InQuikBridges

Product Catalog



Reinforced-Concrete Bridge System

Modular Bridge System

AASHTO Bridge Design Specifications Compliant

Accelerated Bridge Construction

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 100 years or more.

Ben Mullaney,
CEO of InQuik.



Contents

The InQuik Bridge 4

Installation process for an InQuik bridge 4
Key Features 5

Bridge Range 6

InQuik Integral Bridge 7
InQuik Features and Benefits 7
Superstructure / Deck Panels 8
Load Rating and Deck Spans 10
Formwork Cladding Material 10
Curb and Barrier Options 12

Bridge Abutment/Wing Wall 13

Abutment Options and Features 14
Wing Wall Options and Features 14
Foundations 15

Multi-Span Bridges and Structures 16

InQuik IQ14 Bridge 17

Custom Design Features 18

Sample Orders 19

40ft. Dual-Lane Integral Bridge 19
45ft. Dual-Lane Integral Bridge 20
80ft. 2-Span Dual-Lane Semi-Integral Bridge 21
21ft. Single-Lane IQ14 Bridge 22

InQuik Bridge Timeline 23

****All measurements throughout catalog are rounded to the nearest 1/4 inch for convenience; for exact measurements, please see the construction manual.****

InQuik®

The InQuik Bridge

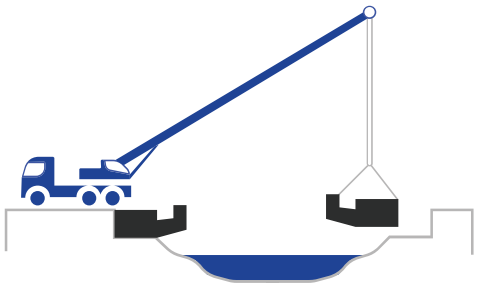
The InQuik® bridge is a conventional reinforced-concrete bridge that's cast-in-place. The construction process combines the efficiency of using prefabricated components and quality of cast-in-place.

The InQuik® bridge is a modular construction system, including abutments and superstructure panels that are prefabricated in a factory. The components comprise reinforcing steel and formwork – no concrete.

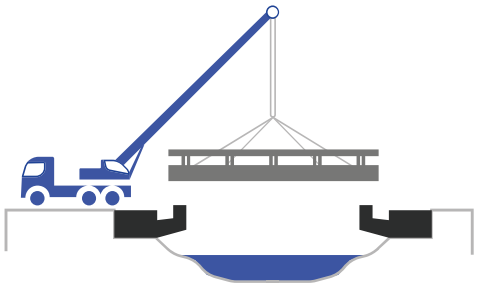
The light-weight components are delivered to site, lifted into place, spliced together, and completed when the concrete is placed to form a single monolithic concrete slab.

The superstructure panels are self-supporting, and the formwork is non-structural, so sacrificial. The InQuik product range includes abutments, wing walls, pier caps, and superstructure/deck panels.

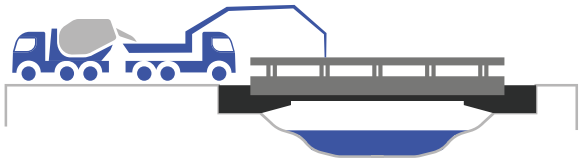
Installation process for an InQuik bridge:



Place abutments and concrete



Install barriers & place decks



Deck concrete



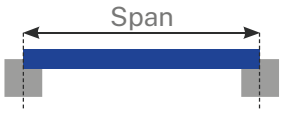
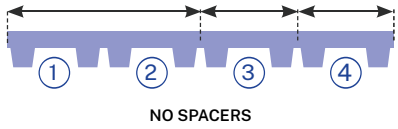
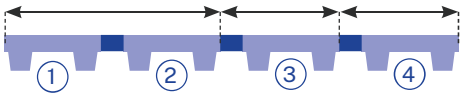
Bridge complete

Key Features

- No temporary bracing or support is required during construction.
- Bridge construction occurs from above, improving worker safety and reducing environmental impact.
- The superstructure / deck panels are placed side by side to achieve the desired bridge width, and then concrete is placed to create a monolithic slab.
- InQuik can supply pier/bent caps to construct multi-span bridge structures.
- The InQuik bridge structure complies with the minimum 75+ year design-life of AASHTO, but could exceed 100+ years when built with optimized materials.
- InQuik abutments, wing walls, bent caps and blade piers are constructed using a similar semi-modular method as the deck.
- Single-span lengths range between 21 ft. and 61 ft, with engineering certified by ARUP to the AASHTO LRFD Bridge Design Specifications - 9th edition.
- InQuik structures require minimal long-term maintenance when compared to precast structures through eliminating longitudinal deck joints.
- Integral bridge design also removes tie-downs and bearings, which also reduces maintenance.



Bridge Range

Product	IQ14	IQ27	IQ40	Explanation
Description	Culvert Replacement	Standard 27” girder depth	Standard 40” girder depth	
Span (Feet)	21’	30’ 40’ 45’	53’ 61’	As measured from the centerline of a 3ft wide abutment. 
Standard Width (Feet)	16’ (17-½’ with 1 spacer) 24’ (27’ with 2 spacers) 32’ (36-½’ with spacers) Wider options available	16’ (17-½’ with 1 spacer) 24’ (27’ with 2 spacers) 32’ (36-½’ with spacers) Wider options are available	16’ (17-½’ with 1 spacer) 24’ (27’ with 2 spacers) 32’ (36-½’ with spacers) Wider options available	All standard InQuik deck panels are 8ft wide and are placed side by side with about a 2” overlap between the deck panels.  NO SPACERS  WITH SPACERS Extension spacers may be placed between the panels to increase the width by 18” per joint.
Load Ratings	HL-93	HL-93	HL-93	InQuik offer bridge designs for HL-93 load ratings and special permit vehicles, as required.
Deck Depth	8”	8”	8”	See “Deck Dimensions” section below for more information.

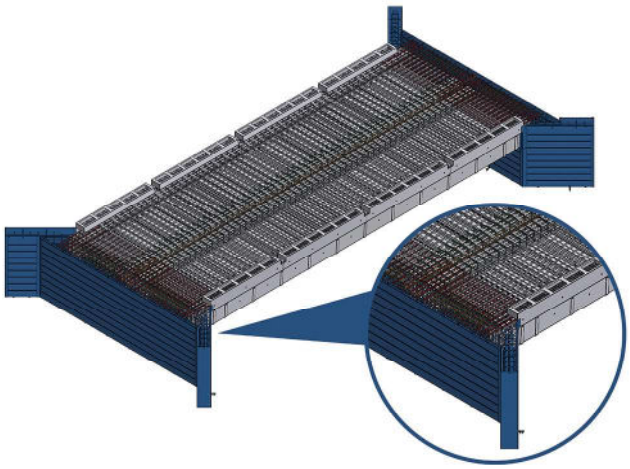


InQuik Integral Bridge

The InQuik bridge system can be simply supported on bearings, or fully integral since it's cast-in-place.

During construction of an integral bridge, rebar is left exposed after placing concrete in the abutment. The superstructure panels are installed into this rebar and then spliced together onsite, connecting all of the reinforcing steel. The concrete is placed in the top of the abutment, superstructure and deck, creating a fully integral structure and monolithic concrete slab.

This results in a very strong, stable and durable structure, providing greater resistance to flooding and earthquake events. It also eliminates the need for bearings and tie-downs, and the associated maintenance requirements that come with them throughout the lifetime of the structure.



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

InQuik Features and Benefits

Pre-engineered, pre-certified, pre-fabricated	Reduced design time and fast on-site installation
No bearings, tie-downs or joints	No long-term structural maintenance over 75+ year design life
Pre-fabricated components with concrete placed on-site	Reduced OSHA risk, reduced contractors, reduced installation time on-site
Lightweight components	Reduced OSHA 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 bracing or supports required
Faster, simpler, safer with no maintenance	Reduced project costs & reduced 'whole-of-life' costs

Superstructure / Deck Panels

All standard InQuik superstructure panels are 8 ft. wide, with an 2” ‘lip’ to connect the formwork onsite.

The panels are installed side-by-side with the 2” overlap between the deck panels (e.g. a bridge that is two panels wide would therefore be 16 ft. wide).

The deck slab is 8” deep, and the center deck formwork is stiffened by 1-½” deep corrugations.

The standard IQ27 superstructure panels have a total depth of 27” from the underside of the girder to the top of the deck. While the IQ40 with widths of 53 ft. and 61 ft. have a total depth of 40” from the underside of the girder to the top of the deck.

The IQ14 bridge (ideal for culverts) has a total depth of 14” which is great for water afflux.

InQuik supplies the loose rebar to splice the panels together onsite, both transversally and longitudinally.

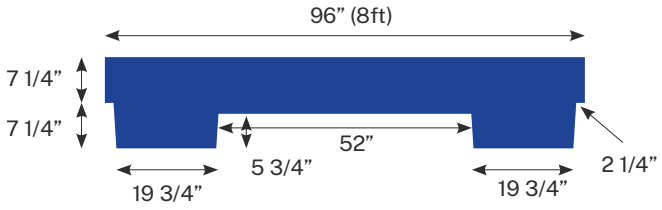
Note that the deck effective spans are defined from the centerline of the standard 36” wide abutments (thus, the clear span is 36” less than the effective span).



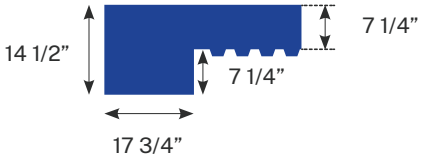
Dimensions

IQ14 21ft

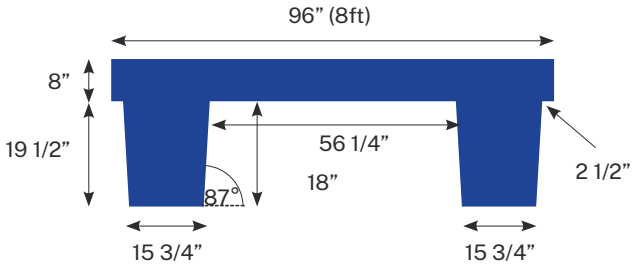
Deck & Girder Cross-section

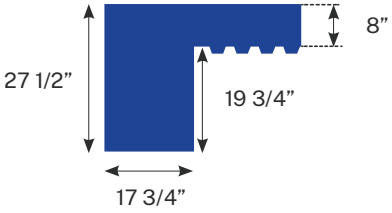


End Beam Cross-section

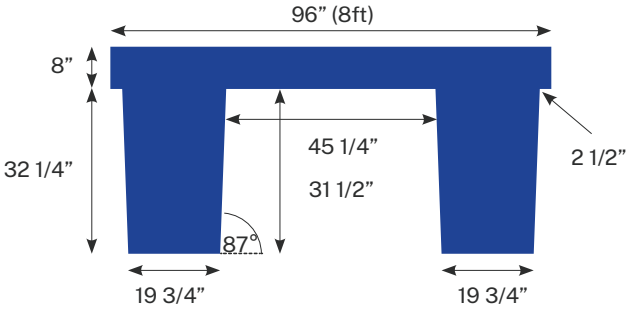


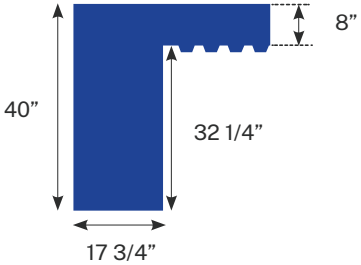
IQ27 20-45ft





IQ40 53-61ft





InQuik®



Live Loading Model and Deck Spans

The InQuik deck panels have been designed to satisfy the load rating criteria for HL-93 (AASHTO LFRD 9th Edition) bridge design specifications.

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

Span (ft)	Load Rating	Integral Mass (t)	Approx. concrete volume (yd^3)
21	HL-93	2.3	8.0
30		3.3	11.6
40		4.2	15.3
45		5.8	17.3
52 1/2		9.4	30.5
60 3/4		10.8	34.8

Formwork Cladding Material

The deck formwork is not structural, so it can be removed, or remain in place providing a protective barrier for the concrete against corrosive influences from the environment that cause concrete degradation.



There are three options for the non-structural formwork cladding: ZAM, Weathering Steel, and Stainless Steel, which each have different corrosion behavior.

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.



ZAM

ZAM 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. ZAM is the only metallic coating product certified for use in a C5 environment.

WEATHERING STEEL

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 our 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.

Curb and Barrier Options

Standard InQuik bridges have a flat side (no curb) or a castellated kerb. Standard kerb design is 6” high, with a width of 8”.

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

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.

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

While InQuik prefers to work with standard designs where possible to reduce costs, bridges do have variable site specific needs, 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 3'-11" (and increases up in 8" increments), to the underside of the deck • Lengths are driven by the standard deck widths • Thickness 3ft or 4ft (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: 9ft • Width: 14" • Height = abutment height + depth of deck panel • Angle: 45° or 90° • Square profile • Symmetrical layout	• 18" wide (if needed for structural reasons) • Tapered profile • Non-symmetrical layout
FOUNDATIONS	
• Driven steel piles (H-piles or Circular Hollow Sections) at 5'-3" maximum spacings • Concrete piles (driven or bored) at 10'-6" maximum spacings • Mass pour or spread footing	• Pile spacings must be multiples of 5'-3" due to the internal structure of the abutment

Abutment Options and Features

A standard InQuik abutment is 3ft wide with a flat deck shelf. If an approach slab is required, a 1ft-wide pocket is incorporated into the abutment, so the approach slab can be placed on top and reinforcing tied.

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 degree wing walls are recommended where possible. If a 90 degree 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 5’-3”.
- Bored or precast concrete piles, and screw piles, have a maximum spacing of 10’-6”.







The standard InQuik abutment height starts at 3’-11” and increases in 8” increments. 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 (20-45ft 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 4-inch gap under the end beam, so that a jack may be used to lift the deck for bearing replacement in the future.

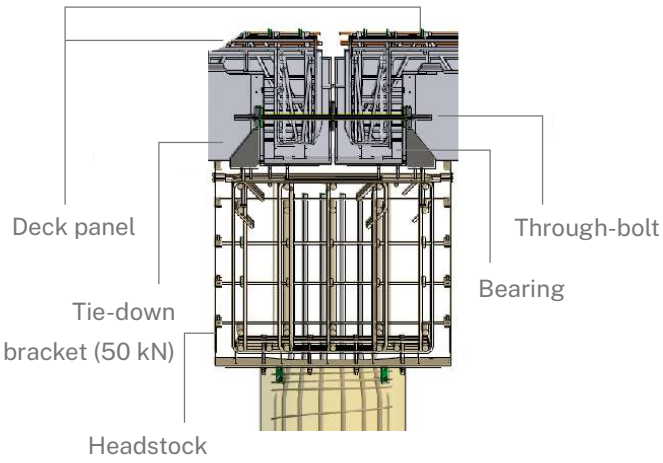
For the multi-span integral headstock design, rebar connectors are positioned between the headstock and the deck panels and tied into placed before the concrete for the deck panels is poured, providing a linkage and load transfer path once the concrete is poured and cured.

Headstock Dimensions:

3'-3" (H) x 4'(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

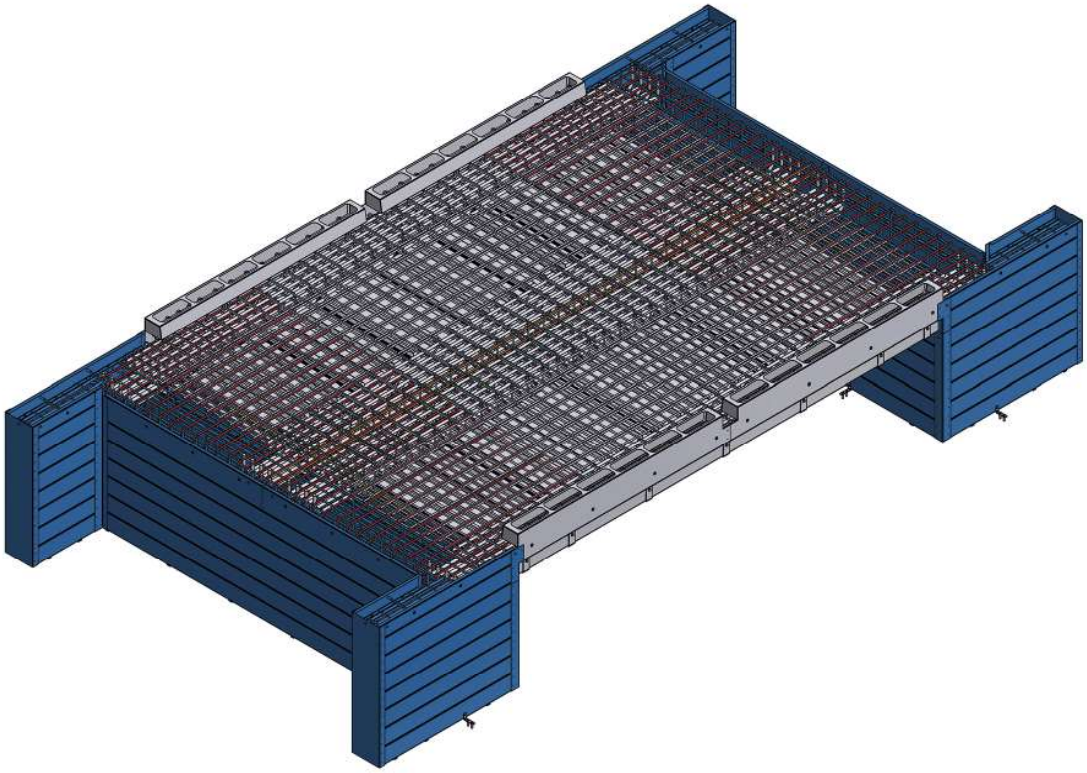
InQuik IQ14 Bridge

The InQuik IQ14 bridge has been developed to address the need to replace culverts and small bridges, and it's a great application for fish passage.

This short-span bridge product has been specifically designed with a 14 inch deep deck profile for ease of water afflux, and is available in a 21ft span with the same bridge widths as the IQ27 design.

The IQ14 has a fully integral design, and is load rated to HL-93.

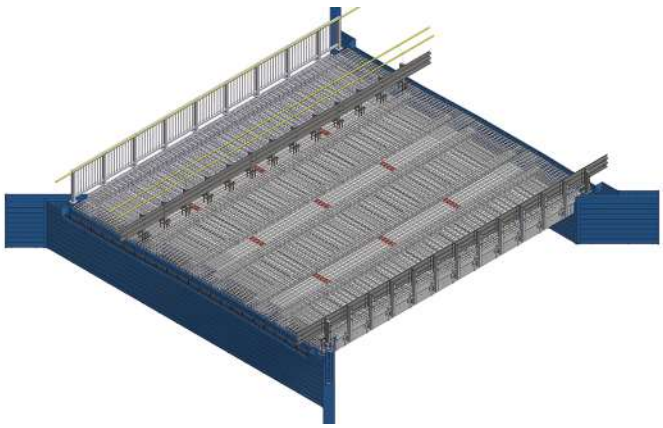
Deck Span	21ft
Width	As per standard IQ27 bridges
Abutment Height	Standard 3'-11", increasing in 8" increments
Wing Walls	Wing walls optional | Length: 6ft or 9ft | Angle to abutment: 45° or 90°
Barriers	Side-mounted TL2-TL3 barrier (optional)



Custom Design Features

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

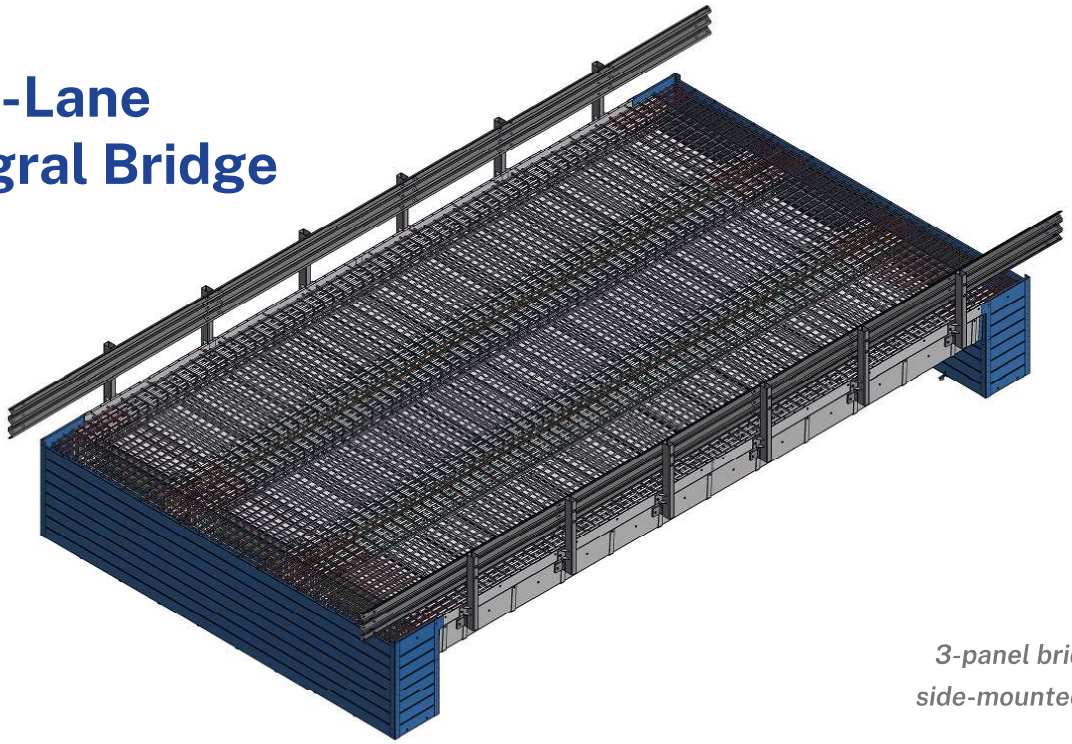
ABUTMENT HEIGHTS	Abutments higher than 8’ may be possible, but require project specific engineering verification.
WING WALLS	Custom wing wall arrangements may be possible, but require project specific engineering.
MULTI-SPAN HEADSTOCK	If crossfall is required it can be designed into the headstock top 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.





Sample Orders

40ft Dual-Lane Integral Bridge

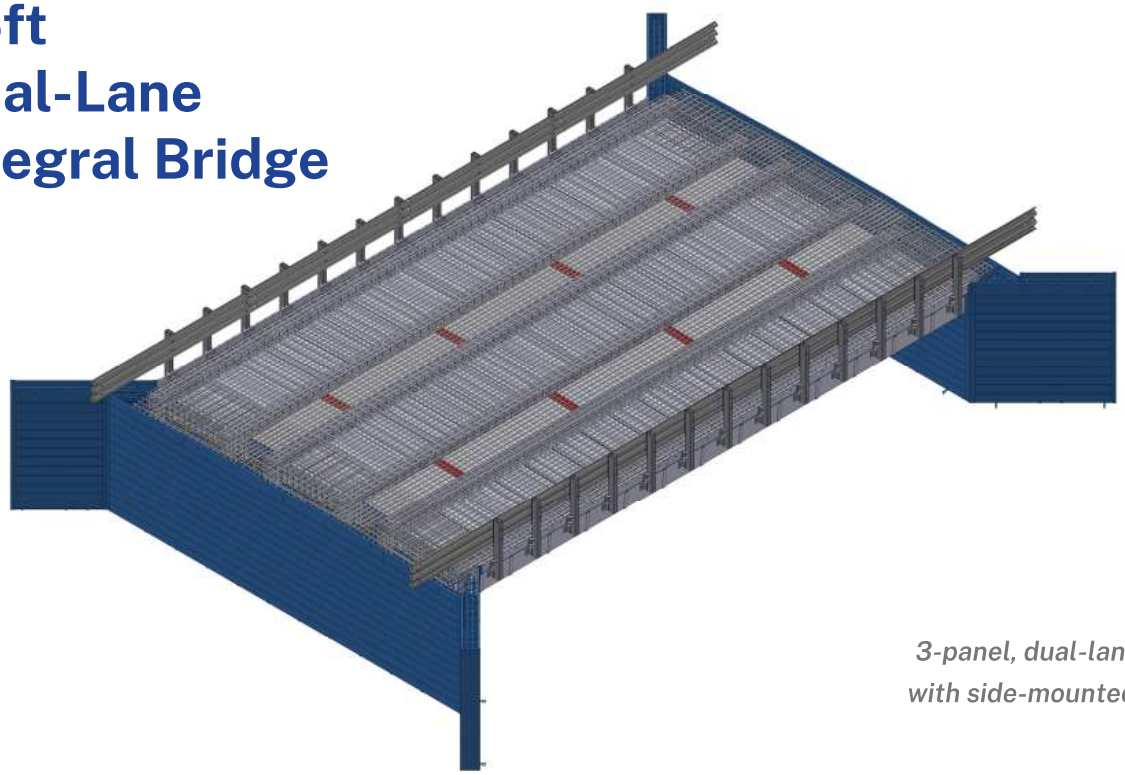


3-panel bridge with side-mounted barrier

This single-span bridge has an HL-93 load rating, and uses 3 x 8ft - wide deck panels to give a total deck width of 24ft. The abutment is 3'-11" high with a 12" pocket for the approach slab. This bridge has side-mounted barrier posts attached to a Thrie-beam guardrail.

QTY	INQUIK COMPONENTS	TOTAL MASS (t)	CONCRETE (YD^3)
3	40ft. ZAM IQ27 HL-93 rated deck panel (8x40ft)	14.2	39.9
2	Double-lane abutment (24ft x 4ft)	3.6	28.5
1	Side-mounted barrier posts and Thrie-beam guardrail	1.1	
1	Deck-abutment integration tie-bar set	1.2	
	TOTAL	20.1	68.4

45ft Dual-Lane Integral Bridge



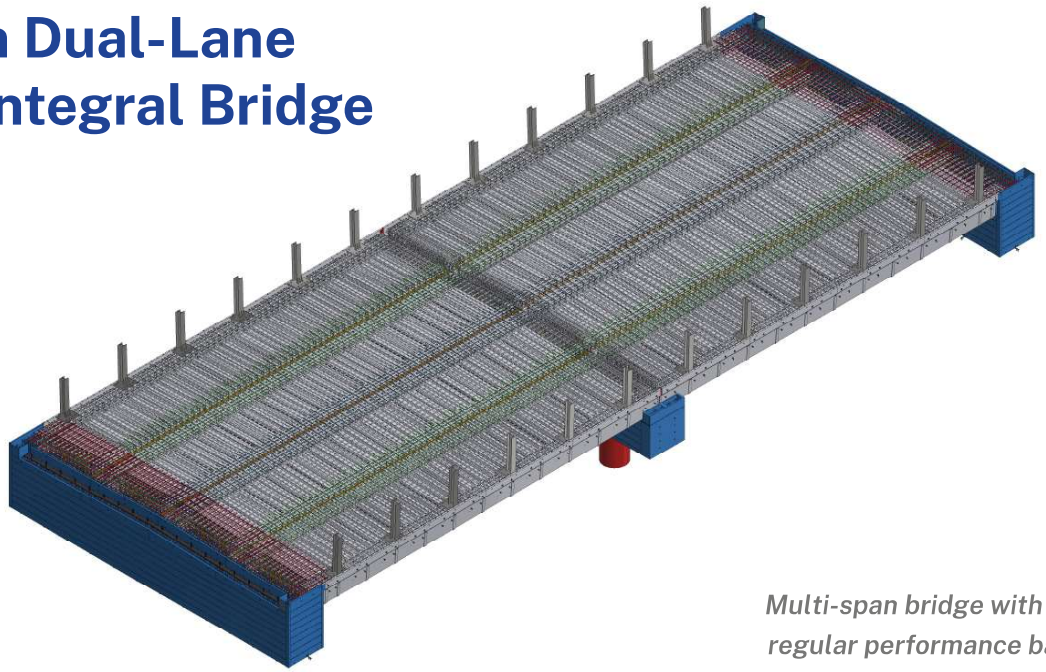
3-panel, dual-lane bridge with side-mounted barrier

This single-span bridge has an HL-93 load rating, and uses 3 × 8ft wide deck panels with 2 × 18" in-fill spacer sections between the panels, giving a total deck width of 27'.

The abutment is 6ft high with a 27' pocket for the approach slab, and the wing walls are 8'-3" high (to the height of the deck), 8'-11" long and angled at 45° to the abutments. The foundations are H-piles. This bridge has side-mounted barrier posts attached to a Thrie-beam guardrail.

QTY	INQUIK COMPONENTS	TOTAL MASS (t)	CONCRETE (YD^3)
3	45ft ZAM IQ27 HL-93 rated deck panel (8 x 45ft)	19.2	50.1
2	18" x 45ft in-fill tray section with reinforcing bars	1.1	
2	Double-lane abutment (27' x 6ft) + 45° wing wall (9ft) set	8.9	62.3
1	Deck-abutment integration tie-bar set	2.1	
TOTAL		31.3	112.4

80ft
2-Span Dual-Lane
Semi-Integral Bridge



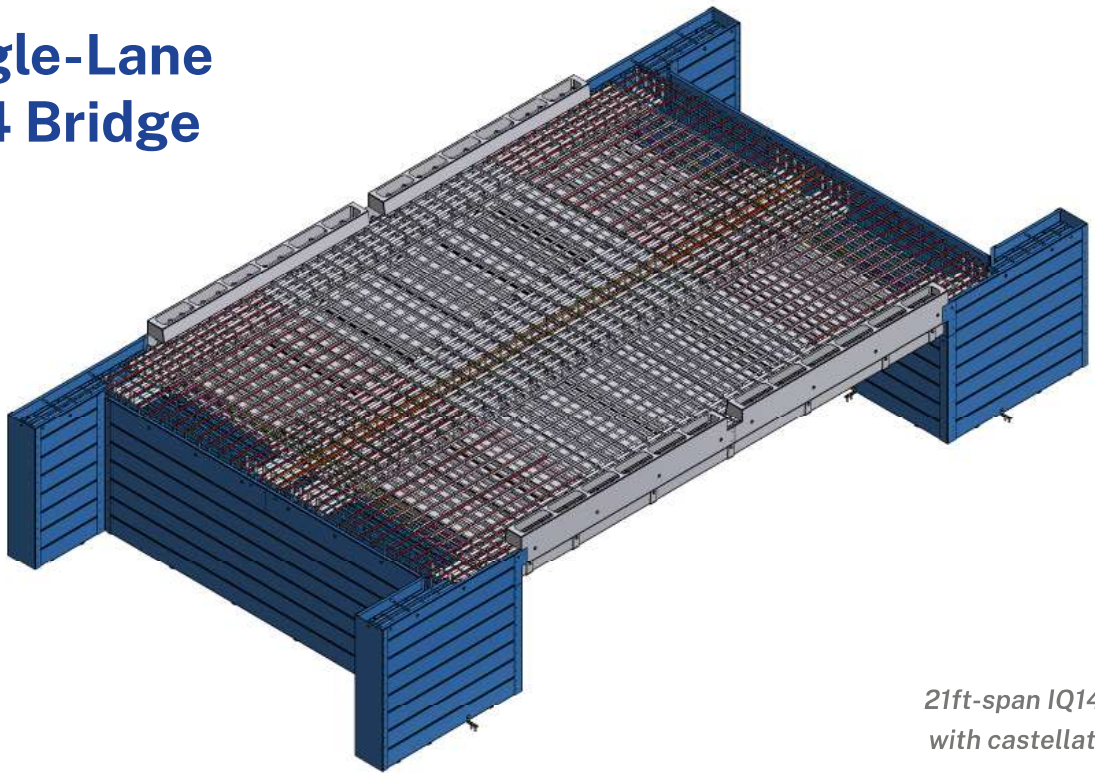
Multi-span bridge with steel regular performance barrier

This dual-lane, 2-span bridge has an HL-93 load rating and is 80ft long. Each span uses 4 x 8ft-wide deck panels with 1 x 5 1/2 in-fill spacer sections between the center panels, giving a total deck width of 32'-6". The integral abutments are 3-11" high, with an approach slab pocket in the backwall. The deck is simply supported over the headstocks using elastomeric bearing strips. This bridge has a regular performance steel barrier, and the foundations are H-piles with concrete collars.

This bridge had side-mounted brackets supporting services.

QTY	INQUIK COMPONENTS	TOTAL MASS (t)	CONCRETE (m^3)
8	40ft ZAM IQ27 semi-integral HL-93 rated deck panel (8 x 40ft)	20	61.5
2	Integral abutment (32'-6" x 3'-11") with approach slab pocket	6.2	33.4
1	Bearing bent cap (32'-6" x 4' x4')	4.6	16.1
16	elastomeric bearings strips (7'-10" long)		
1	Deck–abutment integration tie-bar set	3.0	
1	Assembly components (through-bolts, fasteners, etc)		
TOTAL			111.0

21ft Single-Lane IQ14 Bridge



21ft-span IQ14 bridge with castellated curb

This single-lane, 21ft span bridge has an HL-93 load rating, with 2 × 8ft-wide deck panels that give a total deck width of 16'. The abutment is 4ft high with a 14" pocket for the approach slab, and the wing walls are 5'-2" high (to the height of the deck), 6ft long and angled at 90° to the abutments. The deck has castellated curbs.

QTY	INQUIK COMPONENTS	TOTAL MASS (t)	CONCRETE (YD^3)
2	21ft ZAM IQ14 integral HL-93 rated deck panel (8x21ft)	2.8	24.9
2	Integral abutment (15'-9" x 4') + 90° wing wall (5'-11") set	3.3	51.5
1	Deck–abutment integration tie-bar set	0.6	
	TOTAL	6.7	76.4

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)

InQuik® Image (right) Isolate Bridge

accelerated construction

InQuik® bridges have exceptional resilience to impacts caused by severe weather events and requires minimum to no structural maintenance over its 100-year design. We have manufactured and delivered over 200 bridges across Australia, the Pacific and USA. We provide environmentally friendly long-lasting solutions for communities, and enable the use of local resources, on-site labour, equipment, and materials.

InQuik®

AUSTRALIA
Suite 2.02, 33-35 Saunders St,
Pyrmont, NSW, 2009.
+61 1300 467 845
enquiries@inquik.com.au

USA
Suite 322, 1644 Platte St,
Denver, Colorado, 80202.
+1 866 249 9661
inquiries@inquikbridge.com

InQuik and the InQuik logo are registered trademarks of InQuik IP Holdings Pty Ltd, registered in Australia and other countries and regions.
InQuik's technology is protected under patents 2016265049, 2017377663, and 2018200667 in Australia and other countries and regions.

Version_2.1