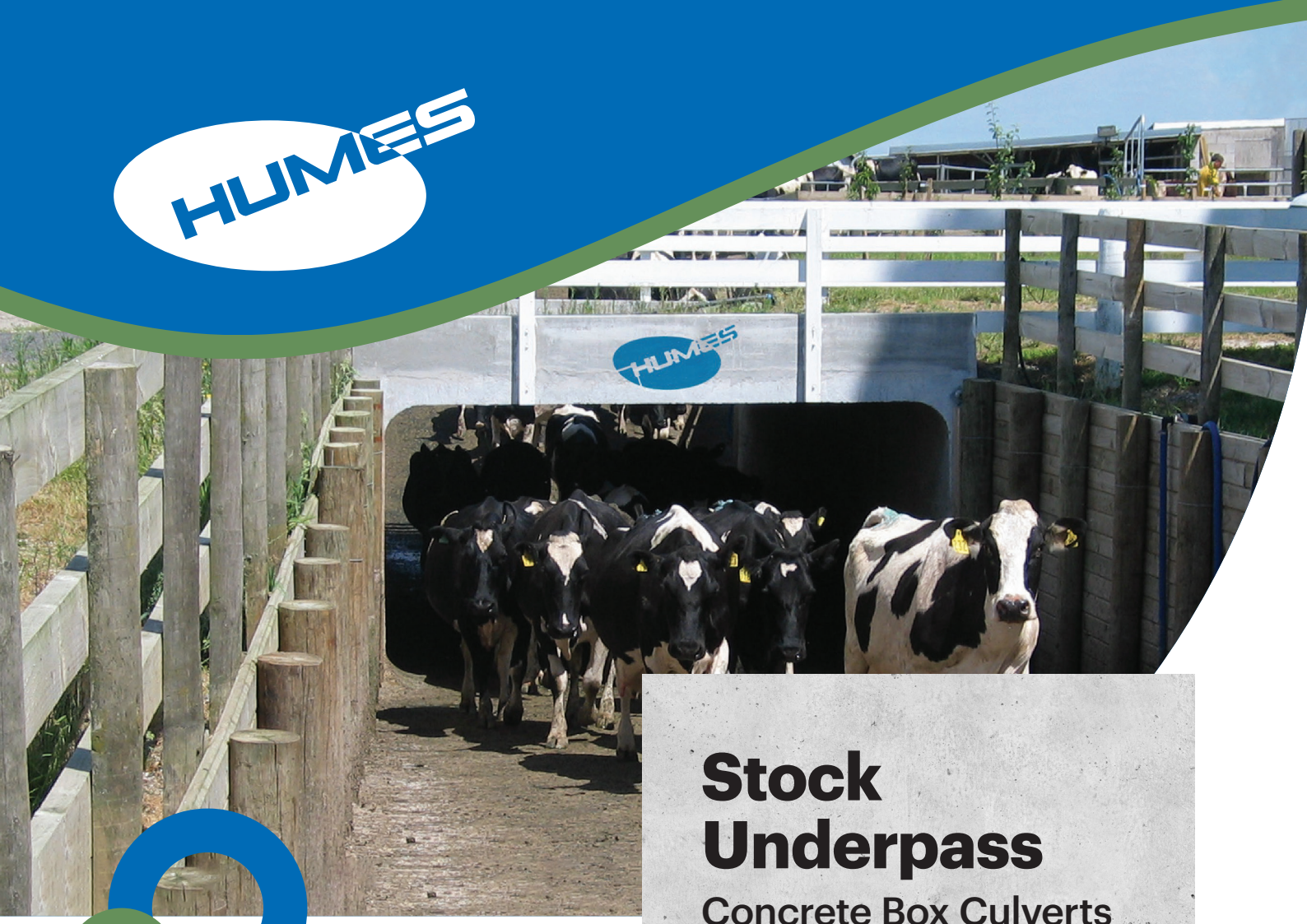

Stock Underpass

Concrete Box Culverts

APPLICATIONS
Stock underpass for rural road highway crossings
Stormwater culverts
Pedestrian tunnels
Vertical chambers

PRODUCT BENEFITS
Fast & Easy Installation – 1.55m modules and only needs to close one side of the road at a time.
No effluent on road disputes
A wide range of sizes is available – from 1.0 x 1.0m to 6.0 x 3.0m
Durable and less maintenance – design life of 100 years
High strength – HN-HO-72 traffic loading

Humes Box Culvert Stock Underpass solution saves time and reduces labour costs associated with road crossings and is a safe and convenient option for stock movement.

Culverts

Quality Designed to 100 Years Service Life

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Stock Underpass
Concrete Box Culverts

Design Specifications

The required size of an underpass is determined by factors such as herd size, distance from the milking shed, head room required, and the height of the water table. The installation of an underpass is made easier by the Humes Box Culvert standard lengths being 1.55m long. This facilitates ease of handling and provides the ability to close only one side of the road at a time. The length of a Stock Underpass is typically between 12m and 20m. This length is determined by the local body governing the road i.e. Waka Kotahi NZTA or the local Council.
A wide range of Box Culvert sizes is available to suit different Stock Underpass requirements.

Table 1 – Precast Box Culvert Range

INTERNAL SPAN (M)	INTERNAL HEIGHT (M)	OVERALL LENGTH (M)	APPROX. MASS (TONNE)
S	H	L	
1.5	1.0	1.55	3.6
1.5	1.5	1.55	4.2
2.0	1.0	1.55	4.2
2.0	1.5	1.55	4.8
2.0	2.0	1.55	5.4
2.5	1.0	1.55	6.4
2.5	1.5	1.55	7.2
2.5	2.0	1.55	8.0
2.5	2.5	1.55	8.7
3.0	1.0	1.55	7.2
3.0	1.5	1.55	8.0
3.0	2.0	1.55	8.7
3.0	2.5	1.55	9.5
3.0	3.0	1.55	10.3
3.5	1.5	1.55	8.7
3.5	2.0	1.55	9.5
3.5	2.5	1.55	10.3
3.5	3.0	1.55	11.1
3.5*	3.5	1.55	10.4
4.0	1.5	1.55	10.4
4.0	2.0	1.55	11.1
4.0*	2.5	1.55	11.9
4.0*	3.0	1.55	12.7
4.0*	3.5	1.55	13.5
4.0*	4.0	1.55	14.2
4.5*	2.0	1.55	12.9
5.0*	1.5	1.55	13.1
5.0*	2.0	1.55	13.9
5.0*	2.5	1.55	14.7
5.5*	2.0	1.55	16.5
5.5*	3.0	1.55	18.3
6.0*	2.0	1.55	19.3
6.0*	2.5	1.55	20.3
6.0*	3.0	1.55	21.3

Notes: Wall thickness varies due to traffic loads and site conditions.
*Non-standard, special designs required

Humes precast Box Culverts are designed in accordance with the requirements of the Waka Kotahi NZTA Bridge Manual and NZS 3101:Part 1:2006 for 100-year design life. All standard Box Culvert designs are based on exposure classifications B1 (deck inside and all outside surfaces) and B2 (inside wall and inside base surfaces). Refer to NZS 3101:Part 1:2006 for the details.

The design of the Box Culverts is associated with the individual precast elements only, not with the overall job design (e.g. installation, jointing, corner tendons, etc.). Please consult an experienced contractor and/or design consultant regarding the necessary installation and highway safety requirements for the installation of culvert elements. The following are some important aspects to be considered by the contractor.

Installation

Standard Humes Box Culverts provide four corner tendons to assist with installation. It is important to have a local consulting engineer complete a site assessment and a site-specific design for the installation of the Humes box culvert modules to ensure aspects such as high water tables, soft bedding materials or special surrounding materials (water and soil) are considered.
It is essential that shear keys in 0-600mm fill cover installations be filled with dry-pack mortar to transfer wheel loads across the deck joint, a key design assumption.

Fill Cover

Fill cover is the depth of the backfill over the culvert. Standard Humes concrete Box Culvert underpasses are designed to withstand HN-HO-72 traffic loading with 0-600, 600-1200, 1200-2000mm fill covers.
Alternatively, units may be designed for site-specific traffic loading or for deeper fill covers.

Bedding Preparation

Safe Bearing Capacity shall exceed 100 kPa unless a specific engineering foundation design is undertaken. The bedding material can be sand, cement or granular material. The compacted thickness of the bedding can range from 100mm for earth foundations to 150mm for rock foundations. The base slab of the box culvert elements must be uniformly supported by the bedding material.

Backfill

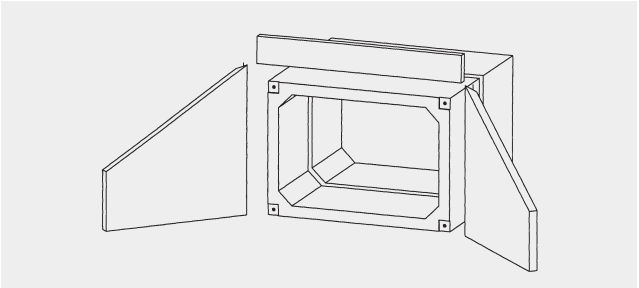
Backfill around the units should be placed and compacted in even layers on both sides simultaneously. Care must be taken to prevent the movement of the units during backfilling.

Manufacturing Standards

Humes Precast Box Culverts are manufactured to NZS 3109:1997 with surface finishes to NZS 3114:1987 F3 surfaces requirements.

End Details (optional)

Precast wingwalls can be supplied to be installed at the end of the stock underpass if requested. These wingwalls will have starter bars protruding from the front bottom surfaces and must be tied to the apron slab reinforcement design. The apron slab is poured by the installing contractor.
Alternatively, Humes Anchorbloc™ can be used at the end of the stock underpass to withstand the backfill soil. In this case, an apron slab will not be required.
Precast headwall beams can also be supplied to be installed at the end of the stock underpass if requested.



• Shown with wingwalls and header-beam supplied separately.

For further information or advice freephone 0800 502 112 or visit www.humes.co.nz

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