ENGINEERS AUSTRALIA

ENGINEERING HERITAGE VICTORIA

HERITAGE RECOGNITION PROGRAM

Nomination Document

for the

SALE SWING BRIDGE

October 2009

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Heritage Award Nomination Form

The Administrator
Engineering Heritage Australia
Engineers Australia
Engineering House
11 National Circuit
BARTON ACT 2600

Name of work: **SALE SWING BRIDGE**
Previously known as the La Trobe Bridge.

The above-mentioned work is nominated to be awarded an Engineering Heritage National Landmark

Location, including address and map grid reference if a fixed work: **Just off the South Gippsland Highway (A440) near the confluence of the Thompson and Latrobe Rivers 4.5 km south of Sale and 1.5 km north of Longford. The A440 was previously known as the Port Albert Road. See Attachment 1**

VICROADS Map 99 reference C4.

Longitude and Latitude from Google Maps:

38°08'46.72"S, 147°05'12.88" E

Owner (name & address): **Wellington Shire Council, Port of Sale Civic Centre, 70 Foster Street, Sale 3850 Victoria Australia. PO Box 506 Sale Victoria 3850 Australia**

The owner has been advised of this nomination and a letter of agreement is attached:
A scanned copy of the letter from Wellington Shire council follows.

Access to site: **From the South Gippsland Highway separate access roads lead to both the north and south ends of the bridge. The bridge is now limited to pedestrian traffic. Each access road is approximately 500 m in length and comes off the western side of the A440 then under the A440 (access to north bank) and the eastern side of the A440 (access to south bank).**

Nominating Body: **Engineering Heritage Victoria**

David Beauchamp
Chair
Engineering Heritage Victoria
15 October 2009

WELLINGTON
SHIRE COUNCIL

29 September 2009

Mr Owen Peake
Engineers Australia
4 Islington Street
COLLINGWOOD VIC 3066

Dear Owen

SALE SWING BRIDGE – BRIDGE NUMBER SN3190 REQUEST TO RECOGNISE THE BRIDGE AND ATTACH A MARKER TO THE STRUCTURE

I refer to your correspondence of 17th September 2009 seeking Council's comments in relation to the nomination of the Swing Bridge for heritage recognition by Engineers Australia, I wish to advise as follows.

Council offers no objection to the nomination for proposed inclusion of the Swing Bridge as part of the Engineering Australia Heritage Recognition Program. I also wish to advise that no objection is raised to the fixing of a recognition marker to the bridge structure, generally as proposed in your correspondence.

In this regard, it is noted that discussions are in train with Council's Public Relations Office in relation to a suitable unveiling ceremony involving Wellington Shire Council and Engineers Australia.

It is noted, that the recognition of the Swing Bridge, is dependent on consideration of the nomination document by various parties and in this regard, I make the following comments.

Bridge Ownership.

- Page 4 and Page 6 - Heritage Nomination notes VicRoads as the owner of the bridge. This is incorrect, the ownership of the bridge was transferred from VicRoads to the Wellington Shire Council following completion of the restoration works referred to in the document.

Opening Times.

- Page 10 – Paragraph 4 of Section 1.18 states that the bridge is swung regularly on Saturdays at 3.00 pm and on Sundays at 4.00 pm and every second Wednesday of each month at 11.00 am. This is not strictly correct. For the record, current opening/closing times are as follows:
  - Saturdays and Sundays - the bridge opens at 3.00 pm and closes at 4.00 pm
  - Second Wednesday of each month - the bridge opens at 11.00 am and closes at 12.00 midday.
  - Other Times - the bridge is also opened / closed at other times by prior arrangement.

Please do not hesitate to contact Council's Manager Property Mr John Hirt if you have any queries in relation to this.

Yours faithfully

CHRIS HASTIE
Director Assets & Operations

Our Ref: JH:GC
Reply To: John Hirt

Definition of a Movable Bridge[1]

Movable Bridges which open, usually to allow the passage of vessels in a waterway, follow one of three general forms:

- **Bascule Bridge** "A counterpoise bridge which can be rotated in a vertical plane about axes at one or both ends. The roadway over the river rises while the counterpoise section descends into a pit. Also called a balance-bridge."

  This type of bridge has not been widely adopted in Australia.

- **Swing Bridge** "A type of movable bridge which is capable of moving through a quarter of a circle, about a vertical pivot, to allow of the passage of a vessel."

  This type of bridge has not been widely adopted in Australia but is the type of bridge nominated in this document.

- **Lift Bridge** "A type of movable bridge which is capable of being lifted bodily through a sufficient vertical distance to allow of the passage of a vessel beneath."

  This type is bridge has been widely adopted on inland waterways in Australia and particularly in the Murray Darling river system to allow the passage of paddle steamers.

[1] Chambers's Technical Dictionary

Heritage Assessment

1. Basic Data

1.1 Item Name:

Sale Swing Bridge

1.2 Other/Former Names:

Originally called the La Trobe Bridge

1.3 Location:

Just off the South Gippsland Highway (A440) near the confluence of the Thompson and Latrobe Rivers 4.5 km south of Sale and 1.5 km north of Longford. The A440 was previously known as the Port Albert Road. See Attachment 1.

VICROADS Map 99 reference C4.

Longitude and Latitude from Google Maps:

38°08'46.72"S, 147°05'12.88" E

1.4 Address:

See Location above.

1.5 Suburb/Nearest Town:

Sale 4.5 km, Longford 1.5 km

1.6 State:

Victoria

1.7 Local Government Area:

Wellington Shire Council

1.8 Owner:

Wellington Shire Council.

1.9 Current Use:

Tourist attraction and pedestrian bridge. Not in use as a road bridge, a new bridge has been built to carry the South Gippsland Highway upstream of the Swing Bridge.

1.10 Former Use:

Road bridge carrying the A440 South Gippsland Highway.

1.11 Designer:

John Grainger, architect and engineer from Melbourne.

1.12 Maker/Builder:

Peter Platt, builder from Sale

1.13 Year Started:

Site inspections and design commenced in 1880

1.14 Year Completed:

September 1883.

1.15 Physical Description:

The bridge consists of a swinging section rotating around a vertical axis in the centre of the river through 90 degrees from closed to fully open position. There are two fixed approach spans with their shore ends resting on brick abutments. The three spans are wrought iron lattice girders of half-through configuration with a timber deck with the timbers running parallel to the bridge length. The swing span is moved by two hand-operated cranking system located over the central pier. A portable hydraulic motor drive has been provided for operation since 2004. The width of the roadway on the bridge is 22 feet (6706 mm), originally designed to be a two lane bridge. See Attachment 2.

1.16 Physical Condition:

The bridge was fully restored in 2004.

1.17 Modifications and Dates:

The original criss-cross guard railing was removed at some stage and replaced by modern Armco safety barrier. This was in turn removed during the 2002-2004 restoration and the old criss-cross guard rail was replaced or a replica manufactured where some panels had been lost or damaged beyond repair.

Both abutment structures have been strengthened or rebuilt. Work was done on the Longford abutment (south) in 1936 and more substantial rebuilding of the north abutment in the 2002-2004 restoration.

The bridgekeepers cottage located near the north abutment was removed to Sale after the position of bridgekeeper was abolished in 1938.

1.18 Historical Notes:

Early Crossings

The first crossing in the vicinity of the Swing Bridge was a punt operated by James Aitken in 1843 and purchased by Andrew Gerrand in 1853. This operated about 1 km downstream from the present Swing Bridge location.[2]

A low-level fixed timber bridge was built in 1858 immediately below the confluence of the Latrobe and Thompson Rivers. This entailed the construction of causeways to high ground. The bridge operated as a toll bridge.[3]

Pressure for an Opening Bridge

The Victorian Government had been under pressure from Sale councillors for some time to build an opening bridge to replace the 1858 timber bridge.

The government abandoned a plan in 1872 to build a railway branch line from Sale to the Latrobe/Thompson River waterway in favour of the town's preference of taking the shipping facilities closer to Sale.[4]

There had been plans for some time to locate the main port in the Gippsland Lakes at Sale. Sale is on the Thompson River, above the fixed bridge. Plans to build a port at Sale could not therefore be implemented until an opening bridge was built. A canal to widen and deepen the Thompson River was eventually constructed and port facilities were built at the Port of Sale, close to the town centre. This work was, however not completed until some three years after the completion of the Swing Bridge.

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[2] Peter Synan, Story of the Swing Bridge, VicRoads 2006,ISBN 0-73119-131-5, page 9
[3] Ibid page 10
[4] Ibid page 11

The Port of Sale was not, as it turned out, very successful as a railway from Melbourne was completed at about the same time as the Port of Sale. Railway transport was more convenient, particularly as there were serious problems with the passage of vessels through the lake entrance from Bass Strait at what is now called Lakes Entrance.

In 1879 the Commissioner of Public Works invited competitive designs for a drawbridge over the Latrobe River in place of the fixed structure. The prize went to architect John Grainger and John Jenkins the town surveyor of Richmond. This design was for a 'rotating' rather than a 'lift' bridge.[5]

Grainger visited Sale in 1880 to inspect the site and placed his design on public view at the Sale Council Chambers. During construction Grainger moved to Sale and resided at the Victoria Hotel at Latrobe Wharf near the construction site.

Construction

The contract for the construction of the bridge was awarded to Peter Platt, an experienced local builder, member of the Sale Council and a previous Mayor of Sale.

An early difficulty encountered was the foundation conditions. Grainger had apparently under-estimated the depth of soft material at the site and excavation to a firm footing could not be achieved. Grainger and Platt overcame this problem by driving timber piles below the foundations.

The lattice structure of the swinging span (149 foot 10 inches [45.669 metre] long and weighing about 100 tonnes and the two approach spans (19 foot 6 inches [5.944 metre] were constructed of riveted wrought iron. The identity of the manufacturer is not known.

The castings for the bridge were made by Messrs Johnson & Company of the Tyne Foundry on the banks of the lower Yarra River in Melbourne and were delivered by schooner through the Gippsland Lakes directly to the bridge site.[6]

Opening

The bridge was opened in September 1883 with no public ceremony to mark the occasion. The earlier timber bridge alongside the Swing Bridge was then dismantled.

The first opening of the bridge was not until August 1885, almost three years after the bridge was completed. This was because the Sale Canal had not yet been excavated and the temporary wharf facilities at The Willows, above the Swing Bridge, had not been completed.

The first ship for which the Swing Bridge was opened was the *Tambo* bound for Melbourne with a load of red gum paving blocks for the Melbourne Tramway Company.[7]

Operation

The Swing Bridge was operated by a series of bridgekeepers from 1884 to 1938. The bridgekeepers were as follows:

- George Bailey 1884-1886
- James Flint 1886
- John Towner 1888-1891
- Eliza Ball 1891-1893
- John Towner 1893-1912

[5] Ibid page 11
[6] Ibid page 13
[7] Ibid page 14.

- Tom Kivlighon 1912-1938

The job of opening the bridge was of a part time nature and did not pay enough for those entrusted with the duties to survive without another job. Many of the bridgekeepers were also local publicans, and the two tasks seemed to be compatible. The long-serving Tom Kivlighon had a number of additional sources of income including at least tanning and leather work, road maintenance for the Country Roads Board and the manufacture of soft drinks.[8]

The bridge was only opened very occasionally after 1938 as described in the following extract from *Story of the Swing Bridge*:

"Since then, the bridge has only been opened very occasionally: 1953 when a dredge towed by the tug-boat *Avon* passed upstream to remove a tree which was blocking river traffic, 1963 for the *Tambo Lady* as part of the centenary celebrations of the Municipality of Sale, and in 1972 at the request of the Traralgon and District Historical Society. At the 1972 event, historyphiles were treated to recollections of growing up at the bridge from Brother Marcellin (Kivlighon), as well as a history of the bridge from Gippsland CRB Divisional Engineer, Bill Dolomore. 1972 would be the last public opening of the bridge for more than thirty years".[9]

Maintenance

No significant modifications appear to have been carried out on the bridge to date.

A number of items of major maintenance are listed:

- 1893 – Installation of wider rollers in the central pivot mechanism.
- 1902-3 – Rebuild of winch and new bearer plates.
- 1925 – Re-decking (timber)
- 1933 - Re-decking (timber)
- 1936 – Underpinning and repositioning of the Longford abutment.
- 1953 – Bridge deck strengthened and re-decked.
- 1980 – Installation of traffic lights.
- 1982 – All metal sand-blasted and repainted and timber deck replaced.

Bypassing the Swing Bridge

Traffic requirements of the late twentieth century eventually led to a plan to realign the South Gippsland Highway around the Swing Bridge. The requirements of the off-shore oil and gas industry, off the Gippsland coast, were highly instrumental in pressing this plan. The old bridge had done well but it was built in the days of bullock wagons and could not handle the loads of modern-day heavy trucks meeting the needs for heavy machinery for off-shore activities.

The solution, completed in 2002, was a new sweep of high-level highway with concrete bridges over both the Thompson and Latrobe Rivers and further bridging over the Long Waterhole at Longford. This work, upstream from the Swing Bridge, left the old bridge undisturbed but facilitated road access to both north and south banks. The Thompson River Bridge also provided 6.5 metres clearance over the water for craft using the Port of Sale.

[8] Ibid pages 14-21

[9] Ibid page 24

Major Refit of the Swing Bridge

As soon as the bypass of the A440 had been completed VicRoads commenced to repair the Swing Bridge.

The major work consisted of a complete rebuild of the northern abutment which had moved towards the river causing the bridge to be jammed in the road-open position for many years.

The criss-cross wrought iron balustrading had been removed some years before after repeated traffic damage. Amazingly the removed sections were found in the Morwell VicRoads Depot. Contractor Jarvis Norwood repaired or replaced the old balustrading. The mechanical components of the opening mechanism were repaired, or, in some cases, replaced and a trailer-mounted hydraulic pump and motor was built to remove the drudgery of opening and closing the bridge.

Re-decking, painting and other minor repairs were also carried out.

In 2004, with the refurbishment complete, Ann Synan, great-great-grand-daughter of Gatekeeper Eliza Ball swung the bridge by hand to demonstrate the completion of the work. Subsequently the portable hydraulic power unit is used for the regular swinging of the bridge.

At the end of the refurbishment the bridge was handed over by VicRoads to the ownership of Shire of Wellington to operate and maintain.

Current Operation of the Bridge

The bridge is now restricted to foot traffic and is swung regularly on Saturdays and Sundays, opening at 3pm and closing at 4 pm. Every second Wednesday of each month, the bridge opens at11am and closes at midday.

At other times the bridge can be opened and closed by prior agreement.

1.19 Heritage Listings:

1.19.1 Heritage Victoria Listing[10]:

Name: **Swing Bridge**

Title: **Heritage Place**

Number: **H1438**

1.19.2 Heritage Overlay:

The Sale Swing Bridge is identified as HO61 in the Heritage Overlay Schedule to the Shire of Wellington Planning Schemes.

1.19.3 National Trust of Australia (Victoria):

The Sale Swing Bridge was classified by the National Trust of Australia (Victoria) as a bridge of state significance on 15 October 1970. File number B2379. There are no statutory requirements as a consequence of this classification.

1.19.4 Register of the National Estate:

Not included.

[10] No date for this listing is available.

2. Assessment of Significance

2.1 Historical Significance:

The Swing Bridge held a central role in the Sale district from the time of its building until its closure in 2002. The East Gippsland area, of which Sale is generally regarded as the centre, has had a long history of being a transport hub and capital of East Gippsland. Original access to the area by Europeans was only via the sea primarily via Port Albert, 85 km south west of Sale by road. The Swing Bridge crossed the major river which stood in the way of this highway.

In the early days there was pressure for support facilities in the area for timber getting, mining and a growing pastoral industry. Later an attempt was made to open a sea transport link to the outside world via the Gippsland Lakes to the Port of Sale at the western extremity of the lake system. However the entrance to the lakes at Lakes Entrance was treacherous and not suitable for commercial shipping of any size. As demands for the development of a port as close to Sale as possible grew, the bridge over the Latrobe River on the road between Sale and Port Albert stood in the way of river traffic heading for Sale. The construction of a swing bridge to replace the previous fixed low-level bridge became a matter of priority.

Once a railway link from Melbourne to Sale was established the imperative for shipping links declined and eventually coastal shipping disappeared. Later a road link paralleled the rail link providing further options for transport between Melbourne and Sale.

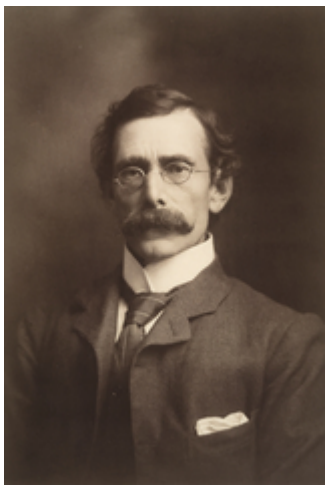
In more recent time oil and gas were discovered off the coast of East Gippsland and there was a need for much heavier loads on the road link as infrastructure for the oil and gas industry was developed. This led to the ultimate bypassing of the Swing Bridge by a new highway link with much greater load carrying capacity.

Hence the Swing Bridge was a factor in each of the development eras of the Sale area.

Refer to Historical Notes above.

2.2 Historic Individuals or Association:

2.2.1 John Grainger, Architect and Engineer



John Grainger was one of Australia's most prolific and successful architect/engineers during the period 1877 to 1912. His influence survives in South Australia, Western Australia and Victoria. A brilliant career was marred by ill-health; however he battled on until shortly before his untimely death in 1917. For reasons probably more to do with the social stigma of syphilis than his own financial mis-management he was buried in a pauper's grave in Box Hill Cemetery in Melbourne's east. But his legacy goes far beyond his tragic end. Every week millions of Melbournians wonder at the lasting beauty of his buildings and pass over the Yarra on Grainger's Princes Bridge which connects Swanston Street with the iconic St Kilda Road, creating one of the world's greatest cityscapes. Arguably his greatest engineering achievement, the Swing Bridge, is less demanding of public adulation, secluded amongst an idyllic river-flat landscape between the Port of Sale and Lake Wellington.

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John Henry Grainger (1854-1917) was born in England. He began his architectural training at fifteen, in the office of W E Wilson, of Dean's Yard, Westminster. In the mid-1870s, while still in Wilson's employ, Grainger travelled throughout continental Europe, visiting Spain, Italy and France. In February l877, he left Wilson's office and migrated to Australia to take up the position of Assistant Architect in the office of the Engineer-in-chief of South Australia. After less than eighteen months, Grainger resigned from this post to concentrate on his burgeoning private practice in Adelaide. - in partnership with local architect Mr Naish. In addition to winning the design competition for the Swing Bridge at Sale, the firm of Grainger & Naish also won first prize in the competition for the Frome Bridge in Adelaide, and designed the United Services Club Hotel and a church at Walkerville. Grainger also designed a house at Mount Barker for the prominent Adelaide businessman and philanthropist Robert Barr-Smith (1824-1915). The architect, however, was summarily dismissed after he somehow made a connection between the fresh water supply tank and the sewerage system, prompting his client to complain of this 'manifest violation of the first principles and of common sense'.

In I879, Grainger entered and won the design competition for the new Princes Bridge across the Yarra River, Melbourne. This became one of his most iconic works.

Princes Bridge, Melbourne about 1880

In October l880, he married Rosa Annie Aldridge (1861-1922) and they moved to Melbourne, where their only son, Percy, was born two years later. By that time, Grainger was working in partnership with local architect Charles D'Ebro (1850-1920). Over the next few years, the firm of Grainger & D'Ebro entered and won numerous other competitions, including those for the new Masonic Hall in Melbourne (1882), the Fremantle Town Hall (1882), the St Kilda Presbyterian Church (1882), the South Brisbane Drainage Scheme (1884), the Grace Park housing development in Hawthorn (l884), and the new Public Library and Art Gallery in Auckland (1884).

Charles D'Ebro left the partnership in l885 but Grainger continued to maintain an extensive practice, designing buildings in every colony in Australia: a flour mill in Port Adelaide, a brewery at Broken Hill, an Art Gallery at Maryborough, and the Independent Church at Launceston. Grainger's involvement with the Fremantle Town Hall resulted in further commissions for buildings there, including the local branch of the National Bank of Australia. This professional connection with Western Australia culminated in 1897 when he took over the position of Government Architect, Public Works Department from George Temple-Poole (1856-1934). During his eight-year tenure, Grainger was responsible for numerous buildings around Perth including the Supreme Court Building, the Claremont Teachers' Training College, and the Art Gallery and Police Buildings in Beaufort Street.

Towards the end of his tenure, Grainger was absent for extended periods due to syphilis, and probably alcoholism. During this time, the PWD was managed by Hillson Beasley, who finally succeeded Grainger as Government Architect in July 1905. Grainger returned to Melbourne in 1907, where, despite his illness, he entered into partnership with architects F A Kennedy and John Little - the latter being a former associate of Hillson Beasley in Perth. This new firm, Grainger, Kennedy & Little was responsible for a number of projects including major alterations to the Melbourne Town Hall (1907-1910), and a residence for Dame Nellie Melba, Coombe Cottage at Coldstream (l9l2).

Grainger's health deteriorated further, he became paralysed, and eventually died in 1917. His son, Percy, was by this time a successful pianist and composer. The architectural firm continued as Grainger, Little, Barlow & Hawkins (and later as just Barlow and Hawkins) until the 1930's.

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The University of Melbourne has a Grainger Museum dedicated to the memory of John and Percy Grainger. The Co-curator of the museum, Brian Allison, has written an essay about the life of John Grainger which expands on the above section. This work is reproduced in full at Attachment 3.

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John Grainger's unmarked grave is located at the Box Hill Cemetery in Melbourne's eastern suburbs. The grave has no headstone and it rather untidy. Engineering Heritage Victoria in association with the Grainger Museum at University of Melbourne is planning to have a headstone erected and to maintain the grave. It is hoped that this project will progress during 2010. A recent photograph of the grave follows.

It is hoped by some that when this work is done there will be a pictorial connection between Grainger and the two magnificent Victorian bridges which were the highlights of his engineering career – Princes Bridge and the Sale Swing Bridge.

John Grainger’s Grave, Box Hill Cemetery, Melbourne, taken in 2007

2.2.2 Peter Platt, Builder

Peter Platt, the builder of the Sale Swing Bridge, was born in Birmingham and migrated to Australia in 1852. He then settled in Gippsland where he had a long and colourful career.

Details of some of Platt's public building contracts between 1867 and l878 have recently come to light. Between 1868 and 1872 his name appears in a chronological index of PWD contractors for roads and bridges in the Sale district. The references include one for works on the Latrobe River, which may have related to renovations to the existing 1858 bridge. In 1873 he also was involved in work on the Bairnsdale and Sale courthouses.

Platt is also noted for a failed attempt at bridge building, when he was involved in the construction of the unsuccessful drawbridge across the Mitchell River at Baimsdale, which was completed in 1875. In 1877 and 1878 he also built the police quarters and station at Sale. He also built the Victoria Street Bridge at Studley Park in Melbourne.

Platt was an active member of the Sale Borough Council from the time of its inception, being one of seven members elected to the Council in September 1863. He continued as a Councillor until l888, having sat on Council for 24 of the first 25 years of its existence. He was also Mayor of Sale 'on three occasions', one of them during 1867. Platt's contracting work took him all over Gippsland, coupled with prolonged absences in Melbourne. This was

seen by the Borough Council as beneficial and he earned the nickname of the 'Agent General' of the district.

2.3 Creative or Technical Achievement:

The bridge was somewhat unusual in Australia where the majority of opening bridges were of the “lifting span” type, commonly associated with bridges on the Murray/Darling River system. There were, however many swing bridges built around the world so it can be presumed that Grainger was aware of other bridges of similar basic configuration.

The design of the bridge in detail proved to be very well thought-out and clearly survived for a very long time. Over the years it was subjected to higher loads but apparently suffered no damage from these.

The only technical problem of note appears to be the tendency of the bridge to jam at the jacking points at the four outer corners of the moveable span. This tendency might have been accentuated by small movements in the brick abutments towards the river which would have had the tendency to reduce the space between the ends of the moveable span and the river end of the approach spans.

Arguably the greatest technical innovation in the bridge was the jacking system which it incorporated. When the bridge was in the closed position and the jacks engaged the main swinging span ceased to be a cantilever structure and became a simple end-supported truss. This greatly reduced wear and tear on the structure and enabled it to withstand higher overloads, particularly later in its life. This feature is not known to have been incorporated in any swing bridges built prior to the Sale Swing Bridge.

The foundations at the site were obviously bad. The performance of the pier foundations supporting the central moveable span and the outer ends of the approach span appears to have been very good and no repair work has been done on these foundations after 126 years of service. The brick abutment foundations, on the other hand, appear to have been a major cause of problems. Both abutments had either reinforcing added or were replaced during the life of the bridge. In general, under the circumstances of the site conditions and the technologies available at the time, it can be said that the foundation performance has been creditable.

The materials selected for the bridge were, in most cases, very robust and long-lived. The wrought iron truss sections of the moveable span and the approach spans had inherent low vulnerability to corrosion even in marine environments. The cast iron, concrete filled piers were a very robust design with an almost infinite life expectancy.

Grainger achieved an elegant solution which was extremely fit-for-purpose, was aesthetically pleasing and proved to be extremely robust.

2.4 Research Potential:

The Swing Bridge has been well researched. The associated stories of the Sale Canal, transport generally in East Gippsland, development of shipping on the Gippsland Lakes in particular and the development of other industries in the area all appear to have been well researched. The overall impression is one of many stories meshed together.

The stories of individuals involved in the Story of the Swing Bridge have been well researched and provide a colourful picture of the times. The stories of the Bridgekeepers are particularly compelling and paint a strong picture of achievement against the odds.

No particular aspect of this story appears to emerge as requiring additional research.

2.5 Social:

The social stories surrounding the Swing Bridge are of great interest.

The Swing Bridge impacted on almost all aspects of society in Sale and district and on the activities which depended on transport through and around the Port of Sale.

The bridge was built, operated, maintained and used by locals. For much of its life it was the most important transport link in the Sale area.

2.6 Rarity:

In Victoria, the Swing Bridge is the last remaining bridge of its type although there are examples of other types of opening bridges. This contributes greatly to the claim of this bridge to be of State Significance.

Elsewhere in Australia there are five other swing bridges still in existence:

- Pyrmont Bridge, Darling Harbour, Sydney, NSW, opened in 1902 and closed to traffic in 1988 but still in use to carry pedestrians and a passenger monorail. This bridge was marked with a National Engineering Landmark plaque in June 1992.
- Glebe Island Bridge, Sydney, NSW, opened in 1901 and closed to traffic in 1995. This bridge was bypassed by the Anzac Bridge.
- Victoria Bridge, Townsville, Queensland, opened in 1914 and is still in use as a foot bridge. This bridge was marked with an Historic Engineering Marker in July 2004.
- Dunalley Bridge on the Dunalley Ship Canal, Dunalley, Tasmania, still in use.
- Victoria Dock, Sullivans Cove, Hobart, Tasmania, still in use. Originally built as a single lane bridge, the present structure was designed by the Marine Board in 1960 and the running gear was replaced in 1976, the rotation being achieved by mounting the bridge on a crane slew ring of 2130 mm pitch circle diameter.[11]

Internationally there are many swing bridges in existence. The following list of countries and number of bridges indicates the scale of surviving bridges:

- Argentina 1
- Belize 1
- Canada 14
- Egypt 1
- France 1
- Germany 1
- The Netherlands 1
- India 2
- Ireland 4
- Italy 1
- Latvia 1

[11] This bridge is featured in the Sullivans Cove Engineering Heritage Walk brochure produced by Engineering Heritage Committee of Engineers Australia, Tasmanian Division.

- New Zealand 1
- Spain[12] 1
- United Kingdom 18
- United States of America 50

All the swing bridges in Australia are road bridges however internationally the bridges are a mixture of road and rail. Some of these bridges are in service for their original purpose, or have a modified use such as the Sale Swing Bridge or are not in service. The total bridges listed worldwide is104.[13]

Remnants of other swing bridges are also known to exist.

2.7 Representativeness:

Fixed bridges with heritage values, of various types and materials are quite common throughout Australia. They represent one of the more obvious and visible examples of engineering heritage.

Moveable span bridges are far less common and can generally be divided into three sub-classes:

- Vertically lifting spans where the moveable span is lifted by cables and winches through a tower structure whilst remaining in a horizontal position. This type of bridge was quite common on inland waterways, particularly on the Murray/Darling system. Many bridges of this type survive.
- Drawbridges where the moveable span pivots at one or sometimes both ends into a vertical position when open. There are few examples of this type of bridge in Australia.
- Swing Bridges of the type seen at Sale where the central balanced span moves in a horizontal plane through ninety degrees to a position parallel with the waterway to allow shipping to pass. There are few examples of this type of bridge in Australia.

The Swing Bridge at Sale is therefore an example of a very specific design of moveable span bridge which in themselves is a small sub-set of all heritage bridges. It is therefore important as a representative of a small group of surviving bridges of this type.

2.8 Integrity/Intactness:

This bridge has been remarkably fortunate in several ways. It has been subject to very few modifications during its long life and it has been maintained in excellent condition right up to the present time with a major refit completed in 2004. It is therefore almost completely intact in its original form, apart from fairly routine maintenance over its life such as the routine replacement of decking timbers. Its integrity has been largely maintained and, in fact improved, in some areas. The reinstatement of long-lost balustrade panels in 2004 is an excellent example of the maintenance of the integrity of the bridge.

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[12] This bridge is a modern double-opening bridge in the Port of Valencia

[13] The data on swing bridges comes from Wikipedia under the search term Swing Bridge.

Under the present management and maintenance arrangements there is no reason to suspect that this situation will change. There appear to be no significant dangers to the integrity of the bridge nor are there any contentious maintenance issues for the bridge considering its present function as a pedestrian bridge.

2.9 Statement of Significance:

Two Statements of Significance follow:

The first, written by the author, recognises the great significance of the designer, John Grainger, and also the care and attention which has been lavished on the bridge in recent times, resulting in it being still fully operational and demonstrated on a regular basis without any compromise to its heritage fabric:

The Sale Swing Bridge is arguably the greatest engineering work of the renowned Australian architect and civil engineer John Grainger. Grainger, most famous for his buildings, was also a skilled civil engineer. The condition of the bridge after 126 years of service is a testament to Grainger's engineering skills. Grainger has not received proper recognition of his great contribution to the fabric of Australia's built environment and recognition of the Sale Swing Bridge goes some way to redressing this.

The bridge was erected in 1880-1883 by Peter Platt, a local contractor under Grainger's supervision. It is supported on a combination of cast iron, concrete-filled piers and brick abutments. The bridge structure consists of the swinging span plus two short approach spans constructed of wrought iron half-through lattice girders with a timber deck.

The use of swing bridges in Australia has been limited and this bridge is the oldest such bridge and one of only a very small number remaining in Australia.

Sale Swing Bridge was pivotal to the development of East Gippsland.

The bridge was restored back to as-new condition by VicRoads in 2004. This work was of a very high standard and is a great credit to VicRoads.

The bridge is now in fully operational and is opened and closed on a regular basis by Wellington Shire Council which has now taken over operation and maintenance of the bridge. The site is well maintained and excellent interpretation is provided.

The second appears on the Victorian Heritage Register Database:

Heritage Victoria Register Database.

"What is Significant?

The Swing Bridge, located over the Latrobe River approximately 5 km south of Sale on the South Gippsland Highway, was erected in 1880-1883 by Peter Platt, contractor, and designed by John Grainger, architect and civil engineer, who later designed Princes Bridge in Melbourne (1886) and was the father of Percy Grainger, the famous Australian composer. Prior to the construction of the Swing Bridge, a punt provided a means of crossing here from 1842, and a timber bridge was constructed on the site in 1857. However, the construction of the Sale Canal upstream (completed in 1888) necessitated the construction of the Swing Bridge, to enable river transport to proceed to the Port of Sale.

The bridge is an elegant wrought iron trussed structure, supporting a timber decked roadway. It is approximately 61 metres in overall length, with a balanced swing span of approximately 45 metres, revolving on a central pier through a hand operated winding mechanism. The central swing span, when in the open position, provided two openings 19.2 metres clear for river traffic. Brick abutments support the fixed approach timber decking.

The Bridge facilitated development of the Port of Sale and a regular steamer service operated up the canal for many years (1885-1920) with connections to Melbourne and the Gippsland Lakes. The Bridge was re-decked in 1933 and the structure strengthened in 1953.

Movements in foundations of the Bridge jammed the swinging mechanism making it impractical to open. It was last opened in 1966 when the *Tambo Express* made two visits to Sale, but has been permanently closed since 1970 due to the placement of continuous decking across the swing span and approaches.

How is it Significant?

The Swing Bridge is of architectural and historical significance to the State of Victoria.

Why is it Significant?

The Swing Bridge is historically significant as possibly the oldest bridge of its type in Australia. Its construction was pivotal in the development and expansion of road and river transport in Gippsland, and confirmed the Port of Sale's place as the centre of shipping activity in the region. The Bridge was designed and built entirely in Victoria and made an important contribution to development of engineering in the state.

The Swing Bridge is architecturally significant as the only bridge of its type in Victoria, with few others of this type and degree of sophistication elsewhere in Australia".

This statement has minor differences to the data presented elsewhere in this nomination document. The most unfortunate deficiency with the statement is, however, its reference to "architectural" merit with minimal reference to engineering merit despite that fact that the bridge is entirely of an engineering work.

2.10 Area of Significance: State

3. Marking and Interpretation:

This site is already extraordinarily well endowed with interpretation signs.

Seven large interpretation signs are located in a row close to the bridge on the southern side covering the following subjects:

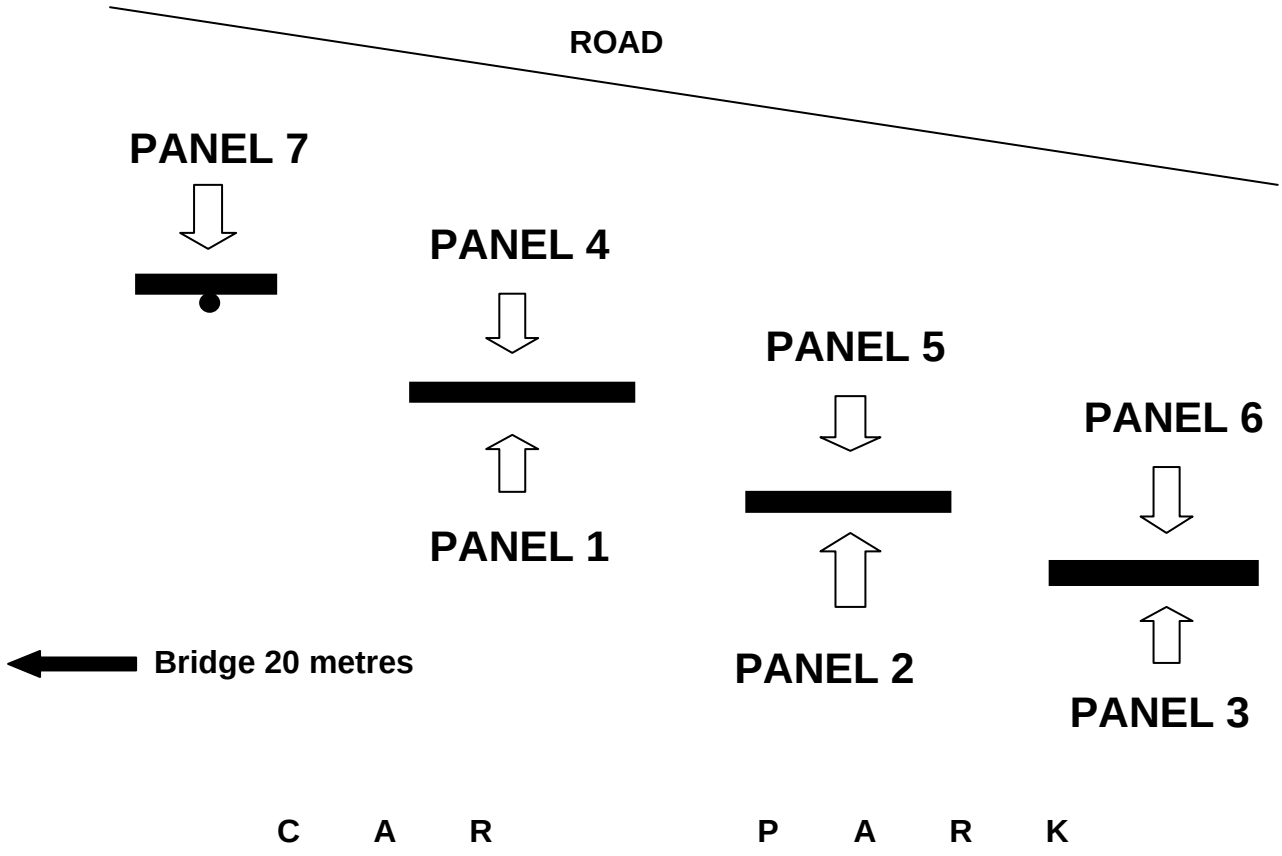
- Panel 1 – Sale Common State Game Refuge
  - Plants and Wildlife
  - Caring for the Environment
- Panel 2 – Restoration of the Swing Bridge
  - Structural Assessment of the Central Pier
- Panel 3 - Restoration of the Swing Bridge
  - Planning the Restoration
  - Reconstruction of the Sale Abutment
  - Swing Mechanism Repairs
- Panel 4 - Sale Common State Game Refuge
  - Sale Common Management
  - Location and Access (including map)
  - From Past to Present
  - Things to See and Do
  - Panoramic Views
  - A Bird's Eye View
  - What is a Wetland
- Panel 5 - Restoration of the Swing Bridge
  - History of the Swing Bridge (including designer and builder)
  - Historical Facts and Figures
- Panel 6 - Restoration of the Swing Bridge
  - Re-decking, Painting and Balustrade Panels
  - Finishing touches
- Panel 7 - Restoration of the Swing Bridge
  - Major Contractors and Suppliers

Photographs of each of these Interpretation Panels are located in Attachment 3.

Each of plates 1 to 6 is approximately 2000mm wide by 3000mm high constructed of aluminium plate with the artwork applied by photographic printing. These panels are mounted in 75mm Rolled Hollow Section frames set in concrete foundations with the bottom edge of the panels approximately 600mm from the ground. There is a photograph of the group of signs from the Car Park (Panels 1, 2 and 3) in Attachment 3.

Panel 7 is of different format but the same construction and faces the south. It is smaller and is mounted on a single 50mm steel post without a frame

The location of these signs is as shown in the following sketch:



There is also a bronze cast plaque commemorating the centenary of the Swing Bridge mounted high on the western face of the southern abutment brickwork. This carries the following wording:

1883 THE SWING BRIDGE 1983

THIS PLAQUE WAS UNVEILED ON 25 SEPTEMBER 1983 BY

Mr T H RUSSELL

CHAIRMAN AND MANAGING DIRECTOR OF THE

ROAD CONSTRUCTION AUTHORITY

IT COMMEMORATES THE CENTENARY OF

THE SWING BRIDGE OVER THE LATROBE RIVER

CR. T.P. SYNAN J.P.
MAYOR
CITY OF SALE

CR. J. ANDERSON A.M. J.P.
CHAIRMAN
SHIRE OF ROSEDALE

It is proposed that Engineers Australia mark the site as follows:

- Place a 300 mm diameter standard vitreous enamel–on-steel Engineering Heritage National Landmark/Engineering Heritage Marker, as approved, on the south-western abutment wing wall to the right of, and below the existing plaque. A photograph of the western side of the abutment wing wall with the proposed location of the marker is at Attachment 3. Note that the ground rises steeply to this wall so that although it is only 700 mm from ground level at the face of the wall it is at a comfortable viewing height from several metres away from the wall.
- In this particular case it would be appropriate to have the year of the EA marking included on the marker if possible.
- Not erect any additional Interpretation Panels as the site is already well catered for and further panels would be repetitive and probably unacceptable to the Shire of Wellington. Photographs of all the Interpretation Panels are at Attachment 4.

4. References:

- C F Tweney, L E C Hughes, *Chambers's Technical Dictionary,* W & R Chambers, Limited, London, 1954 Reprint.
- Peter Synan, *Story of the Swing Bridge*, VicRoads 2006, ISBN 0-73119-131-5.
- University of Melbourne Grainger Museum web site: http://www.lib.unimelb.edu.au/collectionsgrainger/exhibitions/jhgrainger/
- Victorian Heritage Register Database, entry for Swing Bridge, Registered No.H1438.
- *Sale Swing Bridge, South Gippsland Highway, Conservation Management Plan*, Allom Lovall & Associates, Conservation Architects, 35 Little Bourke Street, Melbourne 3000, June 2002.[14]
- A Giufre, *South Gippsland Highway, Restoration of the Swing Bridge over the Latrobe River at Sale, Concept Report*, VicRoads, 30 June 2001.
- *Discover The National Trust classified Swing Bridge – A Hidden Treasure of the Wellington Shire*, leaflet, Wellington Shire Council, date not stated.

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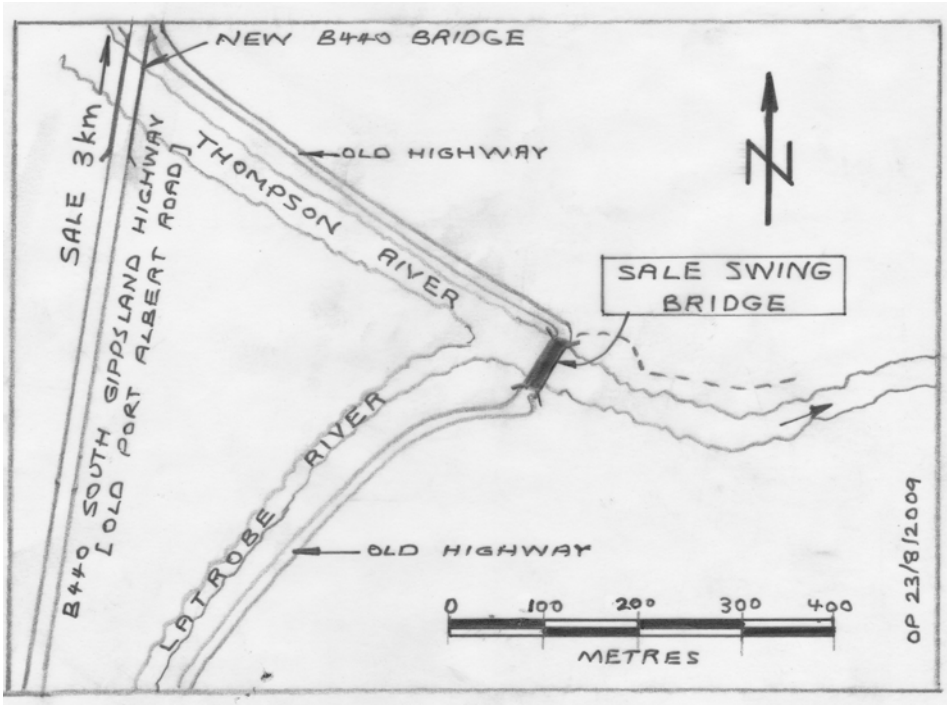
[14] Prepared for VicRoads

Attachment 1

Maps of the Sale Swing Bridge

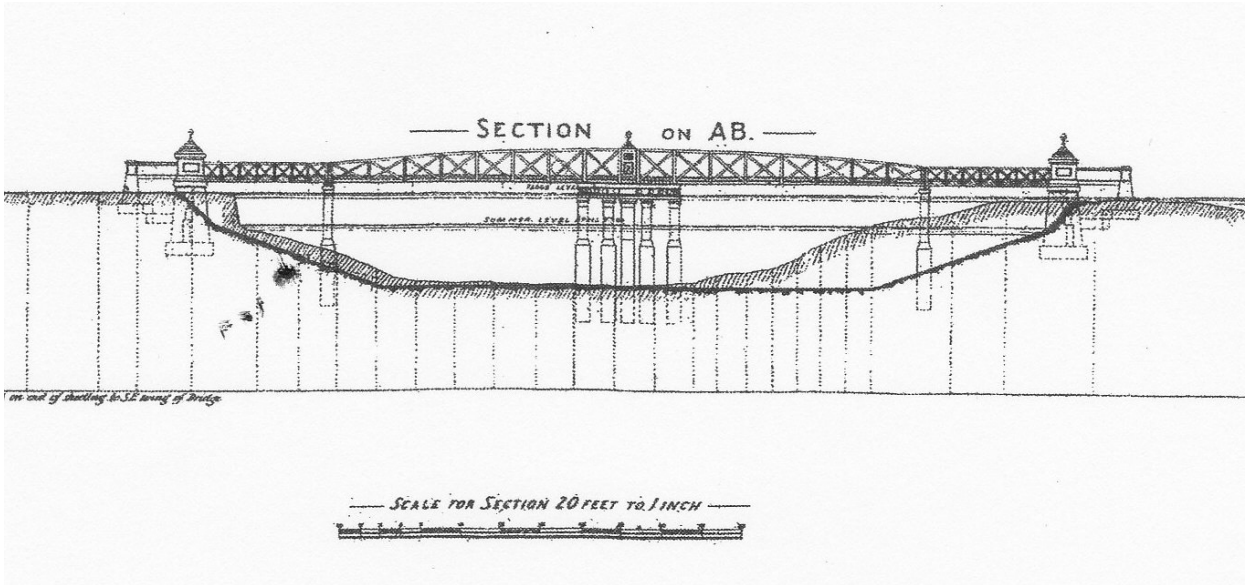
Map of Victoria showing the location of Sale and Port Albert



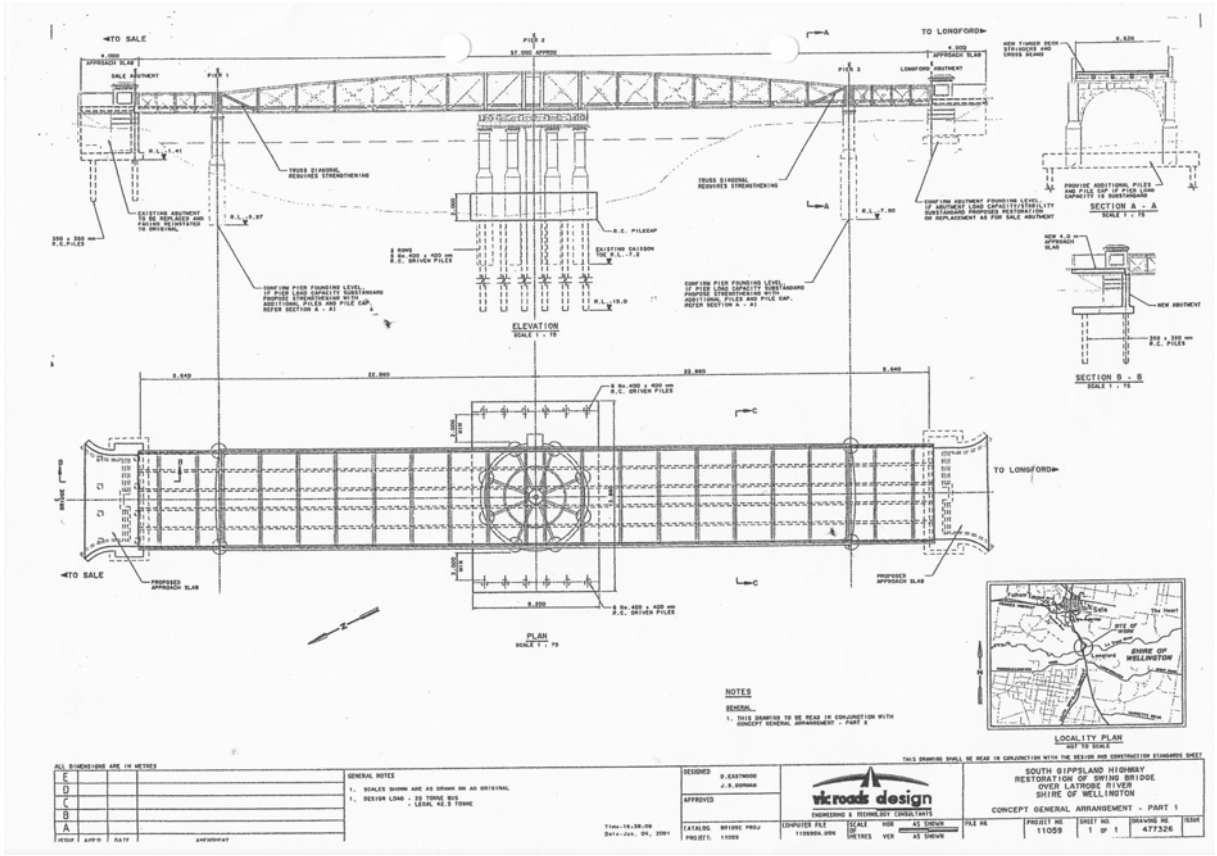
Map of the area around the Swing Bridge showing roads and rivers

Attachment 2

Historical Drawings of Sale Swing Bridge



Cross Section of Sale Swing Bridge from original drawings



Plan and Elevation Drawings for the Restoration of the Bridge, VicRoads 2001

Attachment 3

John Harry Grainger: Architect and Civil Engineer

An online exhibition to accompany an exhibition of the same title presented in the Leigh Scott Gallery, Baillieu Library, The University of Melbourne, 15 October 2007–11 January 2008

Text by Brian Allison, Co-curator.

Accompanying book: Brian Allison (ed.), *John Harry Grainger: Architect and Civil Engineer*, Melbourne: University of Melbourne, 2007.

Introduction

John Harry Grainger: Architect and Civil Engineer explores the life and work of a creative figure who has been largely overlooked by history. He receives a brief mention in the much examined life story of his famous son, the composer and pianist Percy Grainger, where he has been depicted as a proud but ineffectual father, a syphilitic and a drunkard. His prolific output as an architect and his extraordinary talents for bridge building have not received due recognition. The core of this exhibition is sourced from the Grainger Museum Collection at the University of Melbourne. Additional material was sourced from the Public Records Office of Victoria and the State Library Collection.

Obscure Origins

John Grainger's birth certificate lists his date and place of birth as being 30 November 1854 at 1 New Street, Westminster. His parents are recorded as being a John Grainger, Master Tailor and a Mary Ann Grainger, née Parsons.

Little is known about Grainger's early life prior to emigrating to Australia. Winifred Falconer, his companion in the latter part of his life, wrote in an unpublished manuscript in the mid-1930s that he lived with an uncle who was an important influence on him during his childhood. The gentleman was a personal friend of the great theologian Cardinal Newman and the young Grainger 'derived great pleasure as well as knowledge from listening to their discussions of the world's affairs.' His uncle was also an opera enthusiast who took Grainger to his personal box at the opera.

Percy believed that his father received much of his education at a monastery school in France at Yvetot between Le Havre and Paris. This detail is confirmed by Winifred Falconer. John Bird, Percy Grainger's biographer, states that J.H. Grainger claimed he was in Paris during the siege near the end of the Franco-Prussian War (1870-71). This begs the question: what was the son of a Westminster tailor doing at school in France? One possible explanation is that Grainger's uncle – his guardian – may have had business interests on the Continent.

The experience of French culture in his formative years left Grainger with a lifetime love of French architecture. At some juncture, early in his career, he made a very detailed study of French revival styles – particularly Renaissance revival architecture – a style he used in his buildings repeatedly throughout his working career. If, as John Bird states, he was in Paris at age 16, conceivably he may have had an association with an architectural atelier where he could have received some training.

A clipping from the *Argus* newspaper on 4 August 1879 states:

Granger [sic] of Jenkins and Granger [sic] has been in the colony about 3 years. He came from London where he worked with Mr Wilson, the well-known engineer of the Metro. District Railways, and with him made special study of iron bridge making.

Marshall's Biographical Dictionary of Railway Engineers lists a William Wilson (1822-1898) who acted for contractors on the Metropolitan and District Railway. Grainger may have been apprenticed to Wilson or was a junior in Wilson's company; either way he received a solid grounding in civil engineering practices.

Early Years in Australia

At age 22 John Harry Grainger successfully applied for a position in the South Australian Government as an assistant architect and engineer. It is unclear why he chose to emigrate. In his 1954 unpublished memoir 'My Father in my Childhood', Percy refers to his father leaving a girl in England who was pregnant to him. Falconer says that his decision to move abroad followed a quarrel with his uncle. Whatever his motivation, his career decision proved to be well-made. In addition to his government position he developed a thriving private practice in Adelaide. Less than 18 months later in 1878 he resigned his government position to pursue private commissions.

Grainger developed a strong social network in South Australia. He became very active within the musical fraternity and organised the first string quartet in Adelaide. The ensemble rehearsed in his private rooms.

In 1880 Grainger married 22 year old Rosa (Rose) Aldridge, daughter of Adelaide publican George Aldridge. In the year of their marriage Grainger won the competition to design Princes Bridge over the Yarra River in Melbourne. He and Rose moved to Melbourne anticipating that he would supervise the bridge's construction. In the same year he designed a swinging bridge over the Latrobe River at Sale in Gippsland, Victoria. The late architectural historian Margaret Pitt Morison described it as an 'elegant trussed structure in wrought iron with a balanced wing span of 45 metres supported centrally by eight pivot cylinders resting on bedrock.' It is believed that Grainger's bridge was the first to use this technology in Australia.

Grainger maintained a strong connection with South Australia and in 1881 was contracted to design two mansions for the wealthy Barr Smith family – 'Auchendarroch' at Mount Barker and 'Torrens Park' at Mitcham. In the same year he designed a Church of England church in gothic style at Walkerville on the outskirts of Adelaide.

On 8 of July 1882, Rose gave birth to a son, George Percy Grainger. They were living in a brick house in North Brighton, where they employed staff. John Grainger's business was on a firm footing – he entered into a lucrative partnership with fellow English Architect Charles D'Ebro. His future would have seemed very positive, yet it appears that during his residence in Brighton he contracted syphilis and, as so often happened, he passed the then almost incurable disease on to his wife. During this period he was also prone to extended periods of heavy drinking and the state of his health began to fluctuate.

Grainger & D'Ebro successfully submitted a design in a competition for a town hall in Fremantle. Later the same year they won first prize for the Masonic Hall Company's building in Lonsdale Street in Melbourne. In 1884 the partnership won first prize in a competition to design Auckland's public library, art gallery and municipal offices, a design that showcased Grainger's abilities at designing in French Renaissance revival style. In the same year the

partnership won a commission to design Brisbane Town Hall, though their design was never implemented.

In 1885 the Grainger's moved from Brighton to the New England Hotel in Heidelberg. Grainger had over-speculated in mining shares and lost money, which forced his family to suddenly change their living circumstances. His business partnership was also dissolved at this stage. His professional status, however, does not seem to have been affected by either event – in 1886 he was responsible for the design of the once celebrated Georges Building in Collins Street executed with a convincing Classical treatment. In the same year he was contracted to design the New Masonic Hall, also on Collins Street.

Much of what is known about Grainger's movements over the next decade is sourced from correspondence between Grainger and a young woman, Miss Amy Black, the sister of one of Grainger's junior staff members originally articled to the firm of Grainger & D'Ebro. Black lived with her family in Brighton near the Grainger household and became John Grainger's confidante.

Ill Health and Separation

In 1890, Grainger experienced some sort of breakdown. Percy believed he suffered from delirium tremens from excessive use of alcohol as well as nicotine poisoning. Writing to Amy Black, Grainger spoke of being 'disturbed in mind and body'. Following his doctor's orders he ceased working and set out for England on the *S.S. Oruba*. This put a virtual end to an already failing marriage and kept him permanently separated from his child.

Grainger visited family members in England – possibly with intentions of reconciliation. He may not have achieved this outcome as he bought a return passage to Australia on the same vessel. Deck life appears to have agreed with him as his health returned to normal.

During the first half of the 1890s Grainger led a transient life and professionally it was a lean period. In 1892 he is recorded as winning a prize for the design for the Hamley Buildings in Adelaide, but the following year he was working at Hill River Cattle Station near Clare in South Australia, remodelling woolsheds. By 1896 he was living in rough conditions in Kalgoorlie supervising the construction of processing plants for gold mining.

Western Australian Public Works Department

Finding mining town life hard to tolerate, Grainger left for Perth and applied for a position with the Western Australian Government. On 1 March 1897 he commenced working as Chief Architect in the Western Australian Public Works Department on a salary of £600 per annum – a position that was to bring stability back into his life.

Grainger's role was to design public buildings or to sign off on the work of other architects in his department. The mining boom meant that substantial building activity was being undertaken – particularly in regional areas. Buildings possessing Grainger's imprimatur included the Warden's Court in Coolgardie, public buildings in Kalgoorlie, post offices at Guildford, East Fremantle and Boulder, the Albany Quarantine Station and an asylum at Whitby.

Grainger had little time for private commissions in his new role, yet in 1898 he was persuaded to design a large commercial building for a Mr Davies in Colombo, Ceylon (now Sri Lanka). Called the 'Australian Building', the design was a two-storey arcaded structure housing ten shops at street level with office space above and was 'slightly Indian in feeling'.

During his time with the Public Works Department he was engaged in two projects that gave him significant kudos and, he claimed, professional satisfaction. The first, started in 1897, was extensions to Western Australia's Government House which included the design for a new ballroom which featured rolling Romanesque arches.

The second project was the design for the Western Australian court at the Great Paris International Exhibition of 1900. He visited Paris in that year to oversee the display's construction. Amply showcasing the riches of Western Australia's natural resources and designed to highlight native timbers, the court design led to Grainger becoming a member of the Société Centrale de Architects Français. This is the only professional body Grainger was known to be a member of during his working life.

Back in Perth at the end of 1901 Grainger was responsible for lavish street decorations to mark the visit of the Duke and Duchess of Cornwall and York for Federation celebrations.

In 1903 he took three months leave of absence to seek the curative powers of natural hot baths in Rotorua in New Zealand – he was experiencing symptoms he referred to as rheumatism.

Though dogged by ill health he became engaged in music again in 1905 and helped to organise the Perth Orchestral Society in his spare time. He suffered severe cramps in his fingers during that year, making drawing and writing difficult to the extent that he resigned his post with the Western Australian Government. He and Winifred Falconer set off for an extended journey to Europe where Falconer writes he made a detailed study of the architecture of Spain, Italy, France and Belgium and visited many important European public galleries. The couple also visited Harrogate in England where Grainger sought 'the cure' for his ailments in the town's sulphurous baths.

New Partnership in Melbourne

Again the experience of travel seemed to restore Grainger's health and energy. He moved with Falconer back to Melbourne where he entered into partnership with Phillip Kennedy and John Little. Grainger, Kennedy & Little practiced as architects and civil engineers and had an office at 123 Queen Street in central Melbourne.

This last period of his professional life began with a quite prestigious success. Shortly after his arrival in Melbourne he won first prize in a competition for a design for a northern wing to Melbourne's Town Hall. His firm was also responsible for the design of St Michaels Catholic Church in North Melbourne. By 1910 the firm was reduced to Grainger & Little but continued to secure significant projects. Their commissions included the State Savings Bank and Collins House (both now demolished).

Grainger became increasingly troubled by rheumatic symptoms and his health deteriorated dramatically by the outbreak of World War 1. His last building design was for an extension to Coombe Cottage, Nellie Melba's house at Coldstream in country Victoria. Melba's father, David Mitchell, was the building contractor for a number of Grainger's Melbourne projects and the two men were lifelong friends.

Decline and a Pauper's Grave

By 1915 Grainger was a complete invalid and was suffering the last stages of tertiary syphilis. His companion Winifred Falconer nursed him. Entirely crippled and barely able to hold cigarettes, to which he was highly addicted, he spent many hours pumping a player piano for entertainment. His son, Percy, wired him £30 a month from New York as neither he

nor Falconer had any income. He died on 13 April 1917 at 71 Stevenson Street, Kew in Melbourne.

Grainger died a pauper and was buried in an unmarked grave at Melbourne's Box Hill cemetery. It wasn't until the 1930s that Percy Grainger became interested in his father's story. It coincided with Percy's development of his autobiographical museum at the University of Melbourne. He began to correspond with his father's surviving friends and colleagues asking for recollections of John Grainger to be written down – the manuscripts upon which much of this essay is based. He also negotiated the donation to his Grainger Museum of the Amy Black correspondence.

Grainger's name lived on after his death in the name of his architectural practice. Grainger & Little became Grainger, Little & Barlow and finally Grainger, Little, Barlow & Hawkins – the latter existed until 1924. Posthumous use of his name is perhaps an indication of how this highly accomplished architect and engineer was viewed by his professional fraternity.

Further Reading

John Bird, *Percy Grainger*, 3rd edition, Sydney: Currency Press, 1999.

Amy Chalk (née Black), 'John Grainger', unpublished typescript, 1934, Grainger Museum Collection (GMC).

Winifred Falconer, 'The life and works of John H. Grainger, architect and civil engineer' unpublished typescript, c.1934, GMC.

Percy Grainger, 'My father in my childhood', 12 May 1954, from 'Grainger's anecdotes', unpublished typescript and manuscript, 1949-1954, in Malcolm Gillies, David Pear and Mark Carroll (eds), *Self-portrait of Percy Grainger*, Oxford: Oxford University Press, 2006.

Margaret Pitt Morison, 'John Harry Grainger, architect and civil engineer', unpublished typescript, no date, GMC.

Attachment 4
Photographs of Sale Swing Bridge

See separate file following

Change Control

VERSION 1	13 August 2009	501 words	
VERSION 2	15 August 2009	1688 words	
VERSION 3	15 August 2009	3325 words	
VERSION 4	16 August 2009	4269 words	
VERSION 5	18 August 2009	4837 words	
VERSION 6	23 August 2009	5307 words	
VERSION 7	30 August 2009	5794 words	
VERSION 8	3 September 2009	6007 words	
VERSION 9	10 September 2009	6036 words	
VERSION 10	22 September 2009	8912 words	
VERSION 11	5 October 2009	9019 words	BC comments, Wellington Shire Council comments added letter of approval from Wellington Shire Council
VERSION 12	17 November 2009	9237 words	Added text and photo of Grainger's Grave.