

# Clem Jones Tunnel

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## Clem Jones Tunnel (CLEM7) North–South Bypass Tunnel



Tunnel, 60 metres (200 ft) under the Brisbane River, during the Clem7 Community Open Day

### Overview

**Location** [Brisbane River](#)

 [27°27′48.38″S](#)

### Coordinates

[153°02′07.30″E](#)[27.4634389°S](#)

[153.035361°E](#)[Coordinates: !\[\]\(d3102649f02e825ddb76dc3de0190154\_img.jpg\) \[27°27′48.38″S\]\(#\)](#)

[153°02′07.30″E](#)[27.4634389°S](#) [153.035361°E](#)

**Status** Open

**Route** 

**Start**  [Inner City Bypass](#), [Bowen Hills](#)

 Shafston Avenue

**End**  [Pacific Motorway](#)

 [Ipswich Road](#), [Woolloongabba](#)

### Operation

**Work begun** September 2006

**Opened** 15 March 2010; 20 months ago

**Operator** Rivercity Motorway

**Traffic** Automotive

<b>Character</b>	Motorway
<b>Toll</b>	\$1.50–\$9.90
<b>Vehicles per day</b>	28,000
Technical	
<b>Length</b>	4.8 km (3.0 mi)
<b>Number of lanes</b>	4 total in 2 parallel tubes
<b>Operating speed</b>	80 km/h (50 mph)

The **M7 Clem Jones Tunnel (CLEM7)**, known during its development as the **North-South Bypass Tunnel (NSBT)**, is a [A\\$3.2 billion toll road](#) built under the [Brisbane River](#), which crosses between the suburbs of [Woolloongabba](#) and [Bowen Hills](#) in [Brisbane, Australia](#). The [CLEM7 Community Open Day](#), a public open day which included a tunnel run and walk was held on 28 February 2010.<sup>[1]</sup> The tunnel was progressively opened to traffic from late on 15 March 2010 until just after midnight on the 16. It was completely open - all lanes, both directions - by 12.02 am.<sup>[2]</sup>

The tunnel was originally proposed by then Labor Lord Mayor [Jim Soorley](#) in 2001, and was incorporated into the Liberal Party candidate [Campbell Newman](#)'s five tunnel vision, called [TransApex](#) in 2002. In December 2007, [Brisbane City Council](#) decided to name the tunnel the [Clem Jones Tunnel](#) in honour of the former lord mayor.<sup>[3]</sup> On 16 July 2008, the [Government of Queensland](#) announced that the tunnel "heralds Queensland's newest motorway - the M7". The M7 motorway will also include the [Airport Link](#) tunnel.

The project is Brisbane's first privately financed inner city toll road.<sup>[4][5]</sup> The road is the city's largest road [infrastructure](#) project and one of [Queensland](#)'s largest infrastructure projects. With tunnel length of 4.8 km (3.0 mi) it is the longest road tunnel in the country until the planned 6.7 km (4.2 mi) Airport Link tunnel is complete.<sup>[5][6]</sup>

Construction bids were provided by a tender process in which [RiverCity Motorway](#) was selected over the Brisconnections consortium. The project commenced in September 2006, with tunneling using two very large boring machines completing digging by May 2009. The tunnel is tolled via an electronic tolling system. The tunnel design includes extensive safety systems, a traffic control centre and speed cameras. The price of the toll has been criticised as too expensive and the ventilation stacks as too intrusive.<sup>[7]</sup>

Patronage of the tunnel decreased by more than 65% in the week following the introduction of a reduced toll period, and remains considerably lower than the predicted traffic volumes.<sup>[8]</sup> Despite being completed on-time and on-budget, the Tunnel has been an economic failure due to incorrect predictions of traffic volume. [RiverCity Motorway](#) has been unable to collect enough tolls to pay the interest on its \$1.3 billion debt and went into receivership.<sup>[9]</sup> With no hope of profit, and therefore no dividend, RiverCity Motorways shares are now worthless, costing investors millions.<sup>[10]</sup>

## Design

The motorway is designed to alleviate [traffic congestion](#) in the rapidly growing city, especially in Brisbane's congested [central business district](#) and [Fortitude Valley](#).<sup>[11]</sup> The major benefit of the 6.8 km (4.2 mi) [toll road](#) is that it bypasses 24 existing sets of [traffic lights](#), potentially saving 15 minutes of travel time and provide an additional [Brisbane River](#) crossing. The concrete road includes 4.8 km (3.0 mi) of [tunnel](#) and 18 bridges.<sup>[12]</sup> The Clem7 provides two lanes of traffic in each direction via parallel tubes.<sup>[13]</sup> There are 41 cross-passages that are spaced every 120 metres (390 ft) along the entire length of the tunnel which can be used in emergency situations.<sup>[13]</sup> Access to the tunnel from the southern end is via Shaftson Avenue, [Ipswich Road](#) and the [Pacific Motorway](#).<sup>[12]</sup> Northern connections include Lutwyche Road, the [Inner City Bypass](#) and the [Airport Link](#) tunnel<sup>[12]</sup> which is now under construction.



Tunnel under construction

The design includes a smoke reduction [ceiling](#) to rapidly draw out smoke in case of a fire or explosion.<sup>[14]</sup> The ventilation system incorporates 100 jet fans.<sup>[13]</sup> The tunnel has a standard speed limit of 80 km/h (50 mph)<sup>[5]</sup> and contains 165 emergency phones.<sup>[15]</sup> The Clem 7 is equipped with eight speed cameras. These comprise Queensland's highest concentration of fixed speed detection devices and have been justified as a way of reducing the potential for disastrous high speed tunnel crashes.<sup>[16]</sup> A [traffic control](#) centre staffed by 50 personnel continually monitors the tunnel using 250 cameras.<sup>[6][13]</sup>

Steel and aluminium [sculptures](#) at the tunnel entrances act as a transitional light filter. They were designed by architect John Ilett who also designed the colourful exhaust fume stacks.<sup>[17]</sup> The red and purple stacks were inspired by the colours of the [jacaranda](#) and [poinciana trees](#).<sup>[18]</sup> Included in the project's design are a series of urban enhancements such as parklands and road widening in adjacent suburbs.

## Tender process

The successful tenderer, [Rivercity Motorway](#) Limited, was announced by Brisbane Lord Mayor Campbell Newman on 27 April 2006, beating a bid by the [Brisconnections](#) consortium.<sup>[6]</sup> Contracts for the design and construction of the tunnel were given to [Leighton Contractors](#) and [Boulderstone/Bilfinger Berger](#) Joint Venture.<sup>[19][20]</sup> [Transurban](#) declined to place a tender because of [risk-return](#) factors.<sup>[21]</sup>

The losing bid by the [Brisconnections](#) consortium incorporated three lanes of traffic in each direction (as opposed to two lanes for the winning bid). With a price difference of A\$20 million the decision to build a two-lane tunnel was criticised in some circles as short-sighted.<sup>[6]</sup> [Brisconnections](#) did win the tender for the Airport Link with a similarly aggressive bid that requires almost double the traffic anticipated by government for the project to be successful.


One of the reasons for building the tunnel as a [public-private partnership](#) was that it should reduce Brisbane City Council's risks regarding the tunnel construction and operation. However, the public disclosure documents released by Rivercity Motorway indicate that there are still considerable uncosted risks left with Council. For example, a 10 m extension was required for the exhaust stack at the Woolloongabba end of the tunnel and the full cost was required to be borne by Brisbane City Council, not Rivercity Motorway.

## Public offering

The initial share offer was for shares at a cost of \$1.00 with 50% deferred for 12 months.<sup>[11]</sup> The shares were listed on the ASX at \$0.46, 8% below the offer price, and as of August 2010, have traded for as little as \$0.019 while dividends have been discontinued as of September 2008. The ASX issuer code for the Rivercity Motorway Group is RCY.

## Construction



 The boring machine dubbed Matilda

Construction commenced in September 2006.<sup>[22]</sup> At the start of the project it was the longest road tunnel being built in the country.<sup>[23]</sup> 3.5 million tonnes of excavated rock was removed from the tunnel by conveyor, stored in [silos](#) and taken away by truck.<sup>[22]</sup> During a typical weekday period more than 25 trucks per hour have been hauling removed soil and rock along [Kingsford Smith Drive](#) to an area near the [Brisbane Airport](#).<sup>[14]</sup>

During construction all 1,700 staff working on the project and all site visitors, who are inside the tunnel, could be located at any time using an [RFID](#) tagging system that transmits a person's location wirelessly.<sup>[24]</sup> The system was designed to monitor site access and asset location as well as to improve safety and efficiency in what is a high profile and potentially hazardous worksite.

Difficult drilling conditions, due to the very hard Brisbane Tuff rock that is found under inner Brisbane, were encountered and overcome. Both purpose-built, double-shield [boring](#) machines began on the northern end, with the first arriving in Brisbane in July 2007 and cutting commencing in December after testing was conducted.<sup>[6]</sup> At the time, the tunneling machines were the biggest in the world, weighing 4,000 tonnes and each being 250 m (820 ft) in length.<sup>[25]</sup> Each machine cost A\$50 million to build.<sup>[6]</sup> The boring machines of 12.34 m (40.5 ft) diameter each were built by the German firm [Herrenknecht](#) and can dig up to 20 m (66 ft) per day. When finished the boring machines will have placed 37,000 precast linings.<sup>[6]</sup> Smaller [roadheader](#) machines began from the southern end in February 2007.



 Tunnel entrance at Bowen Hills (Clem7 Community Open Day) with the toll gantry and transitional light filters above

As of September 2008, TBM 2 (named Florence) had reached Kangaroo Point on the southern side of the Brisbane River whereas TBM 1 (named Matilda), which began in March 2008, was still tunneling under the river. By this time bridges had reached the final construction stages at the Northern Portal and the

Morrissey Street bridge in Woolloongabba. In early December 2008, Florence had connected to the eastern entrance tunnels from Shafston Avenue.<sup>[23]</sup> By April 2009 the tunnel excavation was 85% complete.<sup>[26]</sup> Florence completed tunnelling work on 16 April 2009,<sup>[27]</sup> while Matilda completed tunneling work on 26 May 2009.

There was some controversy over the environmental hazards which may be caused by the construction phase and operation of the tunnels.<sup>[18]</sup> In March 2005, local residents protested construction plans primarily due to the expected [air pollution](#) from exhaust [ventilation](#) stacks.<sup>[28]</sup> One 43 m (141 ft) purple structure was built in Jurgens Street, Woolloongabba, another 36 m (118 ft) red stack was constructed in O'Connell Terrace, Bowen Hills.<sup>[18]</sup>

## CLEM7 Community Open Day

The CLEM7 Community Open Day took place on 28 February 2010. The Open Day commenced with a 10 km long Clem7 Tunnel Run through the entire length of the Clem Jones Tunnel. The electronically timed event was limited to 5,000 participants. The run started and finished at the Bowen Hills tunnel portal. Runners run through the tunnel twice, from Bowen Hills portal to the Woolloongabba portal, and back to Bowen Hills portal. Funds raised during the Tunnel Run will support the Royal Children's Hospital Foundation.<sup>[1]</sup> Following the Tunnel Run, the first public walk through the tunnel attracted 55,000 people.<sup>[29]</sup>

## Public transport

Starting on 22 March 2010, a new bus route has been operating through the tunnel at a cost of \$1.6 million. Route 77 links the suburbs of [Eight Mile Plains](#) and [Chernside](#), completing the 30 km (19 mi) cross-city journey in 39 minutes and operates every 15 minutes at peak times and 30 minutes off-peak.<sup>[30]</sup>

## Tolls

Toll collection is conducted by both an electronic tolling system using a tag fitted inside vehicles or by taking a photograph of [licence plates](#), avoiding the need for vehicles to slow or stop.<sup>[20]</sup> The [Go via](#) and FLOW Tolling systems are both utilised. The toll concession period is 45 years.<sup>[12]</sup>

A toll free period was in operation until 5 April 2010, followed by 5 weeks of reduced tolls.<sup>[32]</sup> Rivercity Motorway claims the toll is the lowest per kilometre compared with similar tunnels in Australia. An image processing fee of 47 cents is levied on vehicles without an e-tag, starting from 15 September 2010. The tolls are expected to increase on 1 January each year according with Brisbane CPI.<sup>[31]</sup> These toll rates are as expensive as the Sydney [Cross City Tunnel](#) which is Australia's most expensive toll road.<sup>[32]</sup>

Brisbane Mayor Cr Newman has been criticised over the tolling regime being inconsistent with his promises during the 2004 election. The promises included a tolling duration of 35 years, a toll of no more than \$2.00 and a total cost of \$1 billion.<sup>[33]</sup>

Due to lack of patronage, on 28 June 2010, River City Motorways announced reduced tolls of \$2.00 per car from 1 July 2010 until 15 November 2010, hoping to increase traffic.<sup>[34]</sup>

## Poor patronage

The Clem7 Tunnel was predicted by Rivercity Motorways to carry around 60,000 trips each day.<sup>[7][35]</sup> Without a toll an average of 59,000 vehicles used the tunnel but when the reduced toll was payable around 20,000 vehicles made a trip through the tunnel each day.<sup>[35]</sup> The lower traffic volumes resulted in the toll discount period being extended to 30 June 2010,<sup>[7]</sup> and again until September.<sup>[34]</sup> After the poor patronage figures were released Rivercity Motorway shares immediately dropped by one fifth of their value, and have

since declined to 0% of their initial value.<sup>[35]</sup> The peak of 27,000 vehicles was reached on 14 May 2010.<sup>[36]</sup> A new record of 34,705 vehicles was reached on 13 August 2010.<sup>[37]</sup> As of March 2011 the average volume of vehicles is just 28,000 per day, less than 50% of the predicted opening volume.<sup>[38]</sup> On 25 February 2011, Rivercity Motorways has been placed into receivership after being unable to pay interest on its debt.<sup>[39]</sup>

The traffic estimates produced for Rivercity Motorway by Maunsell include a two year ramp up period from opening at 60,000 to an annual average daily volume of 100,000 vehicles in 2012.<sup>[40]</sup> No ramp-up has occurred as of March 2011, and the actual volume of traffic (34,075 peak)<sup>[37]</sup> remains below the minimum opening value estimated by Maunsell. The Maunsell forecast then rises to 110,000 vehicles per day in 2014, and 135,000 in 2026. In contrast, traffic estimates produced as part of the Northern Link Supplementary EIS predict an average weekday traffic volume in the Clem7 tunnel of 70 900 vehicles in 2014, and 92,300 in 2026, if Northern Link is not built (over 30% less than the Maunsell estimates).<sup>[41]</sup> If Northern Link is built, these estimates for the Clem7 tunnel volumes fall further to 65,900 in 2014 and 82,000 in 2026 (40% less than the Maunsell estimates). In the most recent Rivercity Motorway Financial Report it was noted that "if traffic assumptions over the entire concession period differed to estimates by +/-5% then the value in use would be impacted by +/- \$99 million."<sup>[42]</sup>

After opening, the tunnel was found to save an average of 8 minutes travel time. During the toll free period, traffic on the Pacific Motorway, Captain Cook Bridge, inner-city bypass, and [Story Bridge](#), decreased by over 10%, while traffic on Lutwyche Road increased by over 20%. However after the toll was implemented, only the story bridge and innercity bypass showed a reduction (of around 5%) in traffic compared to before the tunnel was open.<sup>[43]</sup>