

IPENZ Engineering Heritage Register Report

Wellington Cable Car

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Wellington Cable Car, near Salamanca Road Station, 2012. Photograph by Simon Daisley

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A. General information

Name: Wellington Cable Car

Alternative names: Kelburn Cable Car; Kelburn Cable Tramway; Kelburne Tramway

Location:

Lambton Quay – Upland Road

Kelburn

Wellington

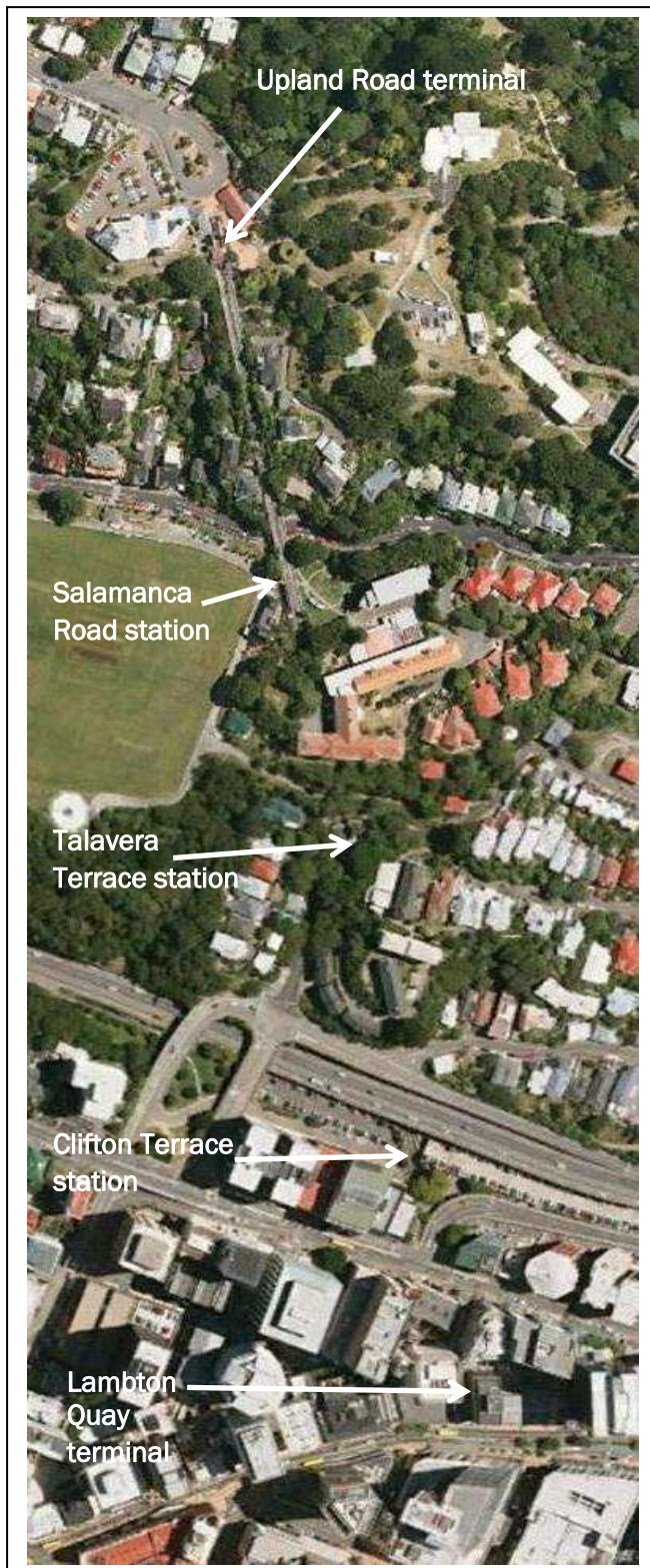
Geo-reference: (Upland Road terminal) Latitude -41.285, longitude 174.767

Legal description: Pt Lot 2 Deposited Plan 977 (WN453/166); Pt Secs 460 TN OF Wellington, Pt Section 1254 TN OF Wellington, Pt TOWN Belt Town of Wellington, Pt Lot 10-11 Deposited Plan 452, Pt Lot 10-11, 17 Deposited Plan 755, Pt WESLEYAN College Reserve Town of Wellington (NZGZ 1899 p. 2316, WN453/166); Pt Lot 2 Deposited Plan 2001 (WN453/166); Pt Lot 10-11 Deeds Plan 433; Pt Lot 1 Deposited Plan 8530 (WN48A/126)

Note: The main physical components of engineering importance for the Wellington Cable Car system are its route (including original tunnels and viaducts) and the current line and system, as well as the former Winding House, now the Cable Car Museum, which houses some of the remaining original cars.

Access information: The Wellington Cable Car system has termini on Lambton Quay (lower/east) and Upland Road (upper/west). Both termini are signposted. Clifton Station is accessible via a walkway from Clifton Terrace; Talavera Station is accessible from Everton Terrace; and Salamanca Station is located next to the Kelburn Park clubrooms on Salamanca Road. The former Winding House building's address is at 1a Upland Road. This building houses the Wellington Cable Car Museum, near the Upland Road terminal.

City/District Council: Wellington City Council



IPENZ category: Engineering Plant; Engineering Work

IPENZ subcategory: Rail transportation

IPENZ Engineering Heritage number: 207

Date registered: 16 October 2012

Other IPENZ recognition: Interpretation panel in Cable Car Museum (2000)

Other heritage recognition:

- *New Zealand Historic Places Trust:* Cable Car Winding House, Category 2 historic place (Register no. 5372)
- Local Authority District Plan: Wellington City Council, Heritage List: Areas, Map 17, Ref. 8 (Cable Car Route, Lambton Quay to Upland Road); Heritage List: Buildings. Map 17, Ref. 30 (Cable Car Winding House); Map 17, Ref: 188 (Kelburn Chambers/Stoneham's Building, Lambton Quay and Cable Car Lane facades)

B. Description

Summary

Wellington's Cable Car is an iconic feature of New Zealand's capital city. As a tourist attraction it is often featured on promotional images gradually ascending towards the lofty heights of Kelburn, with the sprawling central business district laid out below. However, for many residents and Victoria University students the Cable Car remains an important form of daily transportation.

In the late 19th century an increase in Wellington's population led to the development of new suburbs, spreading out from the central city onto former farm land. Some prominent businessmen saw this as a commercial opportunity and private companies were created to oversee new developments. One of these companies was the Upland Estate Company whose subsidiary was the Kelburne and Karori Tramway Company.

The company decided that a cable tramway was the best solution for providing access to their new hillside suburb, which was to eventually become Kelburn. Backed by politicians, the line began to be developed in 1899. The resulting Wellington Cable Car opened in 1902, but despite its name was a combined cable tramway and funicular system. Designed by James Edward Fulton (1854–1928) and constructed by Maurice O'Connor (1840–1921), the line traverses a steep gradient, passing through three tunnels and over three viaducts. The former Winding House features a dedicated Cable Car museum, featuring some of the original system's equipment and a car designed and built by Dunedin's tramcar specialist, Mark Sinclair.

The Cable Car became a beloved part of Wellington city. As such, cries of outrage followed the City Council's 1978 removal of the red rattlers, (as the cars were nicknamed) due to safety concerns. However the new system, introduced a year later, proved to be just as popular and today it remains an integral part of the city's transport system.

The Wellington Cable Car is a valued link to the city's Victorian transport heritage, and is special because it remains one of Fulton's best known works and is a tribute to his engineering skill.

Historical narrative

By the late 19th century an increase in Wellington's population led to the development of new suburbs, expanding the city into farmland beyond the confines of Thorndon and Te Aro. Prior to European settlement the hill rising above Lambton Quay had traditionally been known as Pukehinau (hinau tree hill). First sold as one of the early one hundred acre farm blocks, this became the site of Upland Farm. It was leased by Thomas William Tankersley in 1845 before being purchased by William Moxham in the 1860s.¹ Although there were already access ways to the farm they were probably little more than rudimentary tracks.²

Upland Farm was situated in the borough of Melrose, bordering on Karori Borough and the Corporation of Wellington.³ With the hillsides being considered a healthier alternative to the overcrowded low lying areas, businessmen who wished to remain close to the city began to consider the hill around Upland Farm for property development. The Wellington Hospital Trustees, who owned the land between Upland Farm and Lambton Quay, had already started to take advantage of this trend. They leased the land to developers, who in turn started to build residences on the hillside.⁴

Another important factor behind the development of Kelburn and the Wellington Cable Car was creating better access to the farming community of Karori. In the late 19th century a rather tiresome route through Mitchelltown was used to get to Karori.⁵ When Bolton Street cemetery, in central Wellington, reached maximum capacity in 1892 the focus shifted to Karori cemetery. Yet for many the difficulty in reaching Karori prevented them from being able to regularly visit the graves of friends and relatives.⁶

Prominent businessmen recognised that the need for a new route to Karori, as well as the growing popularity for hillside residences. This demand provided good investment opportunities. In September 1895 Lewis Henry Balfour Wilson and John

¹ Adrian Humphris and Geoff Mew, *Ring around the city: Wellington's new suburbs 1900-1930* (Wellington: Steele Roberts, 2009), p.80

² Humphris and Mew, p.10

³ Kevin Bourke, *Kelburn, King Dick and the Kelly Gang: Richard Seddon and political patronage* (Wellington: Hit or Miss Publishing 2008), p.8

⁴ *Ibid.*, pp.41-42

⁵ Humphris and Mew, p.83

⁶ Bourke, p.43

Kirkcaldie purchased Upland Farm and within a week they had formed the Upland Estate Company.⁷ The company also purchased land at the upper end of Aro Street in order to prevent a rival company from creating their own Karori transport route.⁸ By having a monopoly on the land, the Upland Estate Company believed that they could leverage Wellington's city council. However the Council countered this by making an agreement with Karori Borough to install a tramway from Tinakori Road in Thorndon.⁹

In 1896 the company examined possible access routes to Upland Estate. One of the difficulties they faced was extremely steep terrain. An initial idea was to redevelop one of Moxham's access tracks, which led through the Plantation Reserve near Mount Street Cemetery.¹⁰ When this was declined by the Public Works Committee, James Edward Fulton (1854–1928), the company's consulting engineer, then recommended the construction of a road using a route similar to the current Kelburn Parade and Glasgow Street. In order to provide better access to the Upland Farm from the Terrace, one of the directors of the company, Martin Kennedy, gave the Council permission in 1897 to extend Salamanca Road through land he was leasing from the Wellington Hospital Trustees.¹¹

It was also Kennedy who first recommended that a cable car should be constructed in order to provide easier access to the proposed Upland Farm development.¹² Cable trams had precedents in New Zealand: development of Dunedin's three separate cable tramways started in the 1880s and covered several kilometres.¹³ Kennedy seems to have been a driving force behind the realisation of the Cable Car, securing the required Lambton Quay terminus property. Kennedy was a director of both E. W. Mills and Company and the New Zealand Times Company. At this time the New Zealand Times was looking for new premises, and Kennedy convinced the other directors to purchase E. W. Mills and Company's property on Lambton Quay which could then be subdivided, with an allotment being used to build the lower Cable Car terminus.¹⁴

With this land acquired, the Upland Estate Company formed a subsidiary, the Kelburne and Karori Tramway Company, to oversee the construction of its cable car.

⁷ Humphris and Mew, p.81

⁸ Bourke, p.41

⁹ Ibid., p.8

¹⁰ Humphris and Mew, p.83

¹¹ Bourke, p.9

¹² Ibid., pp. 8, 11

¹³ Stewart, 1997, p.175; Pers. Comm. Mike Mellor to Karen Astwood, 17 March 2014

¹⁴ Bourke., pp.11, 139

The company first announced their plans in a July 1898 *Evening Post* article.¹⁵ The following month the Tramway Company launched a prospectus offering 10,000 shares of £1 each. However, the prospectus failed to gain much interest, with only 1,600 public shares sold.¹⁶ Therefore, the company's directors used their business and political influence to promote a positive image of the proposed development and garner support. Not only did Kennedy use his position at the *New Zealand Times* to ensure that the newspaper wrote encouraging articles, but the Mayor J.R. Blair (whose finance company was involved in the project) also publically endorsed the development of the cable car.¹⁷

The political and commercial manoeuvring was to continue for several years. Because the private cable car needed to pass underground the company was advised by Francis Henry Dillon Bell, a lawyer and former mayor of Wellington, that special legislation was needed. On 29 July 1898 the Wellington High Level Tramways Bill was read in Parliament. It was supported by Premier Richard Seddon, which was perhaps influenced by Kennedy and Blair being important advocates for his Liberal Party.¹⁸ The underground work needed Public Works Department (PWD) and Wellington City Council consents, and again the company used its connections to ensure success.¹⁹ Then in 1901 Charles Pharazyn (a member of the company who was also developing the new suburb of Northland) donated £1,000 to Victoria College. At that time the college was looking for a new location and part of the understanding behind the donation was that they would relocate their campus to Kelburn.²⁰

Building the Cable Car

James Fulton, who had been associated with the Upland Estate Company from early in its history, designed the Cable Car. This was described as “a complicated piece of work of tunnels, viaducts, and retaining walls, and [Fulton also] designed the necessary machinery and safety appliances for handling the traffic.”²¹ At the time of his death in 1928 Fulton was said to be “one of the best known engineers in the Dominion” and the Cable Car was seen as one of his biggest achievements.²²

¹⁵ Humphris and Mew, p.84

¹⁶ Bourke, p.12. It has been suggested that the reason for this lack of interest was due to the financial disasters which had recently befallen the Melbourne cable cars which, as with the Kelburne and Karori Tramway Company, had been closely intertwined with land development. See: Bourke , p. 13

¹⁷ Bourke, pp.13-14

¹⁸ Ibid., pp.16-17

¹⁹ Ibid., p.18

²⁰ Ibid, p.150

²¹ 'Obituary. Mr J. E. Fulton, M.I.C.E.,' *Evening Post*, 7 December 1928, p.10

²² 'Obituary. Mr James Edward Fulton,' *Auckland Star*, 8 December 1928, p.12

Indeed, he had had a distinguished career coming through the ranks of the PWD and going into private practice in 1880. He is noted for being a Resident Engineer on Wellington–Manawatu Railway, and later for designing the original timber trestle, Kelburn Viaduct, and many large bridges.²³ One of his lasting legacies is the IPENZ Fulton-Downer Gold Medal (initially established by Fulton's bequest in 1929), which is presented annually and is IPENZ's premium award to its members.²⁴

The construction of the tramway was overseen by Maurice O'Connor (1840–1921) and undertaken by subcontracted labourers.²⁵ Because he ordered the simultaneous construction of all three tunnels, O'Connor was employing as many as 50 men at a time. Many of the materials were sourced from businesses which O'Connor and other company's directors had interests in.²⁶ With work beginning early and continuing late into night, local residents complained, especially about the use of explosives.²⁷ However, by June 1901 the tunnels and viaducts were nearing completion and track laying began.²⁸

In 1900, the Secretary and Engineer of the Wellington Harbour Board, William Ferguson (1852–1935), travelled to the United States and Europe on business. On behalf of the Kelburne and Karori Tramway Company he also explored various cable car systems. Initially the company had leaned towards using a water balance system, but this changed after Ferguson met Croydon Marks, a cable car designer, in London. Ferguson's conclusion was that a motor driven cable car would be the most suitable approach. Therefore, on April 1901 the company announced that the engine would be powered by steam.²⁹ To house the engine a two storey winding house, also designed by Fulton, was built at the Upland Road terminus. The smokestack would eventually become a Wellington landmark and its smoke plumes were often relied on as an indicator of wind direction.³⁰

²³ F. W. Furkert, *Early New Zealand Engineers*, Wellington, 1953, p.172

²⁴ 'Fulton-Downer Gold Medal – President's Award,' IPENZ, URL: http://www.ipenz.org.nz/ipenz/Who_We_Are/honours_and_awards/Awards_Events/fulton_downer.cfm (accessed 17 July 2012)

²⁵ *Ibid.*, p.20. While in some sources it has previously been reported that prison labour was used for the construction of the tramway, this is not in fact correct. This mistake probably has its origins in the fact that prison labour was used to build Salamanca Road and Kelburn Park. See: Bourke p.22

²⁶ *Ibid.*, pp.21-22

²⁷ 'Picks, shovels and perseverance,' Cable Car Museum interpretation board

²⁸ Bourke, pp.23, 27

²⁹ *Ibid.*, pp.24-27

³⁰ Graham Stewart, *The Kelburn Cable Car Wellington New Zealand: celebrating 100 years of service* (Wellington: Grantham House Publishing, 2001), p.19

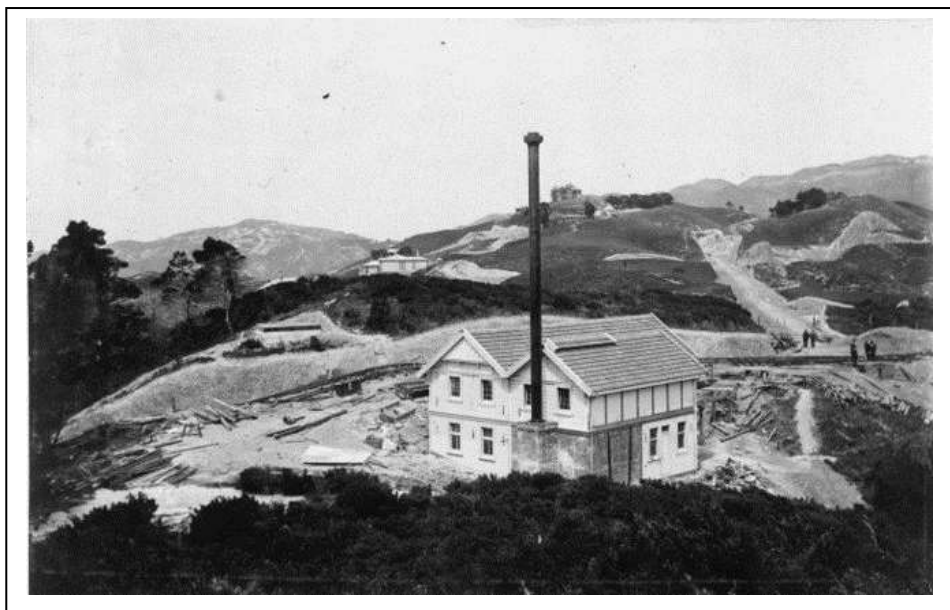


Figure 1: Cable car power house, Kelburn, Wellington, and cable car line under construction. Wilson, Kenneth Adrian, fl 1983: Photographs relating to Wellington. Ref: 1/2-136054-F. Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/22306185>

Of course the line also required cars to carry passengers. The two original cable cars, Grip Cars 1 and 2, were ready in late 1901. These were designed and manufactured by Mark Sinclair of Dunedin, who had previously provided cars for the local market. It was reported that the Wellington cars “will be the finest cable cars in use in the colony, owing to the scope afforded to the builder in carrying out good design.”³¹

On 22 February 1902 the line opened to the public for the first time and was an immediate success.³² This is evident in the fact that up to 4,000 passengers experienced the cable car on its opening weekend, and by 1912 it carried over one million passengers annually.³³

Developing a Wellington icon

The line was so popular that in 1903–1904 three Palace trams were purchased from the Wellington City Council and converted into 30 seat trailers to increase capacity.³⁴ The growing popularity of the Cable Car meant that in 1904 a third car, Grip Car 3, was designed and built in Wellington. The original cars were heavier than the company had expected, so Grip Car 3 was built to be as light as feasible to not place any further undue load on the winding machinery. However, after an initial period of

³¹ ‘Local Manufacturers,’ *Otago Witness*, 20 November 1901, p.1

³² Stewart, 2001, p.18

³³ ‘First run: 22 February 1902,’ Cable Car Museum interpretation board; C. Perfect, ‘Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,’ Wellington Museums Trust, March 2007, p.12

³⁴ Stewart, 2001, p.18; Perfect, ‘Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,’ p.64

continuous use, Grip Car 3 served as a reserve car used only when either of the original two was out of service for maintenance.³⁵



Figure 2: Richard Seddon and others on and near the Kelburn Cable Car. Wilson, Kenneth Adrian, fl 1983: Photographs relating to Wellington. Ref: 1/2-135995-F. Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/22747432>

The steam driven cable car system continued throughout the early 20th century, until 1933 when electricity replaced steam power. In late 1946 the Wellington City Council purchased the Cable Car, incorporating it into the Council's public transport portfolio that included bus and tram services. However, it was not until 1962 that the city's coat of arms was added to the cars.³⁶

The historic cars were declared unsafe by the Ministry of Works (MOW) in 1974 after a review sparked by a 1973 incident when a construction worker stepped out in front of one of the cars.³⁷ As a result of the MOW enquiry the Palace trailers were withdrawn from service in July 1974 and Grip Car 3 the following year. In 1980 Trailer 5 was turned into a feature for the children's playground on Salamanca Road.³⁸ In the years following the removal of the trailers the line was upgraded to meet modern safety standards, and the City Council decided to replace the original cars. The cars

³⁵ Graham Stewart, *Fares please!: the horse, steam and cable trams of New Zealand* (Wellington: Grantham House pub., 1997), p.64; Perfect, 'Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,' p.1

³⁶ Cable Car Museum, 'Meeting the demands of a growing city,' p.1, <http://www.cablecarmuseum.co.nz/assets/PDFs/Cable-Car/Meeting-the-needs-of-a-growing-city.pdf>, accessed June 20 2012; Stewart, 2001, p.18

³⁷ Stewart, 2001, p.18; 'The beginning of the end,' Cable Car Museum interpretation board

³⁸ Stewart, 2001, p.20; 'The beginning of the end,' Cable Car Museum interpretation board; Perfect, 'Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,' p.15

made their final journey on 22 September 1978 and were treated to a grand farewell ceremony by Wellington's public.³⁹ After a year of upgrades, the new line finally opened on 20 October 1979. Along with new Swiss made cars the line also featured new stations and foot bridges, a relocated winding system, track regauging and singling, and a new control system.⁴⁰

Following the introduction of the Swiss system it was decided that the former winding house should be saved and turned into a museum.⁴¹ This did not happen immediately and it served as an interpretation centre for the City Council Parks and Recreation department before briefly becoming the headquarters for Wellington Civil Defence.⁴² In 1992 Peter O'Neill founded the Cable Car Heritage Society and when the winding house faced demolition in 1993, the society argued that the building was of historic importance and should be preserved.⁴³ The City Council agreed and finally confirmed that the former Winding House would be turned into a museum.⁴⁴ In 2000 the restored building opened as the Cable Car Museum, with Grip Car 1 featuring as a main display item. In 2005 extensions were made to the museum and the restored Grip Car 3 was placed on display.

Throughout the 1990s operation of the Cable Car passed through various companies. In 2007 the contract was once again taken up by the Wellington Cable Car Company, a council controlled organisation.⁴⁵ Although there are now roads, walkways and bus routes connecting Kelburn to the city and its surrounding suburbs, the Cable Car is still a popular form of transport and is used on a daily basis by local residents and university students, as well as tourists. For the last few years the annual passenger numbers have averaged over a million people.⁴⁶

³⁹ Stewart, 2001, p.20

⁴⁰ Pers. Com. M. Mellor to K. Astwood

⁴¹ 'The winding house,' Cable Car Museum interpretation board

⁴² Wellington City Council, Cable Car Winding House,

<http://www.wellington.govt.nz/services/heritage/details.php?id=16&m=building&p=1>, accessed 2 July 2012

⁴³ City Voice, 'Rewinding the first cable cars,' November 16 1995, p.12. NZHPT Folder 12009-241, Volume.1

⁴⁴ 'The winding house,' Cable Car Museum interpretation board

⁴⁵ Wellington Cable Car, 'History,' <http://www.wellingtoncablecar.co.nz/index.php?id=909>, accessed July 02 2012.

⁴⁶ Wellington Cable Limited, 'Statement of Intent 2010/2011,' p.11. URL:

http://www.wellington.govt.nz/haveyoursay/meetings/subcom/Council_Controlled_Organisation_Performance/2011/13Jun1030/pdf/WCCLSUI.pdf (accessed 16 July 2012)

Social narrative

The Wellington Cable Car is an iconic feature of the city. A popular tourist attraction, it often features on postcards or promotional photographs of the city. Yet its use is not simply confined to tourists. For over a century Kelburn residents and university students have ridden the cars on a daily basis.

The city's population started to rapidly increase following the relocation of the New Zealand government from Auckland to Wellington in 1865.⁴⁷ In the early 1870s, Colonial Treasurer Julius Vogel launched a public works programme which was aimed at connecting the country through the use of railways.⁴⁸ The need for manpower led to an increase in immigration, which resulted in the expansion of cities like Wellington. With the completion of railway lines in the 1880s, farmland in the Hutt Valley and the Wairarapa became accessible from Wellington and therefore the farmland on the hills surrounding the city was no longer necessary.⁴⁹

Because the new suburbs were located on the outskirts of the city, residents needed an effective and affordable means of accessing the inner city. In 1872 the New Zealand government passed the Tramways Act which allowed both public and private companies to operate tram systems. This was followed in 1877 by the formation of the Wellington Tramway Company, resulting in the connection of Wellington's outer suburbs with the inner city.⁵⁰ Since passengers were now able to travel relatively quickly to and from the outer suburbs, they became seen as a more desirable location for residences than the crowded suburbs of Thorndon and Te Aro. Therefore tramways and the Cable Car became an integral feature of daily life in Wellington society.

Tramways were constructed in towns and cities around New Zealand, and cable tramways were particular features of Dunedin and Wellington, in the late 19th and early 20th centuries. However, of the horse, steam, and cable driven examples highlighted in Stewart's *Fares please!*, only the Wellington Cable Car's route is still in use with a modern system comparable to its original one.⁵¹ Tramways, even electric ones, were a dying breed in New Zealand by the 1950s. During this period they were

⁴⁷ Humphris and Mews, p.14

⁴⁸ New Zealand History Online, 'Building Vogel's railways,' URL: <http://www.nzhistory.net.nz/politics/the-vogel-era/building-vogels-railways>, (Ministry for Culture and Heritage), updated 8-Feb-2012, accessed 5 July 2012

⁴⁹ Humphris and Mews, pp.16, 35

⁵⁰ Ibid., pp.25-26, 30

⁵¹ Stewart, 1997

phased out in Auckland, Christchurch, Dunedin, and Invercargill.⁵² Wellington became the “last stronghold of the tram-car,” but its street tramways finished in the 1960s.⁵³ However, the Wellington Cable Car continued as an authentic Victorian/Edwardian combination cable tramway and funicular system until the late 1970s.⁵⁴

A popular past time for many Wellingtonians, including former mayor Michael Fowler, was to sit on the open faced side seats of Grip Cars 1 and 2 and kick the walls of the tunnels while passing through.⁵⁵ Moments such as these meant that Wellington citizens developed sentimental bonds with the Cable Car. The strength of these ties became evident in 1978 when the original cars were finally removed due to safety concerns. Crowds turned out to farewell Grip Car 2 as it made its final journey from Lambton Quay up to the Upland Road terminus. The passengers who made the trip sang ‘Auld Lang Syne’ while university students from Weir House pelted the car with eggs and water bombs. When the car finally reached the summit it was met by a pipe band.⁵⁶

The respect that Wellington citizens had for the Cable Car ensured that when the original system was upgraded in the late 1970s some remnants of the original system were preserved in anticipation of a museum’s creation. This was eventually realised when the Cable Car Museum opened in 2000. Today local and international visitors are able to visit the museum and see the original Grip Cars 1 and 3.

⁵² Stewart, 2001, p.112. Christchurch’s heritage trams were reintroduced in 1995.

⁵³ Ibid., p.108

⁵⁴ Perfect, ‘Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,’ p.15

⁵⁵ Ibid., p.20

⁵⁶ Ibid

Physical narrative

The main physical components of engineering importance for the Wellington Cable Car system are its route (including original tunnels and viaducts) and the current line and system, as well as the former Winding House, now housing the Cable Car Museum. Some of the remaining cars that were used between 1902 and 1978, and some operational machinery, are part of the Museum's collection, but others are located elsewhere. These aspects are discussed below.

The Cable Car's original concept and route was designed by James Edward Fulton. Despite being commonly referred to as a cable car, the system used to operate the ascending and descending cars was in fact a combination of a cable tramway and a funicular.⁵⁷ The system made use of two cables; the driving cable which would tow the descending car downhill and the tail wire which connected the two cars. The momentum of the descending car would haul the second car uphill through the connected tail wire. The term 'cable car' could therefore only be technically applied to the descending car as it was only on the downhill journey that the cars gripped the driving cable.⁵⁸

The route and line

Originally the line was double track between the Lambton Quay terminus and the Upland Road terminus; a length of 785 metres (m).⁵⁹ The tracks were New Zealand standard railway gauge of 3 feet 6 inches. When the line was rebuilt the gauge was changed to metre gauge, a common European narrow gauge.⁶⁰ As it still does today, from the Lambton Quay terminus the track climbed a gradient of 1:5.1 to a height of 119 m, passing through three tunnels and crossing over three timber trestle viaducts (see Figures 3 and 5).⁶¹ It seems that the viaduct trestle piers were replaced with concrete equivalents beginning in 1929 and steel girders inserted.⁶² There are three intermediary stations: Clifton, Talavera and Salamanca (in ascending order).

⁵⁷ Cable Car Museum, 'A marvellous engineering feat,' p.1, <http://www.cablecarmuseum.co.nz/assets/PDFs/Cable-Car/A-marvelous-engineering-feat.pdf>, accessed 20 June 2012. A funicular is a cable railway. A cable is attached to a pair of tram-like vehicles on rails which moves them up and down a steep slope. The vehicles counterbalance each other as they ascend and descend.

⁵⁸ Stewart, 2001, p.25

⁵⁹ Wellington Cable Car Museum, 'A marvellous engineering feat,' p.1

⁶⁰ Pers. Com. M. Mellor (Rail Heritage Trust of New Zealand), to K. Astwood, 30 April 2013

⁶¹ Cable Car Museum, 'A marvellous engineering feat,' p.1

⁶² This approximate date for the changes to Fulton's original viaducts is based on photographic evidence. See: Salamanca Road bridge on Kelburn cable car tramway, Wellington, New Zealand, 23 July 1929. Dominion Post (Newspaper): Photographic negatives and prints of the Evening Post and Dominion newspapers. Ref: EP-Municipal-

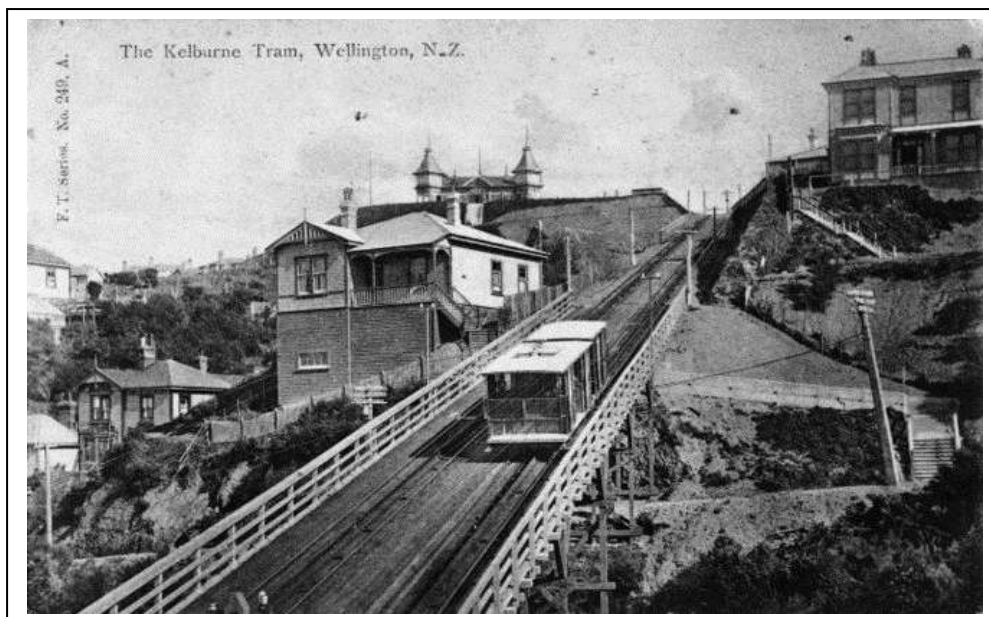


Figure 3: Cable car, Kelburn, Wellington. Original photographic prints and postcards from file print collection, Box 8. Ref: PAColl-6075-37. Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/23016318>. This image shows one of the cars crossing the viaduct at Salamanca Road, in 1910

When the line was rebuilt in the late 1970s it was single track with Australian high carbon steel rails and a midway crossing loop at Talavera Station. To ensure that each car moves onto the correct side of the loop when passing, the cars have double-flanged wheels on one side and flat wheels on the other.⁶³ The cable currently used to haul the cars is 690 m long with a 30 mm right hand Lang lays polypropylene core.⁶⁴ Its length is tested regularly with a magnetic wire tester which searches sections of the cable in order to detect any possible fraying or corrosion.⁶⁵

The stations also underwent some changes when the original track and cable cars were replaced by the new system. Today Clifton Station is located beneath the Wellington motorway which was built in the 1970s.⁶⁶ While pedestrians were originally allowed to cross the tracks at Talavera Station, a footbridge now allows for safe passage.⁶⁷

Cable car-05. Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/23194540>; Evening Post" Photo, FROM KELBURN TO THE CITY.—The bridge across Everton terrace, known as the Talavera "stop," on the Kelburn cable car, which is being rebuilt by the Kelburn Tramway Company by contract. The work is to be carried out without holding up the service. (Evening Post, 26 February 1930). Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/17621785>

⁶³ Stewart, 2001, p.25

⁶⁴ Ibid.

⁶⁵ 'The new system,' Cable Car Museum interpretation board

⁶⁶ Stewart, 2001, p.4

⁶⁷ Ibid., p.6

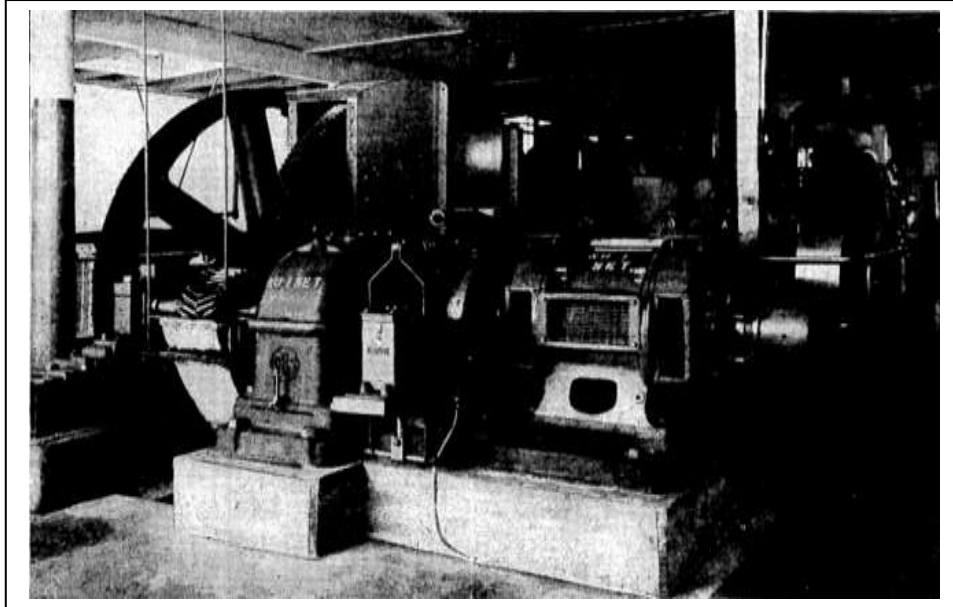


Figure 4: Evening Post Photo. “ELECTRIFYING THE KELBURN CABLE-TRAM. View, of the engine-room at the Gardens end of Upland Road, where the cables are controlled which draw the cars from Lambton Quay to the heights of Kelburn. The electric motor seen in the foreground has just been installed and will supersede the steam unit, shown in the background...” (*Evening Post*, 24 July 1933). Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/17494599>

The Winding House

Initially the Winding House (see Figure 1) consisted of twin gables and its two storeys contained the winding gear, boiler house (with an accompanying 19 m high smokestack), and a workshop for maintenance of the cars.⁶⁸ With the introduction of electricity in 1933 (see Figure 4) the wing containing the original boiler was removed. The building was restored and altered in preparation for it becoming the Cable Car Museum. Additions were made to the building by the architectural firm Bevin and Slessor who designed a new gabled wing to house the restored Grip Car 3. The style of this new wing references the original boiler house.⁶⁹ The machinery originally used to haul the descending car, and other aspects of the operating mechanism, are on display and are discussed within the Museum.⁷⁰

The cars

Grip Cars 1 and 2 were built in 1901 and were the first put into service when the line opened in 1902 (see Figure 2).⁷¹ They were built by Mark Sinclair and were similar to his Mornington cable cars in Dunedin. Wellington’s grip cars were 5.8 m in length and could seat up to 32 passengers. The driver’s compartment was located in the centre

⁶⁸ ‘The winding house,’ Cable Car Museum interpretation board

⁶⁹ Tommey Honey, ‘Gripping Yarn,’ *Architecture NZ*, 2, 2007, p.77, <http://www.bevinslessor.co.nz/publications/ArchNZCableCar.pdf>, accessed 26 June 2012

⁷⁰ Cable Car Museum, ‘A marvellous engineering feat,’ p.1

⁷¹ Stewart, 1997, p.60

of the car and on either side of it were open faced longitudinal seats. These seats were stepped so that passengers would remain level within the cars. At each end of the cars there were enclosed saloons with two cross bench seats that faced each other.⁷²

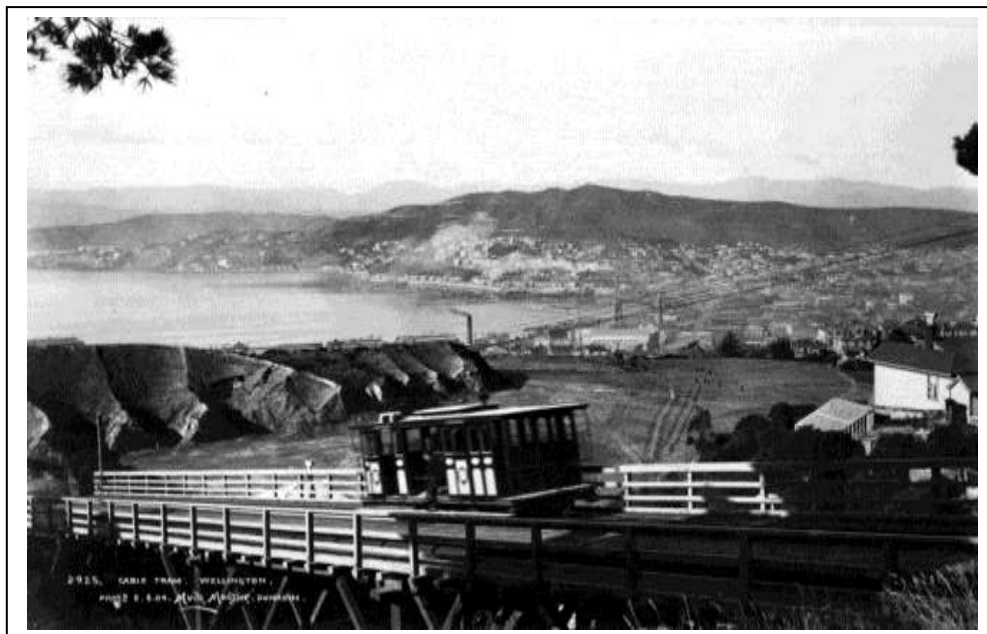


Figure 5: Muir & Moodie (Firm). Wellington cable car and city, 1904. Ref: 1/2-003716-F. Alexander Turnbull Library, Wellington, New Zealand. <http://beta.natlib.govt.nz/records/22798789>

Grip Car 3's design is attributed to John Welsby and it was built in 1904 by Wellington's Rouse and Hurrell Carriage Building Company. At 6.4 m in length, Grip Car 3 could carry a larger number of passengers than the initial two. However this meant that the operating space in the driver's cabin was reduced.⁷³ Grip Car 3 also featured enclosed saloons with inward facing seats, as well as some open outward-facing seats.⁷⁴ While the cars came to be known by the affectionate moniker Red Rattlers, they were not always that colour. Testing during the restoration of Grip Car 3 showed that the original colour was green with white panelling.⁷⁵ In the conservation plan for this car, Perfect notes that "[a]t an unknown time in its life its original appearance was substantially reduced" because of alterations such as removal of side windows and enlargement of a window in the gripman's cabin, replacement

⁷² Ibid.

⁷³ 'Grip Car 3,' Cable Car Museum interpretation board; Perfect, 'Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,' p.15

⁷⁴ Pers. Com. M. Mellor to K. Astwood. Information drawn from Perfect, 'Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,' pp.53-54, 72

⁷⁵ 'Grip Car 3,' Cable Car Museum interpretation board

cabin doors, and panels replacing the original mesh screens at either end of the car.⁷⁶

Instead of purchasing further cars, the Tramway Company then acquired three Palace horse drawn trams from the Wellington City Council, originally built in the 1880s for the Wellington Tramway Company. These trams were refurbished and shortened so that they could operate as trailers to the existing cars. The trailers, numbered 4, 5 and 6, were 4.3 m in length and could seat up to 30 passengers. Each featured two enclosed compartments and open faced seating at either end.⁷⁷

After its retirement in 1975 Grip Car 3 was kept in storage until a decision was made in 2004 to restore it to its original condition. In 2005 it was put on display in the Wellington Cable Car Museum, along with Grip Car 1. Grip Car 2 and Trailer 6 are part of the Wellington Tramway Museum's collection in Paekakariki. In 1980 Trailer 5 became the main feature of a children's playground located on Salamanca Road. This was relocated to Paekakariki in 2012.⁷⁸

The current cars are Swiss-made (see page 1) and their design references the Victorian originals. However, unlike the original cars, the current cars are enclosed. The cars are operated by an ASEA AC410 PLC computer system which controls the speed and positioning of the cars. The job of the drivers is to close the doors and to activate the cars by way of an Abbey System UHF microAlert telemetry system. This telemetry system is responsible for transmitting data between the cars and the computer system and monitors the cars for any malfunctions.

Key physical dates

1900	Construction of the tramway line begins
1901	Grip Cars 1 and 2 are built
1902	The Winding House is built
1903-1904	Three Palace trams are modified to operate as car trailers
1904	Grip Car 3 is built
1907	Electric lights installed in cars

⁷⁶ Perfect, 'Conservation Plan & Restoration Review for Kelburn Cable Tramway Grip Car 3,' p.1. Perfect notes that the side windows may have been removed *circa* 1935, p.15

⁷⁷ Stewart, 1997, pp.62, 64

⁷⁸ This trailer is also accompanied by a replica steam engine. The reason for this is that when there was originally some indecision as to whether the Palace tram actually started out as a horse drawn vehicle. It was believed that the tram was actually hauled by a steam engine that was disguised as a tram so that it would not frighten passing horses. See: 'Steam engine for park,' Evening Press, 12 May 1980. NZHPT Folder 12009-241, Volume 1

<i>circa</i> 1929-30	Timber trestle viaduct piers replaced with concrete equivalents
1933	The steam driven engine is replaced with an electric motor The wing of the winding house containing the boiler is removed
1935	Grip Car 3 overhauled and painted. Main windows possibly removed at this time
1962	Wellington's coat of arms added to the cars
1974	The Palace trailers are removed from service
1974-75	Grip Car 1 is strengthened
1975	Grip Car 3 is removed from service
1978-79	The original Grip Cars 1 and 2 are removed. Renovations begin in preparation for a new line. Rebuild of system including a relocated winding system, track regauging, singling, new cars, and control system
1980	Trailer 5 is turned into the main feature of a children's playground on Salamanca Road
2004-05	Grip Car 3 is restored to its original 1904 condition
2005	Extensions are made to the museum and the newly restored Grip Car 3 is placed on display
2012	Trailer 5 is removed from the playground at Salamanca Road and transferred to the Wellington Tramway Museum in Paekakariki
February 2014	New Upland Road/Botanic Garden terminal opened

C. Assessment of significance

For over a century the Wellington Cable Car has proven an integral feature of the capital city. The system has also played an important role in the city's social heritage. Built at a time when the city was expanding into unused farmland, its construction assisted in the development of the suburb of Kelburn. The Wellington Cable Car is an excellent example of a private engineering venture which was embraced by the public so whole-heartedly that it eventually became part of the public transport system.

The Wellington Cable Car also has considerable engineering value. An aspect of the tramway, which makes it unique in New Zealand, is it has remained in continuous use since it first opened in 1902, with the exception of a short period during its modernisation in 1978–79. The route, with its tunnels and viaducts, is one of the best known works of James Edward Fulton, a leading late 19th and early 20th century New Zealand engineer. The remaining early cars and trailers are also recognised as important vestiges of Victorian modes of transport, and have been preserved in museums as a result. Indeed, the significance of the Wellington Cable Car is recognised with a specialist museum in the former Winding House.

Therefore, the Wellington Cable Car is of sufficient engineering heritage significance to merit inclusion on the IPENZ Engineering Heritage Register.

D. Supporting information

List of supporting information

Cable Car Museum, <http://www.cablecarmuseum.co.nz/cable-car-museum/>

The Wellington Cable Car, <http://www.wellingtoncablecar.co.nz/>

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