

## MARIBYRNONG TRAM SUBSTATION



Maribyrnong substation



Maribyrnong substation view from above



Maribyrnong substation aerial view



Maribyrnong substation quarry wall at rear



Maribyrnong substation cutouts in concrete roof

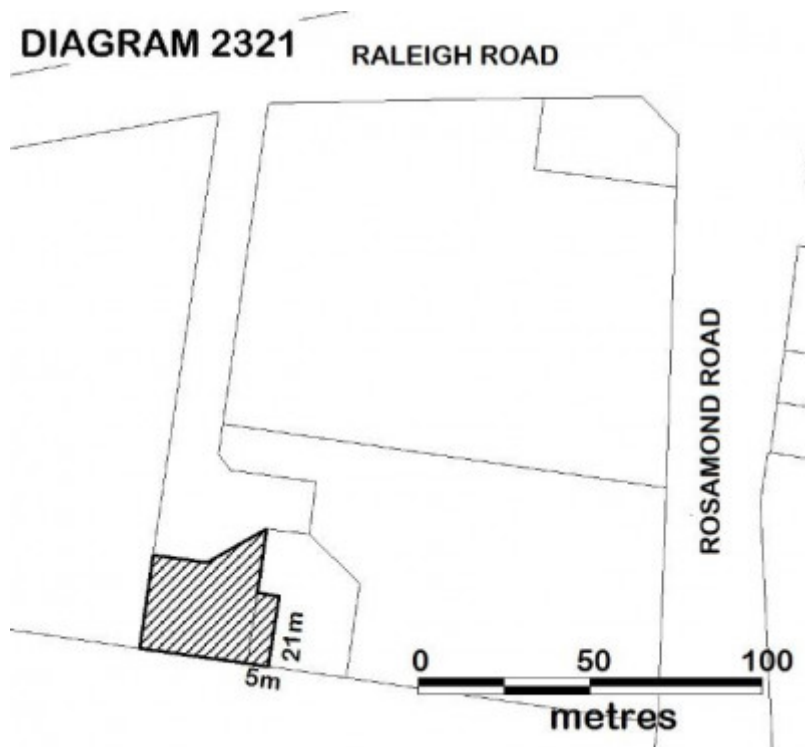


diagram 2321.jpg

**Location**

149A AND 149B RALEIGH ROAD MARIBYRNONG, MARIBYRNONG CITY

**Municipality**

MARIBYRNONG CITY

**Level of significance**

Registered

**Victorian Heritage Register (VHR) Number**

H2321

**Heritage Overlay Numbers**

HO208

**VHR Registration**

December 12, 2013

**Heritage Listing**

Victorian Heritage Register

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**Statement of Significance**

Last updated on -

What is significant?

The Tram Substation at Maribyrnong is a reinforced concrete building, constructed in 1941-42, which has an irregularly shaped roof intended to camouflage the building when viewed from the air.

**History Summary**

The Maribyrnong area was the centre of Australia's munitions manufacturing industry during World War II. Key sites included the Explosives Factory Maribyrnong (EFM) on Raleigh Road, the Ordnance Factory in Wests Road and the Ammunition Factory (ADI) in Gordon Street. At the beginning of the war only bus transport was available for the factory workers, but the number of employees increased greatly following the entry of Japan into the war in 1941, and by 1942 was more than 23,000. To ease the transport difficulties the Commonwealth Government made the decision to subsidise the extension of the existing tram lines. In 1940 the Melbourne & Metropolitan Tramways Board (M&MTB) extended the existing line from Maribyrnong Road across the Maribyrnong River to Cordite Avenue to serve the EFM, and then along Wests Road to the Ordnance Factory. In 1941 a new line was completed running from Ballarat Road along Gordon Street to the Ammunition Factory, and in 1942 another new line was built from Moonee Ponds to the west end of Maribyrnong Road. A new electrical substation was constructed at Maribyrnong to provide power for the trams on the new lines. Both the siting and the form of the building provided protection against possible air raids, and even now it is difficult to see. It was built against the rear wall of an abandoned quarry and had a roof designed with no straight lines in order to resemble a water feature when viewed from the air. The contract was awarded to the builders Weavell & Keast in November 1941, the contract price being £4437, with amendments for camouflaging costing an extra £210. The substation was decommissioned in 2005 and a new substation was constructed nearby.

## Description Summary

The Tram Substation at Maribyrnong is a steel-framed reinforced concrete building with a flat concrete roof which has an irregular outline and irregularly shaped cut-outs within it. Corrugated iron has recently been laid over the concrete roof, covering the cut-out sections, but the irregular outline is still apparent. The concrete walls separating the external transformer bays also have curved edges. The building retains some original equipment, including mercury arc rectifiers, transformers and switching equipment.

This site is part of the traditional land of the Kulin Nation.

### How is it significant?

The Tram Substation at Maribyrnong is of historical significance to the State of Victoria and satisfies the following criteria for inclusion in the Victorian Heritage Register:

Criterion A Importance to the course, or pattern, of Victoria's cultural history

Criterion B Possession of uncommon, rare or endangered aspects of Victoria's cultural history

Why is it significant?

The Tram Substation at Maribyrnong is significant at the State level for the following reasons:

The Tram Substation at Maribyrnong is historically significant for its association with the expansion of Melbourne's transport networks during World War II to provide transport for the large numbers of workers employed at the Commonwealth munitions factories in the Maribyrnong area, which were essential for Australia's war effort. The substation reflects the wide variety of structures required to accommodate the war effort in Victoria, including factories, drill halls, magazines and bunkers, housing, roads and public transport. It is one of the few tangible reminders in Victoria, outside a museum, of a time when Australia was under threat. Although Victoria was probably under little threat of air attack during World War II this building reflects the threat perceived by much of the population. (Criterion A)

The Tram Substation at Maribyrnong is the only known example in Victoria of the survival of war-time camouflage applied to a non-military building. It was designed to resemble a water feature when viewed from the air in order to provide protection from bombing attacks. There are no other known examples of the use of this sort of camouflage on a building in Victoria. (Criterion B)

## Permit Exemptions

### General Exemptions:

General exemptions apply to all places and objects included in the Victorian Heritage Register (VHR). General exemptions have been designed to allow everyday activities, maintenance and changes to your property, which don't harm its cultural heritage significance, to proceed without the need to obtain approvals under the Heritage Act 2017.

**Places of worship:** In some circumstances, you can alter a place of worship to accommodate religious practices without a permit, but you must **notify** the Executive Director of Heritage Victoria before you start the works or activities at least 20 business days before the works or activities are to commence.

**Subdivision/consolidation:** Permit exemptions exist for some subdivisions and consolidations. If the subdivision or consolidation is in accordance with a planning permit granted under Part 4 of the *Planning and Environment Act 1987* and the application for the planning permit was referred to the Executive Director of Heritage Victoria as a determining referral authority, a permit is not required.

Specific exemptions may also apply to your registered place or object. If applicable, these are listed below. Specific exemptions are tailored to the conservation and management needs of an individual registered place or object and set out works and activities that are exempt from the requirements of a permit. Specific exemptions

prevail if they conflict with general exemptions.

Find out more about heritage permit exemptions [here](#).

### Specific Exemptions:

General Conditions: 1. All exempted alterations are to be planned and carried out in a manner which prevents damage to the fabric of the registered place or object. General Conditions: 2. Should it become apparent during further inspection or the carrying out of works that original or previously hidden or inaccessible details of the place or object are revealed which relate to the significance of the place or object, then the exemption covering such works shall cease and Heritage Victoria shall be notified as soon as possible. Note: All archaeological places have the potential to contain significant sub-surface artefacts and other remains. In most cases it will be necessary to obtain approval from the Executive Director, Heritage Victoria before the undertaking any works that have a significant sub-surface component. General Conditions: 3. If there is a conservation policy and plan, all works shall be in accordance with it. Note: A Conservation Management Plan provides guidance for the management of the heritage values associated with the site. It may not be necessary to obtain a heritage permit for certain works specified in the management plan. General Conditions: 4. Nothing in this determination prevents the Executive Director from amending or rescinding all or any of the permit exemptions. General Conditions: 5. Nothing in this determination exempts owners or their agents from the responsibility to seek relevant planning or building permits from the responsible authorities where applicable.

#### Decontamination:

Any decontamination activities or works to make the building safe are permit exempt provided the selection of replacement fabric and materials are undertaken in consultation with Heritage Victoria.

#### New substation building:

All internal and external works to the new substation building to the north of the 1941-42 building are permit exempt.

### Theme

#### 3. Connecting Victorians by transport and communications 7. Governing Victorians

Construction dates	1941,
Heritage Act Categories	Registered place,
Other Names	SUB STATION,
Hermes Number	13963
Property Number	

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### History

#### CONTEXTUAL HISTORY

##### Melbourne's tram system during World War II

The beginning of World War II in September 1939 brought some immense changes to Melbourne's tram system. The introduction of fuel rationing saw passenger numbers increase, and the concentration of patronage in peak hours, particularly in areas such as Maribyrnong and Footscray with its large munitions factories, led to the introduction of staggered working hours and all-night tram services. The last two remaining cable tram routes

were closed and the trams replaced by buses, as replacement ropes could no longer be imported. The M&MTB's Preston workshop was one of Melbourne's major transport establishments. It had precision engineering capability and undertook contracts for the supply of military equipment, which used resources that would otherwise go to keeping the trams running.

As a State Government authority, the M&MTB was not covered by the Commonwealth War Damage Insurance Scheme, so had to carry any war damage risk itself. As a result, from the beginning of 1941-42 it set aside funds to cover repairs in the event of damage due to enemy action. Trams were operated with dimmed internal lights and blackout cowls were used on headlights from December 1941 as a precaution against air raids.

With the start of the war in the Pacific in late 1941, the Board took action to protect its staff by undertaking a program of air raid precautions. Slit trenches were dug at the Preston workshops, the Carlton substation, in Victoria Parade and at the Royal Park meal rooms, as well as in the yards of the depots at Coburg, Brunswick, Essendon, Glenhuntly, Hawthorn and Malvern. Where it was impractical to dig slit trenches, other arrangements were made. Above ground shelters were constructed at the North Fitzroy and Port Melbourne bus garages, the Victoria Parade yard and Hanna Street (South Melbourne) depot. At Kew, Camberwell and Footscray depots, brick blast walls were constructed and a number of the pits were decked to provide air raid protection.

#### Footscray/Maribyrnong as a focus of Australia's war-time munitions manufacture

The land west of the Maribyrnong River was sparsely populated in the nineteenth and early twentieth centuries, and was therefore considered a suitable location for many dangerous industries. According to Heritage Alliance (in 'Defence Sites within the City of Maribyrnong' prepared for the City of Maribyrnong November 2008):

Much of Australia's defence capacity in terms of munitions, ordnance and explosives manufacturing was established in the nineteenth century in the area from Deer Park to Footscray around a handful of small scale manufacturers. These sites were rapidly and dramatically expanded during World War Two to handle not just increased manufacturing but also drawing production, production standards, defence technology research, armed services coordination, as well as personnel safety with the construction of on-site bomb shelters. The facilities were serviced by new tram lines, additional train and bus services, improvements in water and sewerage, worker accommodation and all forms of transport equipment and storage depots and bunkers. This was overlain [sic] with public protection systems of air raid posts, control and command centres, bomb shelters and anti aircraft batteries. This group of facilities from ICIANZ in Deer Park through to the EFM [Explosives Factory Maribyrnong] in Maribyrnong created the most intensively developed and populated defence related sites anywhere in Australia.

The Munitions Factory in Gordon Street (Ammunition Factory (ADI) Footscray, now demolished) produced vast quantities of bullets, bullet belts, and fusing for shells and bombs. It was the major provider of military ammunition in Australia from its inception in the 1880s to the post-World War II period. The nearby Colonial Ammunition Factory (CAC, demolished) (adjacent to Jack's Magazine (VHR H1154), established to decrease Australia's dependence on imported ammunition, was the first factory in Australia to manufacture ammunition. It formed the basis of the many munitions complexes, both Government and private, which developed in the Footscray/Maribyrnong area. Many other industries which supplied the munitions industry, such as Extruded Metals and Austral Bronze, owed their existence to the Government installations, and the prosperity of the district for much of the twentieth century can be connected to the fortunes of this industry. The munitions industry fashioned the character of this area and offered employment to thousands of men and women. In 1942 9,323 people, half of them women, were employed at the factory. A unique culture developed around the works, with women taking over formerly male jobs.

The site of the Explosives Factory Maribyrnong (EFM) on Raleigh Road had been purchased in 1908 by the Commonwealth for the construction of a Cordite Factory (cordite was an alternative to gunpowder), and was by the 1930s manufacturing explosives for commercial and civilian use, as well as a range of other chemical products. During World War II it employed large numbers of people (8,000 in 1942) and concentrated on researching and producing explosives, along with co-located facilities such as a Navy office and the Commonwealth Scientific Industrial Research (CSIR) office, which concentrated on the development of Radar.

The Ordnance Factory (demolished), south of the EFM on Wests Road, was the site of production of bomb and shell casings, artillery pieces and all forms of war equipment such as depth charge throwers and cannon barrels (the word 'ordnance' means military weapons of all kinds). By 1943 6,262 people, more than half of whom were women, were employed there.

Australia became more closely involved in World War II following the entry of the Japanese into the war in 1941. Victoria became a major manufacturer of munitions, and Maribyrnong was the centre of this manufacture.

## HISTORY OF PLACE

Prior to World War II a tram service ran from the city along Maribyrnong Road, but this terminated at the Maribyrnong River. At the start of the war access to the munitions factories in the Footscray/Maribyrnong area was difficult as there were no tram services, and employees used special buses from Ascot Vale and Footscray. Large numbers of people were employed at the factories - there were more than 23,000 employees by 1942. Due to overcrowding on the bus routes the Commonwealth Government made the decision to subsidise the extension of the electric tram routes. In December 1940 an extension to the service along Maribyrnong Road was established via a tram bridge over the river, and the line was continued along Raleigh Road to the end of Cordite Avenue to service the EFM. This line was required by wartime regulations to be further extended in July 1941 to run along a reserve on the east side of Wests Road to serve the Ordnance Factory and other facilities in that area.

In November 1941 a new tram service was completed running from Ballarat Road at Footscray north along Gordon Street to service the ammunition factory. In May 1942 another new line from Moonee Ponds junction to the west end of Maribyrnong Road was opened to replace the bus service bringing workers to the Ordnance Factory and the EFM sites.

As noted by David Wixted ('It's got Maribyrnong written all over it', paper delivered to 2009 ICOMOS conference, at [http://www.aicomos.com/wpcontent/uploads/2209\\_UnlovedModern\\_Wixted\\_David\\_Maribyrnong\\_Paper.pdf](http://www.aicomos.com/wpcontent/uploads/2209_UnlovedModern_Wixted_David_Maribyrnong_Paper.pdf))

this led to some of the more unusual destinations ever displayed on Melbourne's trams, such as 'Explosives Factory', 'Pyrotechnics Factory' and 'Ammunition Factory'. (It was not until 10 years after the war's end that the lines were joined together thus creating one of the strangest tram routes found in Melbourne: the Number 82 from Moonee Ponds to Footscray via the byways around the EFM, the Ordnance Factory and Ammunition Factory. It is one of only three Melbourne tram routes that does not travel through the CBD.)

The 1925 tram substation on Maribyrnong Road, Ascot Vale would probably initially have powered the trams along Raleigh Road, but the extensions to the lines required the construction of a new electrical substation at Maribyrnong. This was built against the rear wall of an abandoned quarry, which made it less visible and provided some protection. Although Victoria was probably under little threat of air attack during World War II there was a great deal of concern amongst the population at the time, particularly in coastal areas, about possible threats from attack by Japanese aircraft. Both the siting and the design of the building were intended to provide protection against air raids. This is noted in the M&MTB Annual Report of 1942 which refers to a 'new substation at Maribyrnong (concealed)'. The contract for the steel-framed reinforced concrete building was awarded to the builders Weavell & Keast in November 1941, the total contract price being £4437, but amendments for camouflage of the building costed an extra £210. The contract was extended to 10 March 1942 to allow for changes to the roof construction for 'camouflage purposes'. The roof and the edges of the walls of the external transformer bays were designed without straight lines and the roof included pond-like shapes cut out of it so that from the air the building resembled a pond at the bottom of the quarry.

In 2005 a number of Melbourne's substations and their equipment became redundant, including the substation at Maribyrnong. A new substation was built adjacent to the existing building.

## KEY REFERENCES USED TO PREPARE ASSESSMENT

Biosis (Gary Vines), 'Melbourne Metropolitan Tramway Heritage Study', Report for Heritage Victoria. 2011  
Heritage Alliance, 'Defence Sites Within the City of Maribyrnong', prepared for the City of Maribyrnong November 2008.

Russell Jones for Friends of the Hawthorn Tram Depot, 'Fares please! An economic history of the Melbourne & Metropolitan Tramways Board', 2008, online at <http://www.hawthorntramdepot.org.au/papers/ecohist/ecohist0.htm>

Russell Jones for Friends of Hawthorn Tram Depot, 'From Rotary Converters to solid-state: tramway substation architecture in Melbourne', 2013; online at <http://www.hawthorntramdepot.org.au/papers/substations.htm>.

John Keating, *Mind the Curve! A history of the Cable Trams*, Sydney 2001.

David Wixted, 'It's got Maribyrnong written all over it', paper delivered to ICOMOS conference 2009, online at [http://www.aicomos.com/wpcontent/uploads/2209\\_UnlovedModern\\_Wixted\\_David\\_Maribyrnong\\_Paper.pdf](http://www.aicomos.com/wpcontent/uploads/2209_UnlovedModern_Wixted_David_Maribyrnong_Paper.pdf)

## Plaque Citation

This is a unique surviving example of a non-military building whose design was intended to camouflage it during war. It was built in 1941-2 to power trams used by workers employed at the munitions factories in the area during World War II.

## Assessment Against Criteria

### Criterion

The Tram Substation at Maribyrnong is of historical significance to the State of Victoria and satisfies the following criteria for inclusion in the Victorian Heritage Register:

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### Criterion A)

The Tram Substation at Maribyrnong is the only known example in Victoria of the survival of war-time camouflage applied to a non-military building. It was designed to resemble a water feature when viewed from the air in order to provide protection from bombing attacks. There are no other known examples of the use of this sort of camouflage on a building in Victoria. (

### Criterion B)

## Extent of Registration

All of the place shown hatched on Diagram 2321 encompassing all of Crown Allotment 10J and part of Crown Allotment 10K Section 20 Parish of Cut-Paw-Paw.

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*This place/object may be included in the Victorian Heritage Register pursuant to the Heritage Act 2017. Check the Victorian Heritage Database, selecting 'Heritage Victoria' as the place source.*

*For further details about Heritage Overlay places, contact the relevant local council or go to Planning Schemes Online <http://planningschemes.dpcd.vic.gov.au/>*