

Independent technical analysis of the Wellington trolleybus electrical infrastructure
Appendix 2: Overhead lines assessment Draft 14/12/2015 (Prepared by AEC Neilson)

Route	Section	Length (metres)	Cat 1 (metres)	Cat 2 (metres)	Cat 3 (metres)	Cat 4 (metres)	Comments
Karori	Bowen St (from Lambton Quay to Tinakori Rd)	820		820			Renewed about 5-7 years ago
	Tinakori Rd (Bowen St intersection to Viaduct (Pole K78))	1330			1330		Some parts may need renewal?
	Viaduct (Pole K78) to Cemetery (Pole K141)	1560	1560				Renewed 2015
	Cemetery (Pole K141) to Karori Terminus	2540	2540				Renewed in last 2-3 years

Brooklyn	From Manners St Intersection to Brooklyn Rd/Webb St intersection via Victoria St	990		791			Single outgoing line section in good order
	From Manners St Intersection to Brooklyn Rd/Webb St intersection via Willis St	917			734		Single incoming line section may need some repair?
	Brooklyn Rd/Webb St intersection to Pole G17 (opposite Central Park)	160	160				Curve renewed
	Pole G17 to Cleveland St Pole G96	1620			1000	420	Patch renewals sighted on one curve. Some parts particularly on curves and Cleveland Rd may need renewal (thus allowance of 420m)
	Cleveland St (Pole G96) to The Ridgeway (between Poles G157 & G158)	1400	630	770			630m section from Pole G132 (by 157 Mills Rd) southwards to poles G157/8 renewed in recent years
	The Ridgeway (between Poles G157 & G158) to Wentworth Terrace intersection	200			200		Section may need some repair (older overhead??)
	The Ridgeway from Wentworth Tce intersection to Kingston Terminus in Qebec St	700		700			Installed about 1987 when route extended to Kingston

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Aro St	From Willis St intersection to terminus	860		660	200		Section in overall good repair but some parts may need some minor renewal. A lightly used route
Island Bay	From Riddiford - Rintoul St intersection to Luxford St/Adelaide Rd intersection	1120	1120				Rebuilt in recent years
	Adelaide Rd from Luxford St intersection to Pole A73	650				650	Older section with 80 mm ² contact wire. Classified as needing rebuild as rest of route upgraded, and a high
	Adelaide Rd from Pole A73 to The Parade Terminus	1950	1950				Rebuilt in recent years
Lyll Bay	From Rongotai Rd intersection along Onepu Rd to Pole L 19	430			330	100	Includes complex junction arrangements with Bus depot
	Along Onepu Rd from Pole L 19 to Lyall Parade	840	840				Rebuilt in recent years
	Onepu Rd /Lyll Parade intersection to Rua St/Queens Drive intersection	368			368		Older overhead
	Outward single line in Rua St and Queens drive	388	310				Rebuilt in recent years
	Inward single line leg in Queens Drive	360			148	140	Older overhead, some also subject to significant corrosion. Some re-wiring may be necessary?
	Onepu Rd /Lyll Parade section to terminus	580		580			Good order. Rebuilt in recent years, but subject to significant corrosion due to costal proximity.

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Seatoun	From Caledonia St /Hobart St intersection to Seatoun Dundas St /Monro St intersection	2440	2440				All recently rebuilt.
	Seatoun terminus loop line - Monroe/ Burnham/ Hector/ Dundas streets	830	664				Single direction line. All recently rebuilt.
Miramar	From Caledonia St /Hobart St to Park Road /Rotherham Tce intersection	1250				1250	Older overhead certainly needing some selective rebuild, and probably full contact wire replacement?
	Rotherham Tce	300		300			New contact wire - some minor renewals of fittings and span wires may be necessary
	Darlington Rd - from Rotherham Tce intersection to terminus	900				900	Mainly long straight section. Contact wire may need full replacement?
Kilbirnie - Miramar Jctn	From Onepu Rd/Rongotai Rd intersection to Troy St (point opposite Kemp St) - 557m	1114			891		Outward and inward lines on adjacent parallel roads (each approx 557m). Some part renewal may be required, mainly on curves
	From Troy St (point opposite Kemp St) along Cobham Dr to Calabar Rd (south side of roundabout) - 633m.	1266	1013				Outward and inward lines on adjacent parallel roads (each approx 633m). Rebuilt in recent years.
	Along Calabar Rd (south side Roundabout) to Caledonia St /Hobart St intersection	700		400	300		400m along Calabar Rd rebuilt in recent years
Kilbirnie Junction	Section on Rongotai Rd from Bay Rd and Onepu Rd intersection	120				120	A complex junction area that will need periodic work and some renewals

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Kent Tce - Haitaitai	From intersection Elizabeth St /Kent Tce to west end Haitaitai Tunnel Portal (Pirie St)	800	800				Recently rebuilt
	Haitaitai Tunnel	392		392			392m tunnel section by observation at ends has newer heavy contact wire, but condition could not be sighted, so assumed to be in good repair.
	West end Haitaitai tunnel to Moxham Ave /Waitoa Rd intersection.	340				340	Section from tunnel down Waitoa Rd shows signs of battering especially on outgoing line on down hill grade and should be considered for rewiring. Span wires and sweeps observed under replacement July 14 as a part of pole replacement work.
Haitaitai - Kilbirnie	Moxham Ave /Waitoa Rd intersection to Bay Rd/Rongotai Rd	1600	50		1050	500	Section on corner Moxham Ave/Hamilton Rd between poles M34 and M36 recently renewed. Other sections
Haitaitai Loop	Single direction line up Haitaitai Rd, to Arawa Rd, down Waipapa Rd and back into Waitoa Rd (now out of use)	0			0	0	Overhead largely as erected in early 1960's. Showing signs of significant contact wire wear and deferred maintenance with "essential only" work being carried out. Complex junction at Waitoa Rd high maintenance. Considerable number of hardwood poles still installed (probably installed in the late 1940 for original loop opened about 1950). NB Loop excluded from assessment quantities.

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Taranaki St - Wallace St - John St	From Manners St intersection to Adelaide Rd	1900		1500	400		Installed about mid 1980s. Some maintenance renewals may be necessary on part of the route depending on wire wear (allowance of 400m)
Newtown - Kilbirnie	From Riddiford St/ John St intersection to Bay Rd/Rongotai Rd intersection	1650	1650				May 2015 - Showing signs of significant wear in patches, especially in in Crawford Rd. Crawford Rd section should be earmarked for rewiring. Some replacement work in the John St section probably necessary also. Now undergoing replacement (September 2015)
Newtown	From intersection Riddiford/Constable St to Zoo Terminus in Roy St	900		900			Installed about mid 1980s. Lightly used route. Possibly some minor renewals may be necessary on curves depending on wire wear??
Courtney Place - Newtown	From Courtney Pl /Majoribanks St intersection to Basin Reserve south side (approx 660m each road).	1320		856	200		Most in good order. 200m south & west side of Basin Reserve may need some repair. Outward and inwards lines on separate adjacent roads -each approx 660m.
	Adelaide Rd - from Basin Reserve south side to intersection John St/ Adelaide Rd	700	130		620	100	Section from Basin Reserve to Hospital Rd needs some work -possibly partial renewal?
	Riddiford St - from John St/ Adelaide Rd intersection to Riddiford St/ Constable St intersection.	730		730			Includes junctions at Adelaide Rd/John St and Riddiford St/Rintoul St, which will need ongoing maintenance and minor repairs from time to time

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Lambton Quay - Courtney Place (see special note below)	Lambton Quay - Terminal to Bowen St intersection	260	340			60	Incorporates allowance for terminus wiring
	Lambton Quay - Bowen St to Hunter St intersections.	668		80		588	Outward leg (160m) Panama St to Hunter St relatively new contact wire (allow 80m)
	Outward leg down Hunter St to BNZ corner Willis St	200				160	Single outgoing line section
	Inward leg Lambton Quay - BNZ corner to Hunter St	145				116	Single outgoing line section
	Willis St - BNZ corner to Mercer St	335	60			275	60m allowance for 122m of new contact wire on outward leg Mercer St to Manners St intersections
	Manners St - between Willis St and Taranaki St intersections	500	400	100			100m allowance for 200m of new contact wire on inward leg Taranaki St to Cuba St intersections
	Courtney Place - Taranaki St to Cambridge/Kent Tce intersections	471				471	
Service Lines (single direction)	Wgtn CBD	3350		2680			Lines in overall good order, and low usage.
	Ross St Kilbirnie	330			265		Lines may need minor renewal, low usage.
	Karori depot	720	580				Renewed in recent times.
Category totals	Category totals summated		17237	12259	8376	5850	43722
Total line length by road	All sections	46014					Excludes Kilbirnie Bus depot wiring and Haitaitai loop lines

SUMMARY			
Overhead categories	Cat No	Length	Percentage
New wire	Cat 1	17237	39%
Good order	Cat 2	12259	28%
Some rebuild needed within 10 years	Cat 3	8376	19%
Major rebuild needed within 10 years	Cat 4	5850	13%
Total Cat 1-4 inclusive		43722	
New wire & good order	Cat 1&2	29496	67%
Some rebuild & major rebuild	Cat 3&4	14226	33%

SPECIAL NOTES
<p>Red numbers - these represent an adjusted distance for a single direction</p> <p>For the Lambton Quay - Courtney Place CBD section, existing overhead contact wire installed in the early 1980's (when the city section was renewed with the new K&M style equipment) is now of the order 30 years old and may be due for replacement due to wear. All sections not renewed in recent times has been categorised as Cat 4 to recognise this possibility, but a detailed engineering survey may show that a portion of the overhead in this section may be in fact Cat 3.</p>