InQuikBridges

Product Catalogue



Innovative Modular Bridge Systems

Accelerated Bridge Construction Award

Resilient Monolithic Structures

InQuik®
accelerated construction



We developed the InQuik bridge to keep communities connected, and we're so proud to be delivering robust and resilient bridges to regional areas across the country, which will serve the residents for the next 150 years or more.

Logan Mullaney
CEO of InQuik

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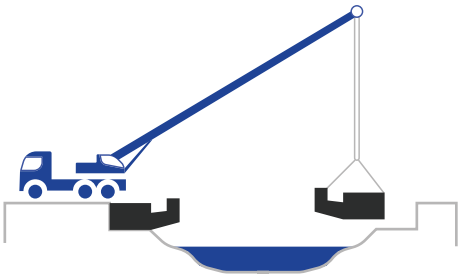
InQuik®

The InQuik Bridge

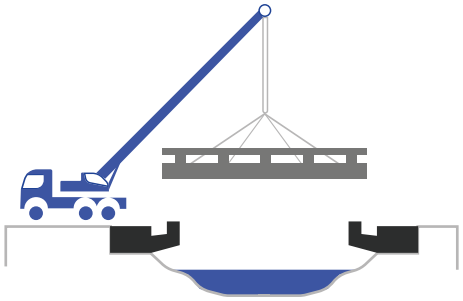
The InQuik® bridge is a semi-modular system, where the integrated steel formwork and reinforcing components are prefabricated off-site, then completed when concrete is poured on-site to form a single homogeneous mass.

The bridge panels are self-supporting and the formwork is aesthetic and sacrificial, so beneath the steel form is a conventional in-situ poured reinforced concrete bridge, with all the benefits that provides. The InQuik product range includes abutments, wing walls, headstocks, blade piers and deck panels.

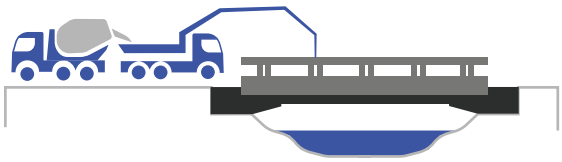
Installation process for an InQuik bridge:



Place abutments and concrete



Install barriers & place decks



Deck concrete



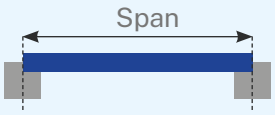
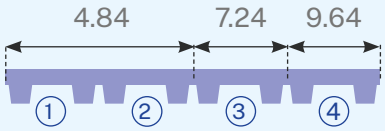
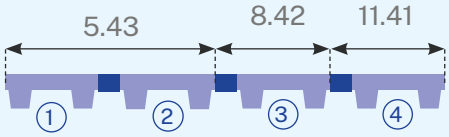
Bridge complete

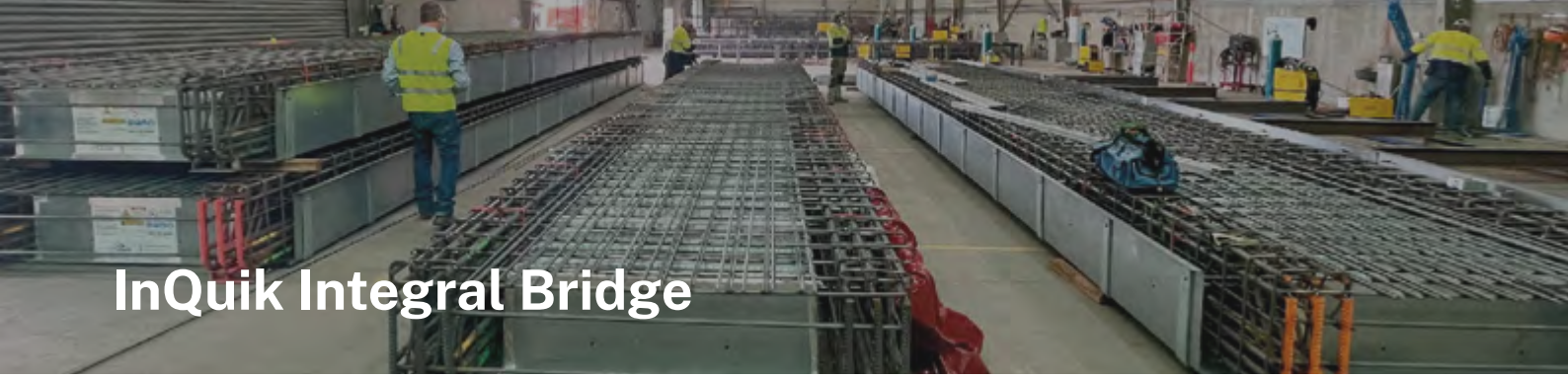
Key Attributes

- No temporary formwork support is needed.
- Bridge construction occurs from above, with minimal need to work under the bridge, improving worker safety and reducing environmental impact.
- The semi-modular deck panels are placed side by side to give the desired bridge width, and then concrete is poured to create a homogeneous slab.
- Can create multi-span bridge structures with pier/headstock components.
- The InQuik bridge structure is designed for a minimum 150-year service life.
- InQuik abutments, wing walls, headstocks and blade piers are constructed using a similar semi-modular method as the deck.
- Single-span lengths range between 6.1-18.5m, with engineering certified by SMEC Australia to the Australian Standards, AS5100 (2017) Bridge Design requirements.
- Reduced long-term maintenance requirements when compared to precast structures through eliminating longitudinal deck joints, and the integral design also removes tie-downs and bearings.



Bridge Range

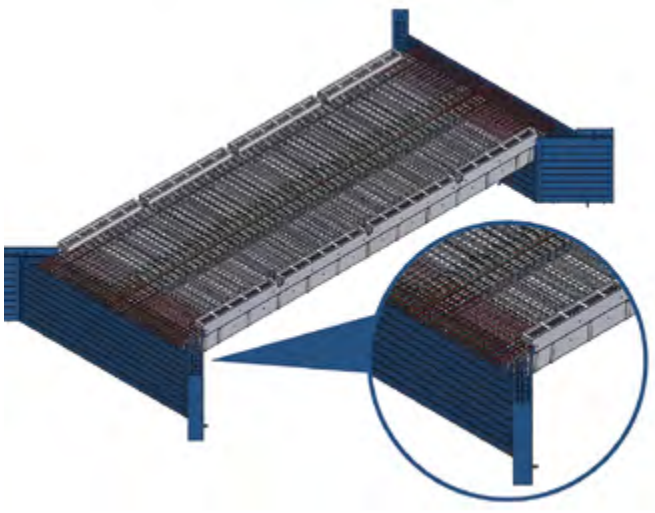
Product	CR370	HM32	IQ500	IQ700	IQ1000	Explanatory Comments
Description	Culvert Replacement	Narrow Crossing	Reduced 520-deep deck	Standard 720-deep deck	Standard 1035-deep deck	
Span (metres)	6.4	6.1 9.1 12.1	9.1	6.1 9.1 12.1 13.7	16.1 18.5 22.1	As measured from the centreline of a 900mm wide abutment. 
Standard Width (metres)	4.84 (5.43 with spacer) 7.24 (8.42 with spacers) 9.64 (11.41 with spacers)	3.2	4.84 (5.43 with spacer) 7.24 (8.42 with spacers) 9.64 (11.41 with spacers)	4.84 (5.43 with spacer) 7.24 (8.42 with spacers) 9.64 (11.41 with spacers)	4.84 (5.43 with spacer) 7.24 (8.42 with spacers) 9.64 (11.41 with spacers)	All standard InQuik deck panels are 2440mm wide (except HM32) and are placed side by side with 40mm overlap between the deck panels.  NO SPACERS  WITH SPACERS Extension spacers may be placed between the panels to increase the width by 550mm per join.
Load Ratings	SM1600	T44 (68t)	SM1600	SM1600	SM1600 T44 (22.1m)	InQuik offer bridge designs for SM1600 (AS5100:2017) and T44 (68 tonne, Austroads: 1992) load ratings.
Deck Depth	390	720	520	720	1035	See “Deck Dimensions” section on p8 for more information.
Skews	0°, 6°, 12°, 18°	0°, 6°, 12°, 18°	0°, 6°, 12°, 18°	0°, 6°, 12°, 18°	0°, 6°, 12°, 18°	Skews can service ±5°



InQuik Integral Bridge

Though the InQuik system can be simply supported on bearings, a major benefit of pouring the concrete fully on-site is that it allows the construction of a fully integral bridge, where the bridge deck and top of the abutments are cast at the same time to make an integrated concrete structure. This results in a very strong and stable structure, providing greater damage resistance to flooding and earthquake events, and eliminates the need for bearings and tie-downs (and the associated long-term maintenance requirements)

For an integral bridge, the formwork is removed from the abutment backwall rebate, and the end beams of the deck panels. On-site, additional tie-bars are placed to connect the decks and the abutments.



Design for a single-lane InQuik integral bridge, showing deck-abutment tie-bar detail.

InQuik Features and Benefits

Pre-engineered, pre-certified, pre-fabricated	Simple and fast on-site installation
No bearings, tie-downs or joints	No long-term structural maintenance over 150-year design life
Pre-fabricated components with concrete poured on-site	Reduced WHS risk, reduced trades, reduced installation time on-site
Lightweight components	Reduced WHS risk, small local cranage, ease of transportation
No joints in structure	No joints to allow salt and water ingress
Self-supporting modular structure	No temporary supports required
Faster, simpler, safer with no maintenance	No temporary supports required

Deck Dimensions

All standard InQuik deck panels are 2440mm-wide, and are placed side-by-side with ~40mm overlap between the deck panels (e.g. a bridge that is 2 panels wide would therefore be 4.84m in width). The top deck slab is 205 - 262mm-deep, and the centre deck formwork is stiffened by 40mm-deep corrugations.

The 6.1-13.7m long standard IQ700 deck panels have a total depth of 720mm, while the 16.1 and 18.5m IQ1000 panels have a total depth of 1035mm.

The CR370 bridge (suitable for culvert replacements) has 6.4m-long deck panels with a total depth of 390mm.

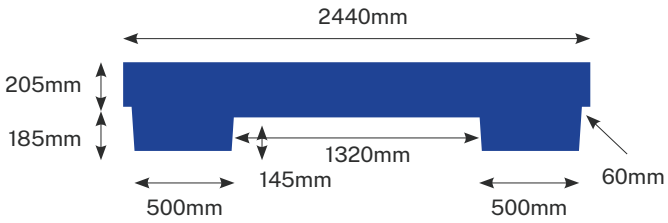
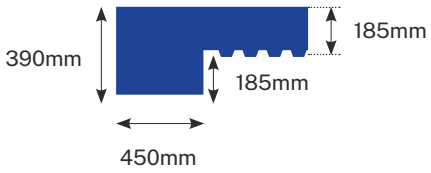
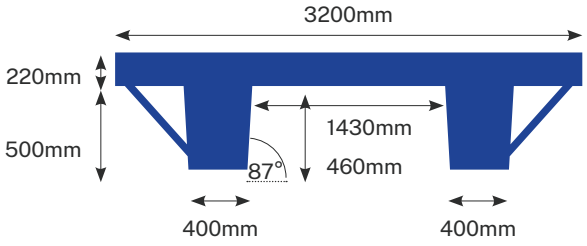
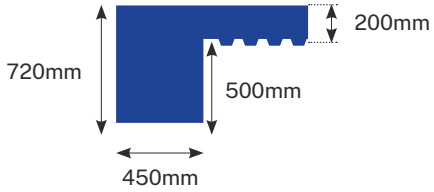
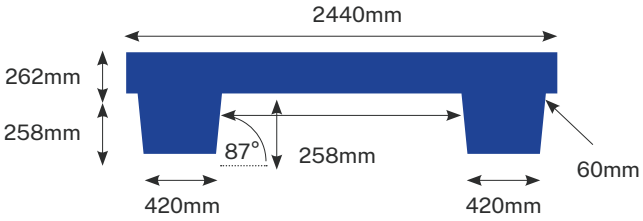
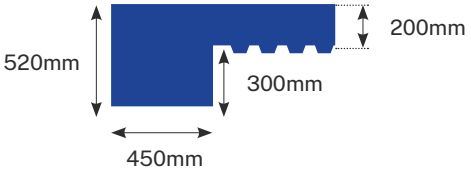
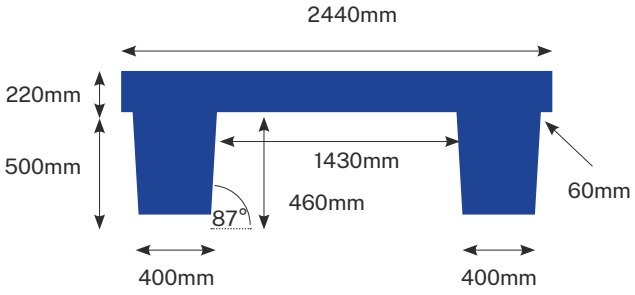
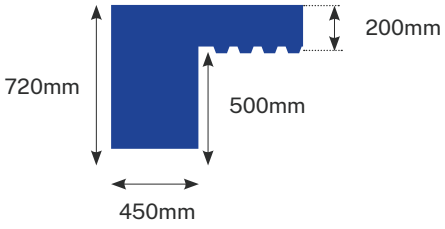
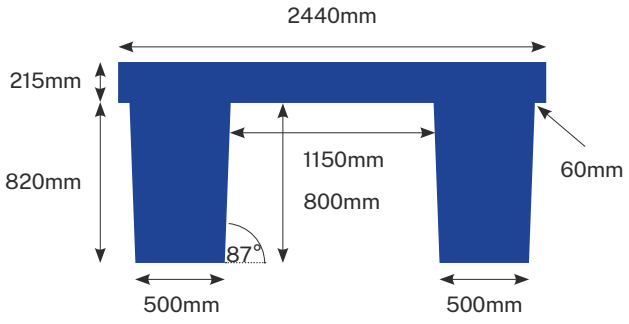
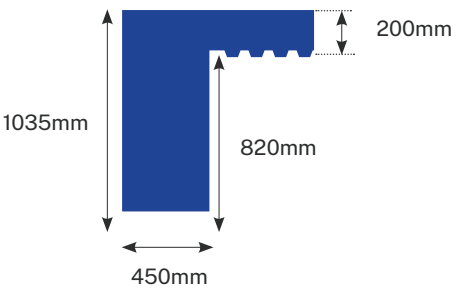
The IQ500 has a total depth of 520mm and is only available in 9.1m span lengths.

Deck panels for the HM32 bridge (used for narrow crossings) are 3200mm-wide and only need 1 panel. Spans are 6.1, 9.1 and 12.1m in length. These deck panels have a total depth of 720mm.

Note that the deck effective spans are defined from the centreline of the standard 900mm-wide abutments (thus, the clear span is 900mm less than the effective span). In all corrosion classification environments up to B1, InQuik bridges are designed to use 40 MPa concrete, except for the 13.7m deck panel, which needs 50 MPa concrete unless otherwise approved.

B2 classification environments require 50 MPa concrete for all spans.



	Deck & Girder Cross-section	End Beam Cross-section
CR370 6.4m		
HM32 6.1 - 12.1m		
IQ500 9.1m		
IQ700 6.1 - 13.7m		
IQ1000 16.1 - 22.1m		

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IQ700 and IQ1000 Load Rating and Deck Spans

The InQuik deck panels have been designed to satisfy the load rating criteria for both T44/68t B-Double (Austroads, 1992), and SM1600 (AS5100, 2017) design codes.

The 6.1-9.1m spans have the same design for both load ratings, and the 12.1-18.5m spans have a heavier reinforcing design for the SM1600 rating.

The simply-supported deck design is 0.3-0.5t heavier than the integral design.

Span (m)	Load Rating	Integral Mass (t)	Approx. concrete volume (m^3)
6.1	SM1600	2.2	6.6
9.1		3.4	9.7
12.1		4.7	12.8
13.7		6.2	14.4
16.1		9.4	23.8
18.5		11.2	27.3
22.1	T44	12.9	32.5

Formwork Cladding Material

The deck formwork is a permanent fixture and remains in place, providing a protective barrier for the concrete against corrosive influences from the environment that can cause concrete degradation.



There are three options for the deck formwork cladding: Weathering Steel, Magnelis®, and Stainless Steel, which each have different corrosion behaviour.

The most suitable cladding component would be selected based on its corrosion performance in each bridges' specific environment. Other materials would require a special order.



MAGNELIS® (STANDARD FOR INQUIK)

Magnelis® is a proprietary product which is steel coated with an alloy of zinc, aluminium and magnesium. This coating has been shown to have far superior corrosion resistance properties to zinc galvanised steel, particularly in salty environments. Due to the high corrosion resistance, less material is needed to coat the steel, and it achieves a superior result. In a marine environment, the coating loses ~0.3 µm/year in thickness. Magnelis® is the only metallic coating product certified for use in a C5 environment.

BLUESCOPE REDCOR® WEATHERING STEEL

REDCOR® weathering steel is a high strength formwork cladding material that develops a stable oxide layer on the surface of the steel, known as the 'patina'. When used in the appropriate environment, the patina enhances the corrosion resistance of the steel compared to conventional uncoated steels, effectively 'weathering' the steel in a natural way. Once fully formed and weathered the appearance is usually dark brown to a purple colour that nicely blends with the environment. Weathering steel has been used since the 1930s in railway coal wagons, bridges, facades, and many architectural features such as sculptures and landscaping. When designed and detailed correctly, considering the environmental factors that govern its use, it has exhibited enhanced corrosion resistance. This means REDCOR® weathering steel formwork cladding may be used without the need for protective coating systems, significantly reducing both initial fabrication and ongoing lifetime maintenance costs.

STAINLESS STEEL

For bridge projects where aesthetics is important in the long-term, and/or the bridge is to be constructed in a highly corrosive environment (e.g. tropical, industrial, etc.), stainless steel cladding can be used, which has extreme resistance to corrosion. For 316 grade stainless steel, the estimated time for pitting to penetrate 1mm is 260 years in a marine environment (the steel cladding is 3mm thick), implying the formwork is likely to outlast the bridge structure.

Kerb and Barrier Options

Standard InQuik bridges have a flat side (no kerb) or a castellated kerb. Standard kerb design is 150mm high, with a width of 200mm.

Custom designs requiring a different kerb can be accommodated if required. For multi-span bridges, the positive camber in the deck panel can result in a humped kerb appearance, so we recommend installing a precast kerb for multi-span bridges instead of the prefabricated InQuik kerb.

Appropriate fixings and connections for barriers can also be included in the deck design, with a standard barrier design available for side and top-mounted low performance barriers.

The InQuik system is certified for low, regular and medium performance barriers, and can accommodate a customised connection system as required.

Standard InQuik bridges include low performance Thrie-beam or regular performance TMR-style barrier.

Note: All galvanised components such as barrier posts and Thrie-beams must be stored correctly when they are received on site to prevent the formation of white rust. They need to be kept dry and clean, and positioned to allow any water which does accumulate on them to run off.

BARRIER STYLE	PERFORMANCE RATING
Thrie-beam	Low performance Side-mounted or top-mounted
TMR-style steel barrier	Regular performance
RMS-style steel barrier	Regular performance
Concrete	Regular performance







Bridge Abutment / Wing Wall

InQuik prefers to work with standard designs where possible to optimise the design and manufacturing processes. However, bridges do have variable site specific needs, and so we offer non-standard premium features as well. If a project requires any features or dimensions not listed below, we may be able to provide for them in the design as well.

- The InQuik abutment length is determined by the width of the bridge.
- The abutment height (to the deck shelf) is determined by the site conditions.
- The size and type of foundation drives the pile openings in the abutment.

STANDARD FEATURES	NON-STANDARD FEATURES
ABUTMENT	
• Default height 1200mm (standard heights available 1200mm, 1800mm & 2400mm), to the underside of the deck • Lengths are driven by the standard deck widths • Thickness 900mm or 1200mm (the size of the foundations and/or requirement for an approach slab will determine the required thickness) • Flat abutment shelf	• Non-standard abutment heights • Crossfalls are typically built into the abutment shelf • One-way crossfall on a single-lane bridge can be incorporated into the blinding layer
WING WALLS	
• Length: 2.7m • Width: 350mm • Height = abutment height + depth of deck panel • Angle: 45° or 90° • Square profile • Symmetrical layout	• 450mm wide (if needed for structural reasons) • Tapered profile • Non-symmetrical layout
FOUNDATIONS	
• Driven steel piles (H-piles or Circular Hollow Sections) at 1.6m maximum spacings • Concrete piles (driven or bored) at 3.2m maximum spacings • Mass pour or strip footing	• Pile spacings must be multiples of 1.6m due to the internal structure of the abutment

Abutment Options and Features

A standard InQuik abutment is 1200mm wide with a flat deck shelf. If an approach slab is required, a 300mm wide pocket is incorporated into the abutment, so the approach slab can be placed on top.

Certain projects may require a crossfall, which depending on the width of the bridge and the size of the crossfall, could be incorporated into the blinding layer (for a one-way crossfall), formed on-site by mounding up the deck concrete (for crowned crossfall), or incorporated into the abutment shelf.







Wing Wall Options and Features

Where a barrier is required, 45° wing walls are recommended where possible. If a 90° wing wall is required, barriers will need to be customised to align with the wing walls.

Foundations

The InQuik abutments are suitable for all major bridge foundation types. The best foundation for a particular bridge will depend on site-specific conditions (consult your engineer), and the foundation type affects the abutment design parameters:

- Driven steel H-piles have a maximum spacing of 1.6m.
- Bored or precast concrete piles, and screw piles, have a maximum spacing of 3.2m.







The standard InQuik abutment height starts at 1.2m and increases in 0.4m increments (1.6m, 2.0m and 2.4m). If a height greater than this is required, a thicker blinding slab can be used.

Higher abutments can be made as a custom design, but will be delivered in vertical sections due to transport height limitations.

Multi-Span Bridges and Structures

In addition to single-span bridges, the InQuik system can be used for multi-span bridges, wharves, jetties, elevated roads and rail crossings. InQuik has developed its own headstock and bladepier designs, which are similar in construction to the abutment design.

InQuik headstocks and bladepiers can be designed with either a simply supported articulation (all spans) or a fully integral connection (6-13.7m spans).

For multi-span simply supported bridges, the decks can be tied down to the headstocks using brackets. Elastomeric strip bearings are generally used for the headstock shelf, as well as buffer bearings for the downstream side of the bridge. Through-bolts to tie together adjacent spans are also typically used to help transfer loads between the spans.

All simply supported decks have a 100mm gap under the end beam, so that a jack may be used to lift the deck for bearing replacement in the future.

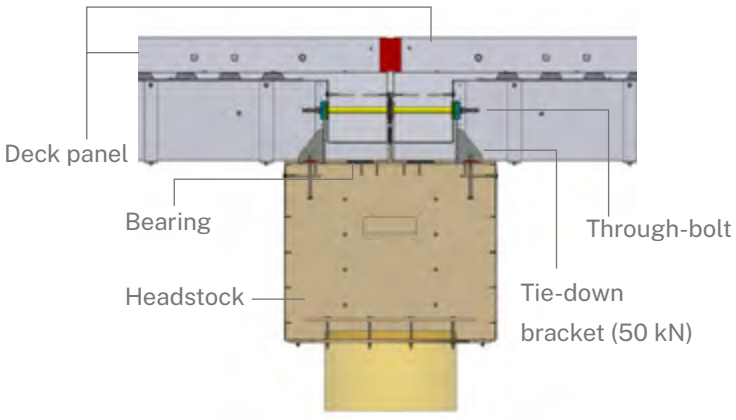
For the multi-span integral headstock design, rebar connectors are positioned between the headstock and the deck panels and tied into placed before the concrete for the deck panels is poured, providing a linkage and load transfer path once the concrete is poured and cured.

Headstock Dimensions:

1.0m (H) x 1.2m (W)

Foundations:

- Common foundation types include bored concrete piles and driven steel piles (UC or CHS).
- Pile collars can be used to support the headstock on an embedded concrete pile if required.





Cross-section of an InQuik headstock, showing possible deck connection details

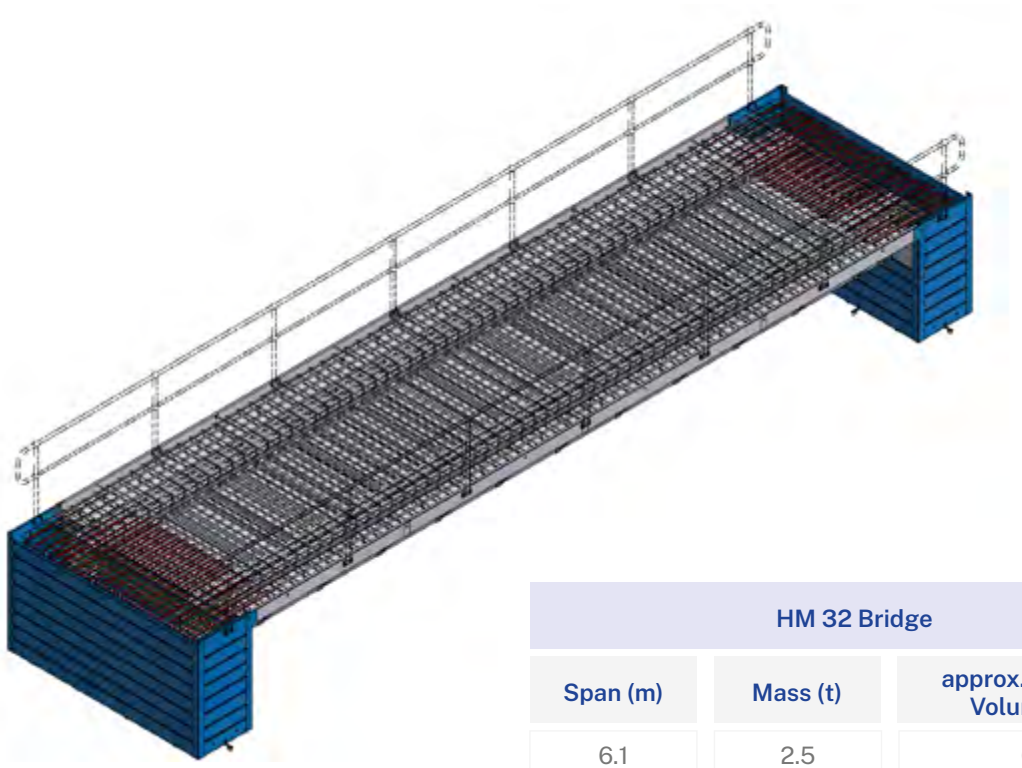
HM32 Bridge

The InQuik HM32 bridge has been specifically developed to provide a cost-effective bridge for private and remote crossings. The bridge has a fully integral design to minimise long-term maintenance needs. It is 3.2m wide, and comes in 6.1, 9.1 and 12.1m spans. The bridge is rated for a load of up to 68 tonnes, and the depth of the deck panels is 720mm.

To save cost, the abutments can be supplied without cladding (as reinforcing cages only).

The abutment formwork would then be constructed on-site and removed once the bridge concrete has cured.

Deck Span	6.1m | 9.1m | 12.1m
Width	3.2m
Abutment Height	1.2m standard only
Abutment Formwork	Reinforcing cage only With full cladding
Wing Walls	Wing walls optional Length: 2.7m Angle to abutment: 45° or 90°



HM 32 Bridge		
Span (m)	**Mass (t)**	**approx. Concrete Volume (m^3)**
6.1	2.5	6.8
9.1	3.8	10.1
12.1	5.9	13.5

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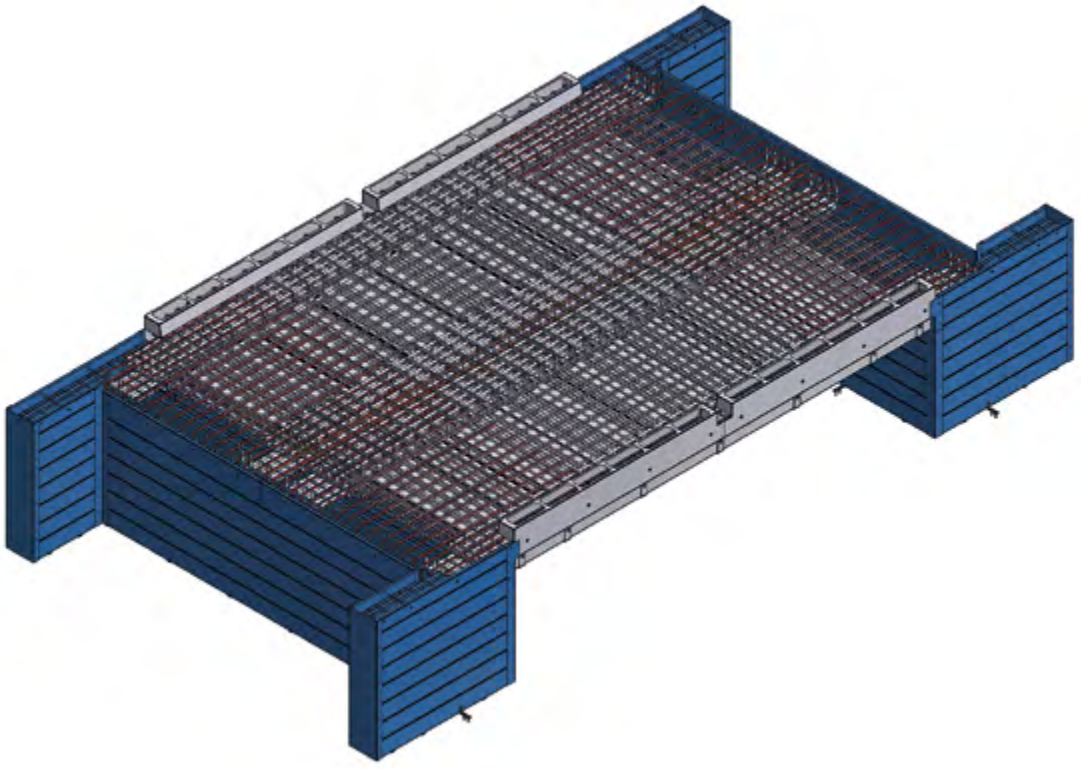
CR370 Bridge

The InQuik CR370 bridge has been developed to address the need to replace culverts and small bridges by local councils, farmers and primary producers.

This short-span bridge product has been specifically designed with a 390mm deep deck profile for ease of water afflux, and is available in a 6.4m span with the same bridge widths as the IQ700 design.

The CR370 has a fully integral design, and is load rated to SM1600.

Deck Span	6.4m
Width	As per standard IQ700 bridges
Abutment Height	1.2m | 1.6m | 2.0m | 2.4m
Wing Walls	Wing walls optional | Length: 2.7m | Angle to abutment: 45° or 90°
Barriers	Side-mounted low performance barrier (optional)

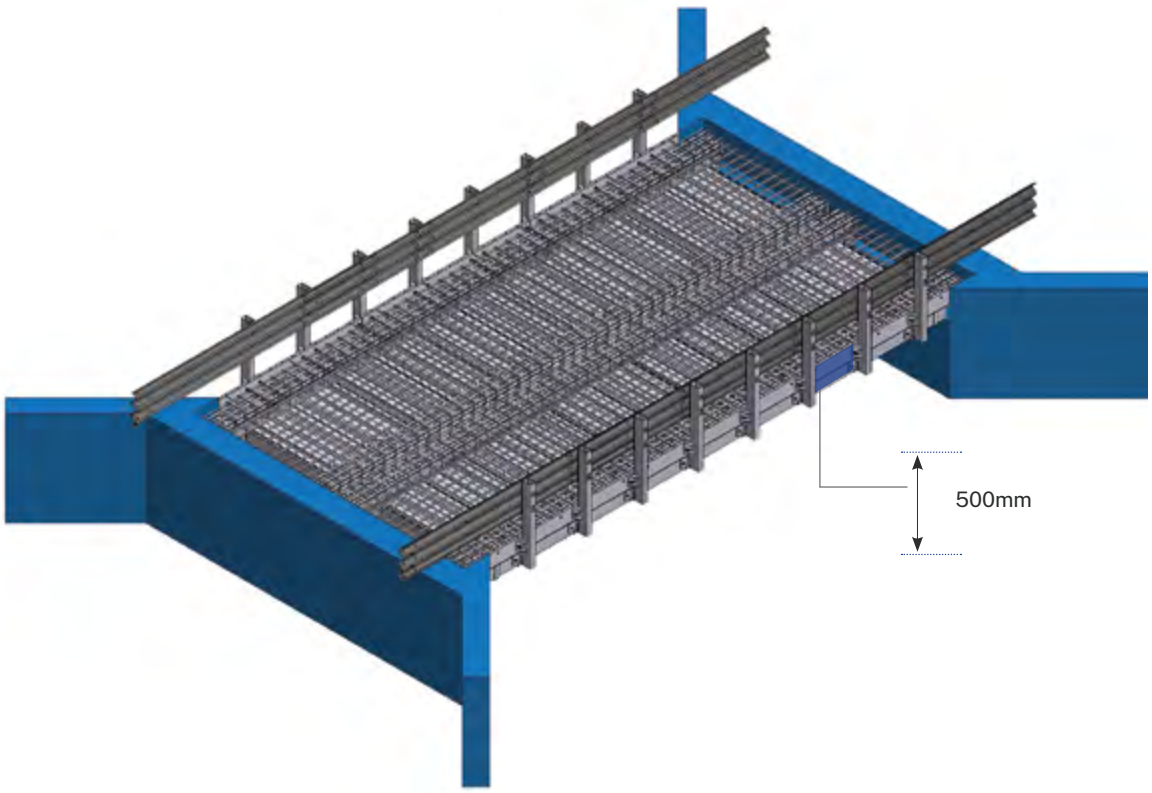


IQ500 Bridge

InQuik's IQ500 bridge was developed in response to market feedback requesting a longer span but lower profile bridge to address the needs of local councils and primary producers. The IQ500 meets AS5100 (2017), has a fully integral design, is load rated to SM1600 and has a 150-year design life.

The IQ500 has a 9.1m span with a 520mm girder depth, which is minimised for this span length and load rating. This reduced girder depth will assist in mitigating potential water afflux issues. Water afflux occurs when the flow path of a waterway is reduced to less than its natural width due to obstruction.

Deck Span	9.1m
Width	4.84 - 14.4m
Abutment Height	1.2m
Wing Walls	Wing walls optional
Barriers	Low Performance barriers



As well as council and farm projects, the increased span of the InQuik IQ500 bridge is perfect for golf courses, wineries, service roads, solar/wind farms, box culvert replacements and new land releases where the extra length is required but reduced girder profile height will allow for better water flow.

Custom Design Features

In addition to the standard InQuik bridge components, we can also provide custom design features at additional cost.

ABUTMENT HEIGHTS	Abutments higher than 2.4m may be possible, but require project specific engineering verification.
WING WALLS	Custom wing wall arrangements may be possible, but require project specific engineering.
MULTI-SPAN HEADSTOCK	If crossfall is required it can be designed into the headstock top surface. It will sit flat on the piles.
BARRIER DESIGN	We can incorporate non-standard barrier designs, according to site requirements. The InQuik system is suitable for up to medium performance barriers, but unusual barrier designs may require engineering verification.
DECK SLOPE	For wider bridges and larger crossfalls, one-way or crowned crossfalls may be incorporated into abutment shelf.
SERVICES	Service brackets can be incorporated underneath the bridge for simply-supported designs only. For integral bridges, services can be mounted on a bracket at the side of the bridge.

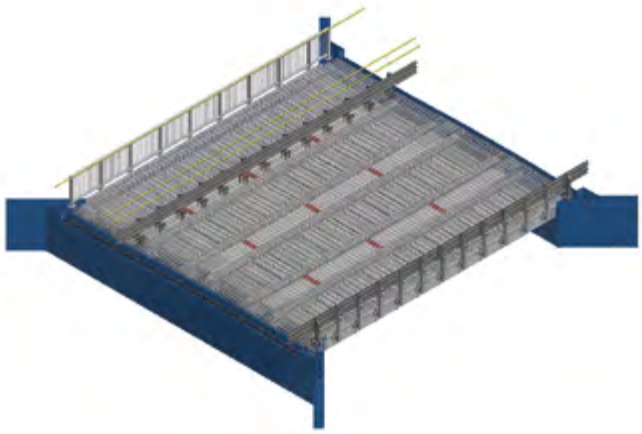




Image (right):
Fowler Rd Bridge



Typical InQuik Bridge Timeline

Customer	InQuik
Design Basis report - project scope	
Design will typically require Geotechnical report, flood study, traffic volume data, survey detail and environmental impact report. Global bridge design details the bridge foundation and scour protection required. REF - Review of Environmental Factors - Safety in Design assessment. Ensure all necessary Council and DPI Fisheries approvals have been submitted and approval time-frame known.	
	Quote sent to customer
Global Design/Structural Plans	
Accept quote, give purchase order	
	Send sales contract and deposit (50%) invoice
Sign contract, pay deposit	Counter-sign contract, initiate production
Arrange site preparation works (earthmoving, foundations, etc.)	
	Liaise with customer for estimated delivery date
Abutments/wing walls installed and concrete poured	Abutments/wing walls delivered
Deck panels installed	Deck panels delivered Final invoice sent
1st deck concrete pour	
2nd deck concrete pour [only for some deck designs]	
Light traffic after deck concrete reaches 30MPa **(~7 days)**	
Unrestricted traffic after deck concrete reaches design strength (usually 40MPa) (**~28 days after concrete pour)**	
	Upon project completion, supply Material Data Records (MDR)

Image (right): Toorale Bridge

accelerated construction

InQuik® bridges have exceptional resilience to impacts caused by severe weather events and requires minimum to no structural maintenance over its 150-year design. We have manufactured and delivered over 200 bridges across Australia, Pacific and USA. We provide environmentally friendly long-lasting solutions for communities, and enable the use of local resources, on-site labour, plant, and materials.

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