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# Swan River Crossings Project

## WELCOME, KAYA

### About the Project

The current Fremantle Traffic Bridge was opened in 1939 as a temporary structure and has served its function well.

The bridge's structure has been deteriorating over a number of years, and despite extensive strengthening and maintenance works (including a highly disruptive closure in 2016), the bridge needs to be replaced.

- The bridge currently carries 23,000 vehicles a day and at peak times is congested. If it were closed or reduced to a single lane in each direction, the traffic queues and congestion would impact the entire surrounding local Fremantle road network.
- There is also pressure on the current rail bridge. The State Government freight rail subsidy is moving more freight to rail and an additional passenger rail bridge will improve services for the community and industry.
- The path for cyclists and pedestrians on the current bridge is narrow and in poor condition.
- The Swan River Crossings project will replace the Fremantle Traffic Bridge however the solution needs to consider road users, passenger and freight rail, services, river vessels and pedestrian and cycling connectivity across the Swan River.

# Project Background and Project Scope

## When did this project commence?

The project commenced in October 2019.

## Where will project funding come from?

The State and Federal Governments have committed a combined \$230m (50/50).

## What are the key project stages?

The project has two key stages. Stage 1 which involves the initial project scoping phase, with constraints considerations, a first round of community consultation and heritage and urban landscape design priorities (**Current Stage**).

Stage 2 will commence in early 2021 and will involve the refinement and finalisation of the design and commencement of construction towards the start of 2022, subject to statutory approvals.

## When will key stakeholders and community be involved?

August to September 2020 in Stage 1 and July to September 2021 in Stage 2. See diagram of the project timeline below.

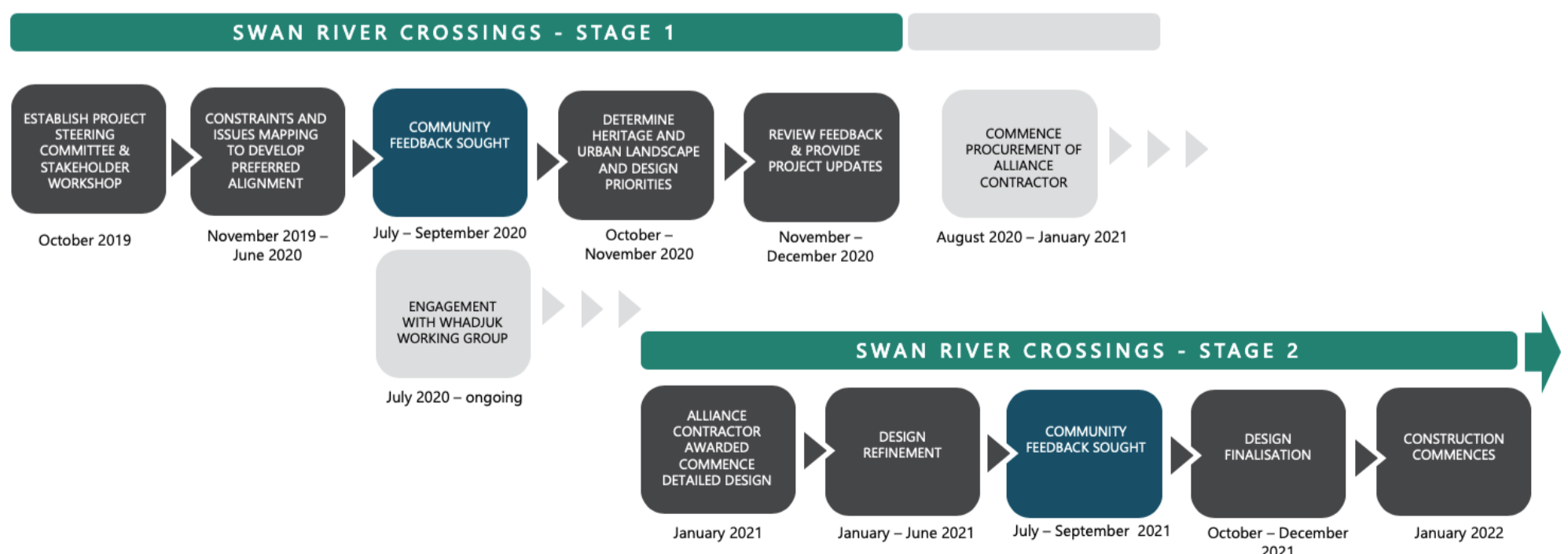
## What are the Project Objectives?

- Replace Fremantle Traffic Bridge
- Increase freight rail and passenger rail capacity, efficiency and productivity
- Improve pedestrian and cycling connectivity over the Swan River and to North Fremantle Station
- Maximise sustainability through economic, social and environmental responsibility. Improve amenity and sense of place for the community, tourists and road users
- Create value through provision of affordable infrastructure

## How will the project be delivered?

Main Roads will be partnering with design and construction contractors, and others, to deliver the project as an Alliance team. The procurement process is already underway with an Alliance Contract to be in place in early 2021. The Alliance responsibilities will include:

- Undertaking outstanding investigations
- Undertaking outstanding approvals
- Continuing the design development
- Continuing the community and stakeholder consultation
- Undertaking project construction





# Project Background and Project Scope

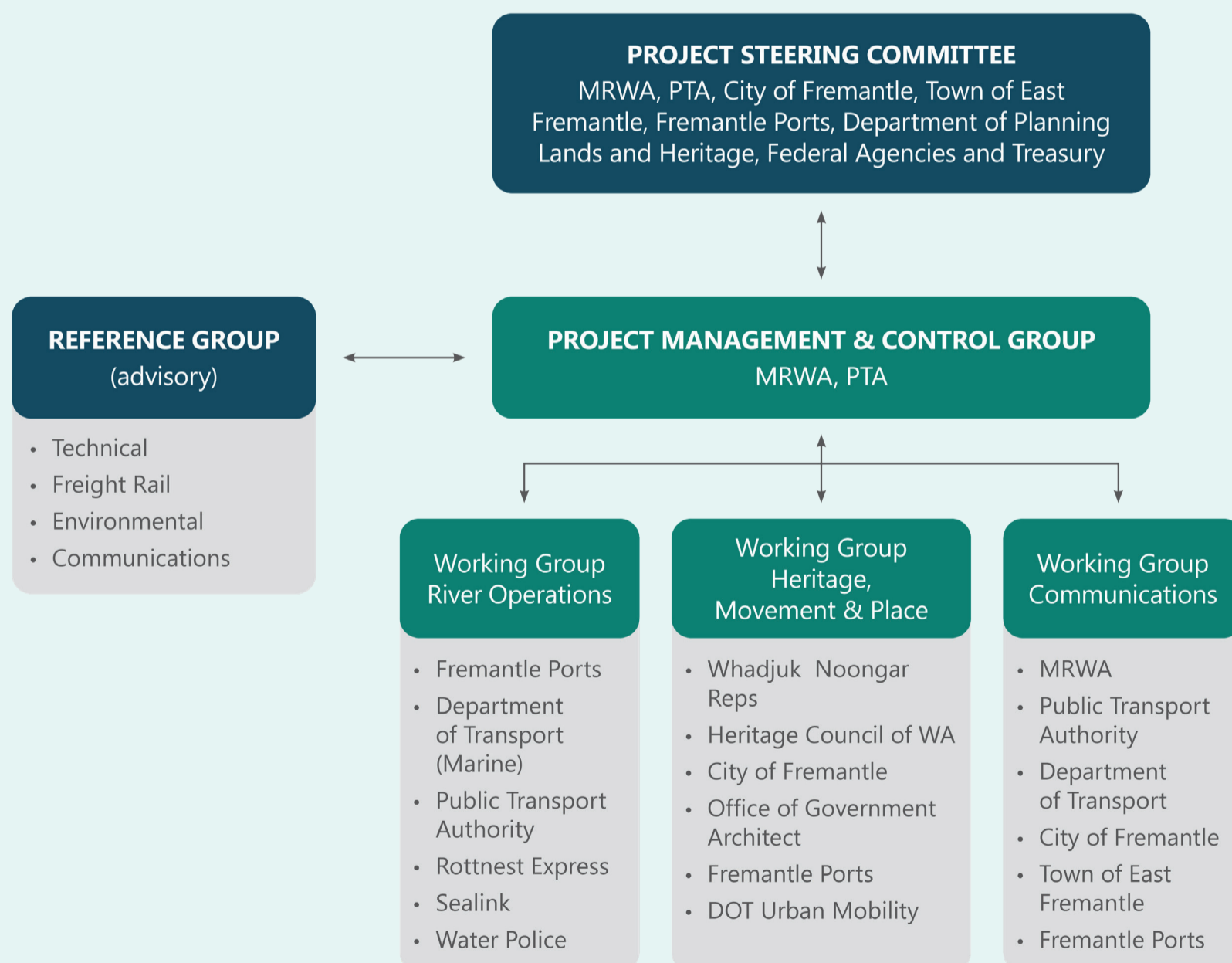
## Who has been involved?

Main Roads as the governments project lead has been engaging with a range of government and non-government stakeholders including:

- Public Transport Authority;
- Fremantle Ports;
- Department of Planning Lands and Heritage;
- City of Fremantle;
- Town of East Fremantle;
- Whadjuk Noongar Representatives;
- Office of the Government Architect;
- Department Transport marine, freight and active transport (cycling and walking) teams.
- Various stakeholder representatives.

## How are key stakeholders getting involved?

A project steering committee was established to ensure all key stakeholders and project partners are part of the decision-making group. Further a number of working groups have been established and have commenced meeting to ensure all interests are being explored.



Role: Inform scope, represent interest groups, identify project matters for resolution

# Project Considerations

## Why can't we restore the current traffic bridge?

- The Fremantle Traffic Bridge was opened in 1939 as a temporary structure (it is the fourth built at this site) and, has served its function.
- The bridge's structure has been deteriorating significantly over a number of years and despite extensive strengthening and maintenance works (including a highly disruptive closure in 2016) the bridge needs further costly maintenance works.
- The bridge has many substandard features that are unsafe and do not meet current bridge standards, e.g. narrow navigation widths and scouring of the riverbed. Restoration will not remove these substandard features.
- Due to its significant age, it would unfortunately be unsafe and not economically viable to retain the bridge. Main Roads has been in discussions with the City of Fremantle to retain a portion of the existing traffic bridge on the southern embankment for potential future activation opportunities.

## Can we build a new crossing between the existing bridges?

That was our starting point but when we took into account the above constraints, we found:

- **Space:** Unfortunately there is insufficient room. There is only 30 metres between the two current bridges on the northern embankment – we need to construct a new rail bridge, a new road bridge and a path for bike riders and pedestrians.
- **Traffic impacts:** Building in between the existing bridges would need us to demolish the traffic bridge immediately shifting 23,000 vehicles a day to the Stirling Bridge. The impact would gridlock the Stirling Bridge and local roads in North Fremantle, limiting access into Fremantle for locals, visitors and tourists.
- **Remnant bridge:** We committed to retaining part of the existing bridge, so we must have space to do that.

## Costs

The new bridges will reduce maintenance costs and address the significant deficiencies of the existing bridge structure.

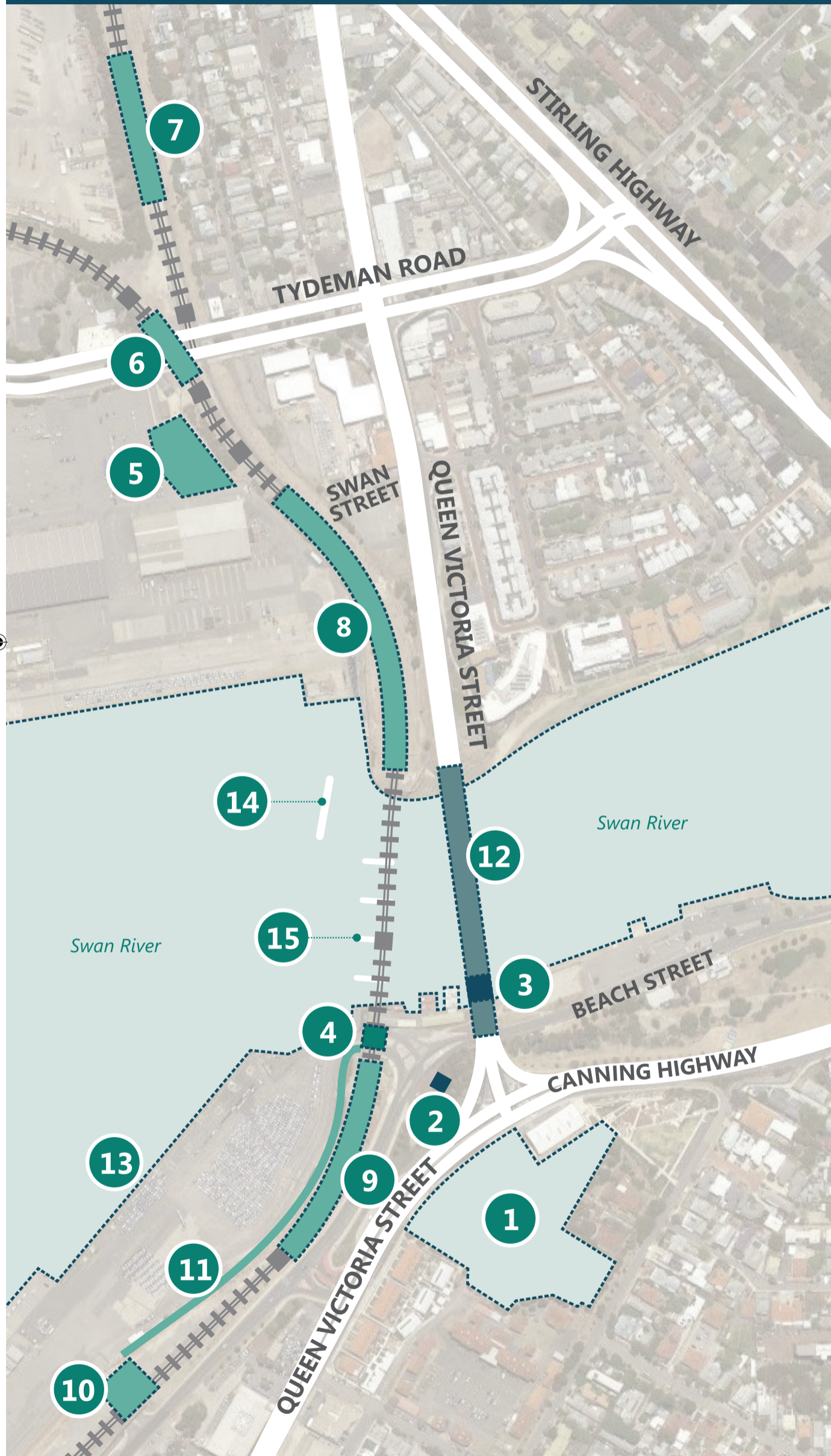
- Main Roads has spent \$23.5 million in repairs to the bridge over the last five years.
- Given the current riverbed erosion and timber deck failure issues, a further \$44 million would be required to repair and maintain the bridge to the current level of service in the foreseeable future. Keeping in mind the current level of service is sub-standard.

## What is scouring?

Simply put, scour is the engineering term for the erosion of soil surrounding a bridge foundation (piers and abutments). Bridge scour occurs when fast-moving water around a bridge removes sediment from around the bridge foundation, leaving behind scour holes. These holes, in turn, can seriously compromise the bridge's integrity.



# Considerations



## Considerations

1. Cantonment Hill (Environmental)
2. Ferry Capstan Base (Heritage)
3. Remnants of existing Fremantle Traffic Bridge to be maintained (Heritage)
4. Gate 3 Fremantle Port access (Port)
5. Western power Sub-station (Rail)
6. Freight rail bridge over Tydemans Road (Rail)
7. Freight rail bridge over 878-A/B (Rail)
8. Northern rail embankment widening (Rail)
9. Southern rail embankment widening (Rail)
10. Peter Hughes Drive Bridge (Rail)
11. Port fencing at bottom of embankment (Rail)
12. Existing Fremantle Traffic Bridge to retain minimum two lanes throughout construction (Road)
13. Berth J Victoria Quay (Navigation)
14. Rock Mound (Navigation)
15. Pier protection dolphins (Navigation)

## Legend

- Environmental Considerations
- Heritage Considerations
- Port Considerations
- Rail Considerations
- Road Considerations





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# Current Update – Preferred Alignment

## Summary of Considerations and Opportunities

Gateway potential for Fremantle announcing entry into the Port City

Opportunity to recognise in the design stages both Historic and Aboriginal stories

Need to address significant safety/navigation issues for boats, and marine life under existing bridges

Recognise proximate Port operations and ship movements

Retain portion of the existing traffic bridge, opportunity for focused place activation

Proximity to Cantonment Hill and protect the Heritage Listed Ferry Capstan

Connect PSP to network and improve pedestrian connectivity

Need to keep existing road and rail bridges operational during construction

Opportunities to improve community spaces and connections

### What investigations have been undertaken so far?

- Identify site considerations, constraints and key stakeholder issues and priorities
- Identify any fatal flaws
- Alignment options have been explored and assessed with the Steering Committee
- A preferred alignment has been established
- Explored Conceptual rail design (Signals, Civil, Structures and Communications)
- Commenced Historic and Aboriginal research
- Commenced Urban Design investigations
- Undertaken road, rail, cycling and vessel space proofing investigations





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# History

## Where it all began...

### 50,000+ years

Noongar people lived in the South West for at least 50,000 years prior to British colonisation. Walyalup was a place of ceremonies, significant cultural practices, and trading between groups. There was a prominent limestone and sand bar at the river mouth where Whadjuk crossed the Derbal Yerrigan (Swan River) between Mooro (Yellagonga's territory) on the north side and Beeliar (Midgegooroo's territory) on the south side.

### Colonisation 1829

The Swan River Colony relied on river transport and early ferry services operated from Preston Point (East Fremantle) across to Minim Cove (Mosman Park), and from Willis Point (Fremantle) to Lukin's Jetty (North Fremantle). Ferry service commenced from base of Cantonment Hill c1835.

### 1849

The traditional Whadjuk river crossing limestone bar across the river mouth was blasted to create a deeper channel for vessels entering the harbour.

### 1850

Convicts were imported to the Swan River Colony. Their labour improved roads and bridges. People and goods were still conveyed across the river at Fremantle using ferry boats worked by convicts and utilising tow ropes. This is thought to be the original of the Ferry Capstan base.

### 1866

North Fremantle Bridge was the first timber road bridge, built by convicts. Nicknamed the Bridge of Sticks/Styx.

### 1939

New Fremantle Traffic Bridge built. Designed by E. W. (Ernie) Godfrey, Main Roads Bridge Engineer from 1928-1957. Intended to last around 40 years. Built on the same location and alignment as 1898 Low Level bridge.

### 1909

High Level bridge flattened to accommodate a tram link to North Fremantle. Low Level bridge mostly demolished (last remnants demolished 1920).

### 1898

Second bridge constructed alongside the North Fremantle Bridge which was built wider, stronger, lower, known as Low Level bridge. 1866 bridge known as High Level bridge. High Level bridge only for pedestrians.

### 1890s

Gold boom and population increase put pressure on the bridge. Traffic loads reduced as North Fremantle Bridge considered unsafe. New Fremantle Inner Harbour works involved dredging the river, further removing the limestone and sand bars and reclaiming the river foreshores.

### 1881

Guildford to Fremantle railway opened. The original Fremantle railway bridge located downstream of the current bridge.

### WWII

Defence took control of Fremantle Harbour Including works and security.

### 1947

The 1866 bridge was demolished between December 1947 and May 1949. Series of wooden pylons and concrete pylon bases remain in situ on the northern riverbank, immediately adjacent to the upstream side of the current Fremantle Traffic Bridge.

### 1950s

Steel and concrete became preferred material for bridges. Standard designs were adopted across the state, using precast, pre-stressed concrete units and in situ concrete topping.

### 1964

Standardisation of railway gauges resulted in need for a new rail bridge. Original 1881 rail bridge demolished 1967.

### 1980s and 1990s

Strengthening and remedial works and replacement of timber piles in attempt to improve life span of bridge.



# Aboriginal Stories

## What do we know so far...?

The project team have commenced engaging with representatives of the Whadjuk Working Party, some of the stories that are emerging that will help shape the design are as follows. This process is on-going.

### Themes

- The river and the land provides for people and we care for it in return.
- The land and river nurtures, provides food, a place to live, and materials.
- Walyalup and the Derbal Yerrigan are significant to Whadjuk.
- The river divides the Mooro and Beeliar (North and South)
- The place has been a crossing point between north and south for thousands of years.

### Emerging Stories

- Woorriji, keeper of the crossing
- The Waugal and the crocodile
- Music
- Flora and fauna
- Orchestra of nature
- Neutral meeting and trading place
- Sandbar crossing







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# Historic Stories

## What do we know so far...?

This 1844 map shows that the original landform at the river mouth and the entry to the river had sand bars that allowed for Whadjuk to cross the river. It also shows the location of the first jetties where ferries would operate to transport people and goods across and up the river in the Swan River Colony. There was a ferry service from a location at Willis Point (sometimes also marked as Ferry Point), and across to Lionel Lukin's property in North Fremantle, where there was a jetty at the bottom of Water Street. From c1835 it was decided to close that ferry point and open a new one below Cantonment Hill.

Convict labour was used after 1850 to haul ferries using tow ropes, which is the possible origin of the Ferry Capstan base that remains today.

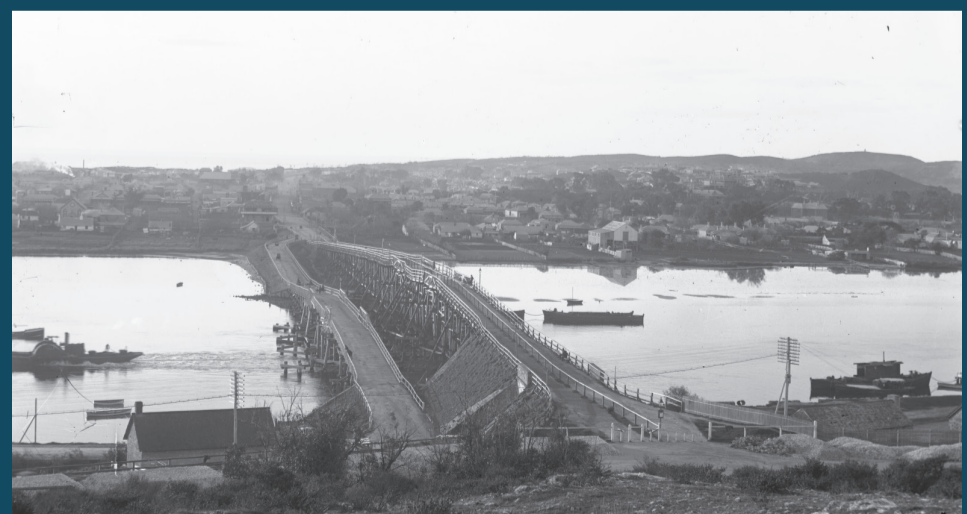
(Source: State Records Office, Cons 3868/126)



In 1892 traffic loads were reduced as North Fremantle Bridge was considered unsafe. In October 1897 construction began on a temporary second bridge downriver alongside it. The new bridge was wider, stronger and lower and was known as the low level bridge. The North Fremantle Bridge then became known as the high level bridge. It was closed to all except pedestrian traffic.

The North Fremantle Bridge, called the 'Bridge of Sticks' due to the abundance of timber, was built in 1866 using convict labour. It was a camel-back structure to permit sailing lighters to pass under it. At the navigation spans, the bridge was 42 ft above high water level. It had 319 timber piles and at the navigation spans the superstructure was stiffened with two Queen Post trusses projecting above the deck on each side of the bridge. This was the standard type of construction used in the Colony at this time and had been employed on both the Causeway Bridge and Du Cane's bridge at Guildford. This bridge was only suitable for foot traffic and small light horse drawn carts and buggies.

This photo shows a rowing regatta taking place on the river at the base of the bridge. (Source: SLWA 230747PD)







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# Historic Stories



Keeping both bridges proved fortuitous when in 1908, the Fremantle and North Fremantle Municipal Councils wanted to extend the existing Fremantle tramway system to North Fremantle. This could not be achieved with the Low Level bridge, which was found to be at the wrong level with an awkward approach. An inspection was carried out on and under the old high level bridge and it was found to be in not such a bad condition after all. The newly levelled bridge was adapted and widened to suit the tramway and road traffic and reopened in June 1909. The low level bridge was removed, except for a section on the north side kept as a landing stage for fishing.

By the 1930s the current bridge was increasingly unstable and dangerous. The speed of trams had to be limited and eventually the government decided to build a new bridge. Main Roads estimated that a new reinforced concrete bridge would cost £650,000 and take three years to build. It was simply unaffordable for a state that has experienced severe financial depression when a timber bridge could be constructed for about £78,000. During the Depression, to assist employment in the timber industry, timber bridge construction had become universal, and there were standard designs used across the State.



## The crossing has a long history

Fremantle Traffic Bridge (1939) & Ferry Capstan Base, comprising a four lane vehicular and pedestrian, traffic bridge (1939) constructed of timber, concrete and steel, and a limestone capstan base (date unknown) has cultural heritage significance for the following reasons:

- The place is a distinctive landmark, which collectively marks the crossing of the Swan River between Fremantle and North Fremantle and the transition from the Swan River to Fremantle Harbour;
- The Fremantle Traffic Bridge (1939) is located at a site which has been a river crossing point since 1866, when an earlier bridge was built during the convict era;
- The Fremantle Traffic Bridge (1939) is at the site of an 1898 bridge, associated with the development of Fremantle Harbour and the expansion of public works in Western Australia in the Gold Boom of the 1890s;

- The capstan base is rare as an uncommon structure demonstrating the function of hauling river vessels, which is no longer practiced;
- The Fremantle Traffic Bridge (1939) demonstrates the continued use of timber in bridge building in Western Australia into the 1930s, when its cost was low, relative to other materials, and its qualities well understood; and,
- The Fremantle Traffic Bridge (1939) was designed by engineer E.W. (Ernie) Godfrey, who was in charge of the Bridge Section of Main Roads from 1928 until his retirement in 1957, and was responsible for the design of all the bridges built in Western Australia in this period, and construction of major ones.

*Heritage Council of WA extract from Statement of Significance*





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# Key areas of design focus



## Character & Heritage

Walyalup has a rich history of Aboriginal connection and stories that will help shape design and place making outcomes.

The current heritage value of the bridge can also inform its character and make it an important landmark for its users.



## Connectivity

We aim to increase connectivity between not only vehicles (marine and road) but also pedestrians and cyclists.

There is also a strong history of connection between both sides of the river.

How can we improve your experience and what are your priority areas that will inform a future design?



## Sense of Place

This location has been a significant point of crossing.

The focus on quality of place in our investigations also relates to identifying dwell zones, transition zones, what makes the place special to its users and what aspects of place can we enhance in our future design?