CAMBERWELL TRAM SUBSTATION

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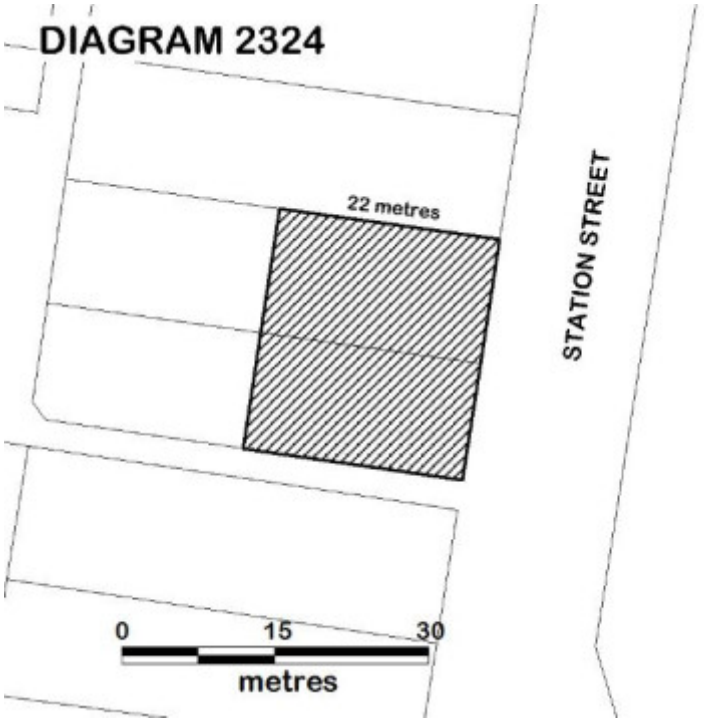

diagram 2324.jpg

Location

30 STATION STREET CAMBERWELL, BOROONDARA CITY

Municipality

BOROONDARA CITY

Level of significance

Registered

Victorian Heritage Register (VHR) Number

H2324

Heritage Overlay Numbers

HO622

VHR Registration

December 12, 2013

Heritage Listing

Victorian Heritage Register

Statement of Significance

Last updated on -

What is significant?

The Camberwell Tram Substation, constructed by the Melbourne & Metropolitan Tramways Board (M&MTB) in 1925 as part of the works required for the electrification and expansion of Melbourne's tram system.

History Summary

The M&MTB was formed in 1919 to electrify, integrate and extend Melbourne's existing cable and electric tram routes. Following the formation of the State Electricity Commission (SEC) in 1920 electricity to power the electric tram lines was taken from the state grid system at substations. These converted the SEC's alternating current (AC) to direct current (DC) at a lower voltage which was then fed through overhead wires to operate the trams. Between 1925 and 1940 the M&MTB progressively electrified the old steam-powered cable tram routes, built new depots and substations, extended the existing tram lines and added new routes. The design of the Camberwell substation is attributed to Alan G Monsborough, the M&MTB's architect, who was responsible for the design of all tramway buildings during the formative years of the electric tramway system. It was built to house the equipment to power the tram lines through Camberwell to Burwood. The building continues in use as a substation.

Description Summary

The Camberwell Tram Substation is a symmetrical Inter-war Stripped Classical style building of brick with a gabled corrugated iron roof. It has a rendered parapet with 'MMTB' inscribed above the front entrance, and rendered dressings around the openings. Along the north side there is a lower brick skillion in a similar style but without openings. The substation has a large central front entrance for the movement of electrical plant, tall steel-framed windows and clerestory lighting on the north side. The original electrical equipment has been replaced, but the building retains its original roller door on the front entrance and the overhead pulley once used to move heavy equipment within the building.

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

How is it significant?

The Camberwell Tram Substation is of historical and architectural significance to the State of Victoria and satisfies the following criterion for inclusion in the Victorian Heritage Register:

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

Criterion D Importance in demonstrating the principal characteristics of a class of cultural places and objects

Why is it significant?

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

The Camberwell Tram Substation is historically significant for its association with the development of Melbourne's transport systems in the early twentieth century, and with the role this played in the development of Melbourne and its suburbs. It is significant for its association with the development by the M&MTB of an integrated electric tramway system in the city and suburbs from the 1920s. The Camberwell substation is one of four 1920s substations which survive relatively intact, and these, individually and as a group, help to demonstrate the scale of the electric tram network developed by the M&MTB in Melbourne and its suburbs and the infrastructure required for this work. (Criterion A)

The Camberwell Tram Substation is architecturally significant as an example of the application of the Inter-war Stripped Classical style to a utilitarian industrial building and is a demonstration of the scale and quality of the works undertaken by the M&MTB. It demonstrates the form of the first substations constructed by the M&MTB in the 1920s as part of the electrification and expansion of Melbourne's tram system and reflects the aim of the M&MTB to emphasise its modernity and strength through the architecture of its buildings. (Criterion D)

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.

Interior works:

Any interior works which do not affect original fabric and are not visible from outside the building are permit exempt.

Theme

3. Connecting Victorians by transport and communications 6. Building towns cities and the garden state

Construction dates	1925,
Architect/Designer	Monsborough, Alan G,
Heritage Act Categories	Registered place,
Hermes Number	192286
Property Number	

History

CONTEXTUAL HISTORY

The first trams operating in Melbourne were horse-drawn. The first of Melbourne's cable trams opened in 1885 on the Richmond line, and in the following six years the councils of Melbourne and the ten surrounding municipalities built a system of cable-hauled tramways. The forty-six miles [74 km] of double track serving seventeen routes radiating from the centre of the city to neighbouring suburbs was probably the world's largest cable tram network, but by 1891 it had reached its maximum extent. By 1900 it was recognised that other countries had established electric tramways that were less expensive to install, and an electric tram had already begun operating in Sydney.

The first electric tram to run in Australia was demonstrated during the Centennial International Exhibition in Melbourne in 1888. From 1889 until 1896 this pioneer vehicle and a second car ran a regular tramway service between Box Hill Station and Doncaster, mainly as a means of attracting potential land purchasers, but it did demonstrate the viability of electric traction.

The first two regular electric tram services in Melbourne opened in 1906, with the opening of a line from the cable tram terminus at Flemington Bridge to Essendon and the Victorian Railways line from St Kilda to Brighton. In the early 1900s, several municipalities formed trusts and built electric tramways in their areas. In 1909 municipal authorities in Prahran and Malvern combined to form a Trust to operate electric tramways within their boundaries and opened lines in 1910, which by 1919 had grown to a network of thirty-five route miles [56 km]. During World War I other suburban electric networks developed, including municipal trust undertakings in the areas of Hawthorn, Brunswick, Coburg, Fitzroy, Kew, Preston and Footscray. Until the State Electricity Commission of Victoria was formed in 1920, electricity for the trams was provided by various private and municipal power generators.

The Victorian Government in 1910 set up a Royal Commission to enquire into the 'present condition of the Railway and Tramway systems of Melbourne'. Their 1911 report recommended electrification of the suburban railway network, and also recommended that all the metropolitan tramways, cable and electric, municipal and private, be vested in a Municipal Tramways Trust, and that the cable tramways be converted to electricity. The

advantages of electric tramways were considered to be lower capital costs, greater speed and flexibility, adaptability to extension and simplification of terminal shunting.

Implementation of these recommendations was delayed by World War I, but in 1918 legislation was passed setting up the Melbourne & Metropolitan Tramways Board (M&MTB). In 1919 it took over authority for the cable trams, and in 1920 for the Northcote line and all the electric networks operated by municipal trusts. The M&MTB formulated a comprehensive plan for integration and development of the system as a whole, with considerable extension of the electric lines and gradual conversion of the cable lines.

The first line electrified was the St Kilda line in 1925, and in less than a month, electric trams were serving the whole length of Swanston Street.The last cable tram line (Northcote) closed in 1940. During this time the cable trams were converted to electric traction, new depots and substations were built, lines extended and new routes added. Hundreds of new, large, electric trams were built to replace the fleets of small cars previously operated by the municipal tramway trusts.

Tram Substations

With the establishment of the M&MTB new substations had to be built to electrify the converted cable tram lines and for new routes, and to systematise the distribution of power from the Latrobe Valley generator of the State Electricity Commission (SEC, formed in 1920) with twelve new substations. Electricity to power Melbourne's tram lines was taken from the state grid system at the substations, where the SEC's alternating current (AC) at 6600 volts was transformed (or rectified) to direct current (DC) at a lower voltage to operate the trams. Substations housed the equipment required to transform the high voltage AC power down to the low voltage DC traction power.

Since the 1880s, electric trams have been powered by direct current (DC) at a relatively low voltage - initially at 500 volts, but in later years more commonly between 600 and 700 volts. DC motors were well-suited to use on trams as they were compact and light and could easily be incorporated into the restricted space on the trams. However direct current has a major drawback: voltage drops quickly with distance and tram performance therefore falls off rapidly if the tram is much more than 4 km from the power source. So substations were usually built near the middle of tram routes.

The early substations of the tramway trusts were often co-located within the tram depots, such as Malvern, Kew, Elsternwick, Hawthorn and Coburg depots, which all used massive rotary converters (which used mechanical means to convert the current to DC). Some of the earliest tram substations were free-standing buildings, the oldest being the Elsternwick substation built by the Prahran & Malvern Tramways Trust in 1914.

The expansion of Melbourne's electric tramway system paused between 1916 and 1923, and the construction of new substations did not proceed until the M&MTB formulated its 1923 General Scheme for the conversion of the cable tramway system and the expansion of the electric tram network.

A series of large substations in a similar style to each other were constructed by the M&MTB between 1924 and 1929 in Camberwell, South Yarra, Ascot Vale, South Melbourne and Carlton. All were designed to house massive rotary converters and required deep footings to prevent damage to the building fabric. They also had large doorways and high roofs, to permit easy handling of the electrical plant, and probably also to reduce overheating as the rotary converters produced a great deal of heat, and large high windows to provide natural light. All were similar in materials and form but varied in their size, their floor plans, and the degree of rendering and decoration on the exterior.

In order to reduce supervisory labour costs, the M&MTB constructed remote control equipment of its own design for its substations. The main central control room was in Queensberry Street at Carlton, which was able to operate all the other substations remotely. By 1933 there were 19 substations, 15 of them fully automatic unattended stations, and by 2013 there were 55, with more planned.

In the 1930s, new technology was introduced, using mercury arc converters instead of rotary converters, employing a process involving ionising mercury vapour. These were smaller than the rotary converters and were initially housed in glass bulbs and later in steel tanks. From the 1960s the system progressed to solid state silicon diode rectifiers. These are what are currently used, together with the extensive use of electronics, to control switching. Melbourne had to re-equip its substations in the 1990s due to the higher electric current required to air-condition trams.

In 2005 a number of Melbourne's substations and their equipment became redundant, including Ascot Vale, South Yarra, Glenhuntly, Essendon, South Yarra, Deepdene, Maribyrnong, Brunswick, Coburg, Preston and South Melbourne. The old substations were cleared of hazardous materials and new substations were built adjacent to the old buildings.

Alan G Monsborough

Alan G Monsborough was the M&MTB's architect and was responsible for the design of all tramway buildings during the formative years of the electric tramway system. His prodigious output ranged from electric sub-stations and tram depots to the large scale heavy industrial buildings at the Preston tramway workshops, the board's multi-storey head office building in Little Collins Street, Melbourne, the elevated signal cabin and waiting shelter in Swanston Street (1928, VHR H686) and the rustic chalet and passenger shelters at Wattle Park in Burwood (1920s, VHR H904).

HISTORY OF PLACE

The Hawthorn Tramways Trust (HTT) was created under the *Melbourne to Burwood Tramways Act, 1914* to construct and manage electric tramways in the City of Melbourne, City of Richmond, City of Hawthorn, and the City of Camberwell. The Trust was responsible for the opening of Wattle Park (VHR H904) in the suburb of Burwood in 1915 and the construction of the (former) Hawthorn depot (VHR H876) in 1916. The Hawthorn Tramways Trust was the only early electric tram operator to operate a route to the city, which was otherwise only served by the Melbourne cable tramway system. The Trust's lines ran from the city along Swan Street, spreading out to High Street, Cotham Road, Riversdale Road and Camberwell Road.

The fast and efficient electric trams stimulated development of the suburbs along its route. Agents of the Tramway Heights Estate in Burwood (c1918) sold blocks on the strength of the land being only eight minutes walk from the first electric tram line direct to the city.

The Hawthorn Tramways Trust was dissolved on 20 February 1920 when control passed to the M&MTB. The Camberwell substation was one of the impressive brick substations designed by Alan Monsborough for the M&MTB and was constructed by them in 1925. It originally contained rotary converters but now uses solid state rectifiers.

The Camberwell substation continues in use, and is now operated by Yarra Trams. All of the original electrical equipment in the interior has been replaced.

Biosis Research (Gary Vines), 'Melbourne Metropolitan Tramway Heritage Study', Report for Heritage Victoria, 2011

HV file PL-HE/03/0424 (Maribyrnong Tram Substation)]

Public Transport Victoria website: http://corp.ptv.vic.gov.au/managing-victoria-s-public-transport-network/history-and-heritage/early-history-of-public-transport/#trams]

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

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

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.

Plaque Citation

Built in 1925, this is one of five impressive electrical substations built in the 1920s by the Melbourne & Metropolitan Tramways Board as part of the electrification of Melbourne's tram system, and is attributed to the Board's architect Alan Monsborough.

Assessment Against Criteria

Criterion
The Camberwell Tram Substation is of historical and architectural significance to the State of Victoria and satisfies the following criterion for inclusion in the Victorian Heritage Register:

Criterion A Importance to the course, or pattern, of Victoria's cultural history Criterion D Importance in demonstrating the principal characteristics of a class of cultural places and objects
Why is it significant?

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Criterion A)
The Camberwell Tram Substation is architecturally significant as an example of the application of the Inter-war Stripped Classical style to a utilitarian industrial building and is a demonstration of the scale and quality of the works undertaken by the M&MTB. It demonstrates the form of the first substations constructed by the M&MTB in the 1920s as part of the electrification and expansion of Melbourne's tram system and reflects the aim of the M&MTB to emphasise its modernity and strength through the architecture of its buildings. (
Criterion D)

Extent of Registration

All of the place shown hatched on Diagram 2324 encompassing parts of Lots 13 and 14 on Lodged Plan 5028.