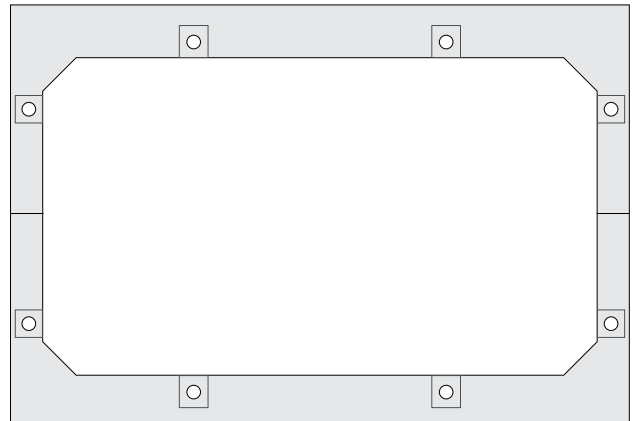
An installation guide will be supplied on confirmation of orders.

Basic Bedding Preparation

Sufficient foundation support and backfill compaction is required to prevent settlement of the imported backfill layers after installation.

The bedding must be able to support the full load of the installed culvert, its contents, and the loads above the culvert. For this reason the Twin U culvert should be laid on compacted granular hardfill to the specified line and gradient. Bedding design for a Twin U culvert conduit should be undertaken by a local consulting engineer as local knowledge of ground conditions is important to ensure a successful installation.

As a general guide, the compacted thickness of a basic bedding over the full width of the trench can vary from 150mm to 250mm thick (depending on culvert bearing loads) with compacted layers not exceeding 150mm



thick. Trench width for most after installations equal to the external width of the culvert plus 600mm.

Local soft spots in the trench must be excavated and the voids filled with well compacted hardfill to provide uniform support under the entire structure. Failure to do so could result in settlement of the units at a latter stage. Additional information is available in NZS3725.

Jointing

Hynds Twin U Culverts are manufactured with a shear key detail which locates and locks adjacent units together. Joint gaps will vary from 5 to 20mm and may be left open in most cases.

If desired, joint sealing can be formed with the use of butyl mastic sealing strips, epoxy, sand-mortar mix, or silicone sealant. Contact your local Hynds Sales Branch for these products.

Drossbach ducts are to be filled with a non-shrink cementitious grout.

Laying

The Twin U culvert units should be inspected before laying to ensure that the jointing surfaces are clean. The unit, is then lowered carefully on to the prepared base aligning the spigot with the socket of the unit already laid. Loose surface bedding material must not enter the joint space between the units, particularly along the bottom, during

positioning of the unit. If any adjustment of level is necessary, remove the Twin U culvert, adjust the surface layer of the bedding and place again. Do not use local packers to adjust the level.

Hynds Twin U Culverts are manufactured with reinforcing ducts for jointing. The units can then be bolted together or post tensioned on site once the units have been installed. Suggested practice is to insert the tie rods as the first unit is placed and push through subsequent units as they are installed.

Backfilling

Backfilling should commence as soon as possible after the Twin U culverts have been laid.

Fill the trench to the level of the top of the culvert working evenly on each side. Use selected backfill material well compacted in layers not exceeding 200mm thickness. Do not use heavy vibratory equipment. Continue to fill the culvert conduit in well compacted layers.

Do not run heavy rollers or construction equipment over the culvert conduit without checking beforehand that the units are designed to withstand these loads.

TABLE 1 Twin U Culvert Codes

	2m High	2.5m High	3m High	3.5m High	4m High
3m Wide	BXU 30001000T BXU 30001000B	BXU 30001250T BXU 30001250B	BXU 30001500T BXU 30001500B	BXU 30001750T BXU 30001750B	BXU 30002000T BXU 30002000B
3.5m Wide	BXU 35001000T BXU 35001000B	BXU 35001250T BXU 35001250B	BXU 35001500T BXU 35001500B	BXU 35001750T BXU 35001750B	BXU 35002000T BXU 35002000B
4m Wide	BXU 40001000T BXU 40001000B	BXU 40001250T BXU 40001250B	BXU 40001500T BXU 40001500B	BXU 40001750T BXU 40001750B	BXU 40002000T BXU 40002000B
4.5m Wide	BXU 45001000T BXU 45001000B	BXU 45001250T BXU 45001250B	BXU 45001500T BXU 45001500B	BXU 45001750T BXU 45001750B	BXU 45002000T BXU 45002000B
5m Wide	BXU 50001000T BXU 50001000B	BXU 50001250T BXU 50001250B	BXU 50001500T BXU 50001500B	BXU 50001750T BXU 50001750B	BXU 50002000T BXU 50002000B
5.5m Wide	BXU 55001000T BXU 55001000B	BXU 55001250T BXU 55001250B	BXU 55001500T BXU 55001500B	BXU 55001750T BXU 55001750B	BXU 55002000T BXU 55002000B
6m Wide	BXU 60001000T BXU 60001000B	BXU 60001250T BXU 60001250B	BXU 60001500T BXU 60001500B	BXU 60001750T BXU 60001750B	BXU 60002000T BXU 60002000B

Note: Standard unit length is 2250 mm (other sizes made to order)

Branches Nationwide Support Office & Technical Services 09 274 0316

Disclaimer: While every effort has been made to ensure that the information in this document is correct and accurate, users of Hynds product or information within this document must make their own assessment of suitability for their particular application. Product dimensions are nominal only, and should be verified if critical to a particular installation. No warranty is either expressed, implied, or statutory made by Hynds unless expressly stated in any sale and purchase agreement entered into between Hynds and the user.

0800 496 377

hyndsrural.co.nz | rural@hynds.co.nz

HYNDS
RURAL