

THE BLACK HOLE THAT IS CANBERRA'S LIGHT RAIL

SUMMARY

Preparation of this document has been prompted by recent events that affect whether and how public transport may be provided for Canberra in the future, given the 2016 election promise of Light Rail Stage 2 (LRS2), newly published figures for light rail in the ACT Budget 2018-19 and the inquiry into LRS2 by the Joint Standing Committee for National Capital and External Territories (JSCNCET).

Canberra's light rail is a giant 'black hole', a bottomless money pit, which will suck in vast amounts of taxpayer funds, at great and unsustainable opportunity costs and cause serious disruption to the social fabric of Canberra. Additionally, it will concentrate and monopolise development funds to the detriment, distortion and disruption of a balanced and equitable development of Canberra as a whole.

The perceived tram network for Canberra was born out of political expediency after the 2012 election and sustained by the ideology and political power of an ACT political minority. The city-state of Canberra is in the grip of misguided ideology and its citizens need to realise it soon before much more damage is done to our beautiful city.

The detrimental effect of Light Rail Stage 1 (LRS1; Gungahlin-Civic) will be bad enough but now we have the prospect of LRS2 (Civic-Woden). LRS2 is and should be seriously in doubt given that it was nothing more than an uncoded 2016 election promise to voters south of the lake.

In early Government reports (pre-LRS1), a Bus Rapid Transit (BRT) network was shown to be twice as effective as light rail at half the cost but was rejected by the Government in favour of trams. Herein, the term BRT is taken to embrace the rapidly developing rail-less technologies of the future.

After some four years of trying to justify LRS1 as having a positive Benefit Cost Ratio (BCR), contrary to the advice of independent analysts and the ACT Auditor-General, the Government does not pretend any longer that light rail is an economic proposition but rather suggests that it "... would look beyond simple benefit cost ratio modelling in making its investment decision and will take into account matters such as its overall vision for Canberra, community sentiment, urban benefits and other factors." In other words, this Government does not care how much light rail will cost.

In its submission to the JSCNCET, the ACT Government epitomised its case by stating that "*The ACT Government is planning for our city's growth by ensuring we have sufficient transport infrastructure in place before increasing congestion critically impacts our highly regarded urban amenity and quality of life. Light rail will have a transformational effect in Canberra by: revitalising our urban centres and supporting active lifecycles; stimulating urban renewal; increasing economic activity, including employment opportunities during light rail construction; reducing Canberra's high level of car dependency; and providing efficient, environmentally responsible public transport.*"

Close scrutiny of these claims show that they are primarily ideological, of very doubtful validity, offer maximum benefits to developers and fellow travellers but minimal benefits to Canberra taxpayers who have to foot the bill.

Despite very high rises in rates and utility costs over the past five or so years (well above the prevailing Cost Price Index), the ACT Government can barely keep its administrative head above water now, in provision of community services. So, how does it expect that the billions of dollars it plans to sink into light rail will serve Canberrans any better? Given that the Government hasn't even started to pay for Stage 1 yet, it is certain that rates, taxes and or debt will need to rise further and substantially just to hold the unacceptable status quo of community services. Every Canberran should demand of the Government what substance there is to its claims for light rail, given its questionable administrative scorecard to date. The Government has a serious case to answer to Canberra taxpayers.

Light rail is clearly a far inferior solution than that offered by the future technology of BRT vehicles. Trams are a totally inflexible and obsolescent technology, very limited in coverage for the travelling public, only half the seating capacity of buses, disruptive of traffic flows, no better at reducing traffic congestion and pollution than BRT, already compromising the ACTION bus network and very disruptive of major arteries. It is intended to densify development of corridors yet ignores the fact that BRT could achieve the same development objectives at a fraction of the cost.

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The future of public transport for smart cities of the future, like Canberra, does not lie with obsolescent trams but with the rapidly developing world of autonomous, electric vehicles (buses, taxis, private vehicles and commercial vehicles), as part of an integrated transport network, enabled by digital technologies, 5G (and future generation) communications, and artificial intelligence. Modern electric, smart buses can meet all of the criteria put forth to justify the use of trams, including the vaunted 'urban transformation'.

A particularly damning consequence of the Government's profligacy is that the huge investment planned for trams will prevent adequate investment in the ACTION bus network and condemn it forever to its current capability of about eight per cent commuter patronage. While the network can be expected to keep pace with population growth, there would be minimal if any increase in the level of patronage. Imagine the comprehensive, effective and efficient BRT network that could be created with the billions of dollars slated for trams.

The total through-life cost of LRS1 is currently estimated at \$1.529 billion (including the \$375 million Capital Contribution and the hidden but real loan cost thereof). Over the 20-year operating period, the average annual cost for LRS1 will be an about \$76 million, being an effective cost of \$12 for each of the projected maximum of 6.3 million passenger-trips per annum, on this one 12 km link. By comparison, the cost of ACTION in 2016-17 was \$155 million for a patronage of 18 million, ie \$8.6 per passenger, for a city-wide network.

The total through-life cost for LRS2 is estimated at \$3.0 billion to \$3.7 billion, based on the Government's own estimate for construction alone of \$1.3 billion to \$1.6 billion. Over the 20-year operating period, the average annual cost for LRS2 is about \$150 million to \$185 million, being an effective cost of \$25 to \$31 for each of the projected maximum of six million passenger-trips per annum.

Canberra is a unique city-state in the world. For its population and demographics, light rail is unnecessary, far too expensive, unaffordable, a dead weight on the creation a more effective and efficient ACTION network and very disruptive to the development of balanced infrastructure throughout all of Canberra that would benefit all Canberrans, not just a few.

If this Government continues this folly, the unacceptable burden of light rail will haunt generations of Canberran taxpayers well into the future. Hopefully, even the most naive of tram enthusiasts will in the next few years come to realise how they've been duped by a government focused more on maintaining power than serving the best interests of the community. But the damage could well be irreversible.

TEXT

Introduction

Canberra's light rail is a giant 'black hole', a bottomless money pit, which will suck in vast amounts of taxpayer funds, at great and unsustainable opportunity costs and cause serious disruption to the social fabric of Canberra. Additionally, it will concentrate and monopolise development funds to the detriment, distortion and disruption of a balanced and equitable development of Canberra.

With modern transport options and rapid development of these technologies, trams are an outmoded, inflexible, slow and very expensive option for public transport in Canberra.

For a city-state the size and demographics of Canberra, light rail is neither suitable as public transport nor affordable.

Context (what is happening)

The perceived tram network for Canberra was born out of political expediency after the 2012 election and sustained by the ideology and political power of an ACT political minority.

History has shown that there have been, arguably, two principal influences on countries and city states, being extreme, misguided ideology (left or right) by those in power and the advance of science and technology. The first has done great damage to societies, often aided and abetted by the latter. The city state of Canberra is in the grip of misguided ideology and its citizens need to realise it soon before too much more damage is done.

Canberra is a unique city-state in the world. It is a growing city, at about 415,000 and tipped to grow to about 500,000 by 2032 and to 621,000 by 2052.¹ Whether it ever grows beyond that point, who knows? In fact,

¹ <https://apps.treasury.act.gov.au/demography/projections/act/total>

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Canberra is already pricing itself out of the housing market with future domestic development more likely to grow in adjoining NSW towns – old and new – as far away as Yass and Goulburn. A city state of even 600,000, spread over an area of 45 km North/South and 35 km East/West, will not equitably sustain even Light Rail Stage 1 (LRS1) let alone LRS2 at twice the cost, and further stages. It would be financial lunacy to embrace light rail for purely ideological reasons.

In some submissions to the Joint Standing Committee for National Capital and External Territories (JSCNCET) (June 2018), inquiring into LRS2, much was made of how the Griffin plan for Canberra provided for tramways. Mr Walter Burley Griffin² could hardly be blamed for not knowing what transport technology would look like in a hundred years' time. His concepts for use of trams, although not the use of avenues, is now irrelevant to the current debate.

One statement by a concerned individual, but one representative of all realists who oppose the absurdity of light rail in Canberra, is given in the box below.³

“For me, amongst the top three reasons for opposing light rail is the erosion of Canberra's potential as one of the world's great planned, sustainable cities. We stand on the threshold of a revolution in transport, with autonomous electric vehicles a key part of the transformation. Instead of embracing this future, we are locking out that future by committing to century-old, inflexible tram system that will see Canberra increasingly left behind world's best practice in public transport.

We as rate-payers are the primary casualties of this folly. The tram initiative started as a sop from Labor to the Greens, to buy their way into power when the election delivered a hung assembly. It has now become a monster that is destroying the city most of us know and love. Development along the tram corridor is being rushed through to create high-density living and future ghettos along the tram route. Bus schedules are being contorted to force people onto the tram. Instead of the tram operating as a public transport system to serve the people of Canberra, we have Government hell-bent on re-shaping the city to serve its pet tram project. Road congestion isn't being eased by the tram - it's being made worse! Public transport isn't becoming faster - it's being slowed down! And all the while, our rates continue to skyrocket - with the massive increases seen over recent years being just the tip of an iceberg.

The damage that this Government has inflicted on Canberra through the tram project extends into other corners. For example, many universities reflect the strengths of the communities in which they have evolved. Wollongong University has great strengths in materials engineering as a result of the BHP & Bluescope. James Cook is excellent in Marine Biology due to its proximity to the Great Barrier Reef and so on. The University of Canberra has unique opportunities to leverage its location in Canberra by exploiting the theme of sustainable cities of the future - running across many disciplines (architecture, town planning, water and energy management etc) - attracting students from around the world and driving world-relevant research. Instead of a next generation public transport system enhancing Canberra's status, the tram is detracting from it.

Needless to say, the catastrophic financial profile of the project is something that will haunt generations of the future - and I expect even the most naive of tram enthusiasts will in the next few years come to realise how they've been duped by a government focused more on maintaining power than serving the best interests of the community. Sadly, the damage is likely to be irreversible.”

Government Claimed Benefits (do they stack up?)

In early Government reports, pre-LRS1, a Bus Rapid Transit (BRT) network was shown to be twice as effective as Light Rail Transport (LRT) [trams] at half the cost.⁴ Nevertheless, the Labor/Green government opted for the less capable and more expensive option on ideological grounds. In its Business Case for LRS1, the Government claimed a Benefit to cost Ratio of 1.2 based on highly criticised assumptions and figures. Independent experts put the BCR at about 0.6 and an Auditor-General report at a paltry 0.49.⁵ In very simple terms, a BCR of 0.49 means the value of benefits is half the cost of the initiative – and rate-payers must cover the gap.

From recent statements concerning LRS2 (Civic-Woden), it is clear that the ACT Government does not pretend any longer that light rail is an economic proposition but “... would look beyond simple benefit cost ratio modelling in making its investment decision and will take into account matters such as its overall vision for

² Walter Burley Griffin was the original designer of Canberra. He won the Federal Capital Design Competition, launched by King O'Malley, Minister for Home Affairs, in May 1911 [National Archives of Australia, 2018]

³ The modest author does not wish to be identified.

⁴ City to Gungahlin Transit Corridor, Infrastructure Australia Project Submission, August 2012. P25 and Table 7: “On an undiscounted basis, the upfront capital costs for the BRT and LRT are estimated to be \$276 million, and \$614 million respectively.” P29 Table 10: Benefit cost ratios. BRT with Higher Density Land Scenario: 4.78. LRT [light rail]with Higher Density Land Scenario: 2.34.”

⁵ A-G Report reference

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Canberra, community sentiment, urban benefits and other factors.”⁶ In other words, this Government does not care how much light rail will cost.

In its submission to the JSCNCET⁷, the ACT Government epitomised its case by stating that “*The ACT Government is planning for our city’s growth by ensuring we have sufficient transport infrastructure in place before increasing congestion critically impacts our highly regarded urban amenity and quality of life.*”

The submission went on to say that “*Light rail will have a transformational effect in Canberra by: revitalising our urban centres and supporting active lifecycles; stimulating urban renewal; increasing economic activity, including employment opportunities during light rail construction; reducing Canberra’s high level of car dependency; and providing efficient, environmentally responsible public transport.*”

Every Canberran should demand of the Government what substance there is to its claimed benefits:

- Decreasing congestion: Light rail may cause a small dip in road congestion along their route, but only temporarily due to increasing population and the fact that households in Canberra need to have at least one vehicle. Before too long, congestion would be back to trend levels and even exacerbated by the presence of trams.
- Revitalising our urban centres, urban amenity and quality of life: This is presumed to mean that more people would be crammed into smaller spaces. Would that mean better quality of life? Not according to a recent study by the Australian National University (ANU). “*We are often told that packing people in more densely is good for the environment. It is said to mean less water and energy use per person. Except that it doesn’t, according to fascinating but little-known research commissioned by the ACT Environment and Planning Directorate and conducted by ... the ANU. It found [among other things] no significant difference in water and electricity use between residents of apartments and houses.*”⁸
- Transformational effect in Canberra stimulating urban renewal: This has always been the real reason behind the light rail push, as often stated by the Government. This claim is challenged. While the statement is accepted by proponents, the huge capital investment in commercial and residential buildings and other facilities along the corridor, irrespective of the source, robs and so disrupts development of the rest of Canberra of funds. Canberra is already well on the way to creating a North/South divide either side of the lake, with the rabbit warrens of Gungahlin and future slums of the Gungahlin-Civic corridor compared to the relative old-world charm of an erstwhile Canberra. Even if densified transport corridors were deemed desirable, alternative public transport systems (with lower costs, more flexibility and a longer-term future) could equally be used as the catalyst for change.
- Supporting active lifecycles: How? By forcing people to ride bikes, to walk further to trams than to buses and the introduction of dockless bikes that have been cast out in other cities as a curse?⁹
- Increasing economic activity including employment opportunities during light rail construction: In its own early studies for LRS1, the Government made contradictory and exaggerated claims for employment during construction and found the post-construction employment effect to be very modest. But, what is this construction employment doing other than laying a thick horizontal, concrete slab for 12 km (with as much utility as a pyramid), given that modern technology no longer needs rails imbedded in thousands of tonnes of concrete.¹⁰ However, there are undoubtedly some winners from the LRS1, given the little that the public knows of the terms and conditions and employment remuneration under the PPP contract. Whilst we remain largely ignorant of any significant aspect of the LRS1 contract, under the ploy of confidentiality, it has been disclosed that the unions have negotiated assorted loadings. These are undoubtedly putting upward pressure on trade costs throughout Canberra.

⁶ Canberra Times, 20 June 2018, “Cost of Canberra’s light rail stage 2 revealed”.

⁷ Gungahlin To Woden (via Barton) Light Rail Submission to the Joint Standing Committee on the National Capital and External Territories, 15 June 2018

⁸ “Evidence should lead planning, not a rush for higher density”, Toni Hassan, SMH, 13 July 2018. Toni Hassan is a Canberra writer and facilitator. She is an adjunct research fellow with the Australian Centre for Christianity and Culture, CSU.

⁹ Canberra Times, 16Jul18, “Canberra is about to get its first bike scheme, and it’ll be dockless.”

¹⁰ It reminds one of the days of the Great Depression when people were paid to dig holes and to fill them in again, to provide at some dignity in work.

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- Reducing Canberra's high level of car dependency: Future property owners along a light rail corridor might be tempted to reduce household vehicle ownership to one, but the effect will be minimal and temporary, giving a growing population. Public transport patronage in Canberra has been well below the level of other cities for many years despite the Government repeatedly setting new targets. The target for 2016 journey to work by bus was 10.5%, but the actual rate was 7.1% according to the 2016 census. Taking into account population growth projections journeys to work by public transport would have to rise to 12.5% by 2026, just to keep the number of vehicles on the road at 2016 levels, and this would also require pro-rata increases in cycling and walking to work that yielded an overall participation in active transport and public transport of 24%.¹¹ Given achievement to date, that would be a tall order.
- Environmentally responsible public transport: Light rail proponents have always neglected to mention the very high environmental impact and carbon footprint of building tramways, the trams themselves and of high-rise building of concrete and steel. Through-life operation of electric trams would not offer any more advantage to the environment than would modern electric buses. One needs also to ask what real, noticeable effect there would be in the Canberra context, ie where there is virtually pristine air quality? Negligible!

What the Government refuses to recognise is that BRT, using modern and developing technologies, would achieve these claimed benefits at a fraction of the cost and with far more city coverage and efficiency. Light rail is a non-sensical, vastly expensive and unnecessary solution to Canberra's public transport need. It is primarily a vehicle for rampant, disruptive development of corridors.

Current performance of Government [a case to answer]

Not only does this too long-standing ACT Government think light rail is good for Canberra and is affordable, it also likes to boast that "Canberra has never had it so good." Is there any truth in this? What does the Government's scorecard look like?

Despite soaring rates and utility costs over the past five years or so (well above the Consumer Price Index (CPI)), the Government can barely keep its administrative head above water now, to wit the following non-exhaustive litany of mediocrity if not failure. What real prospect is there of improving performance in these areas whilst squandering billions of dollars down the black hole and money pit that is light rail?

- a hospital system that almost lost its accreditation this year and with emergency and maternity departments clearly in crisis;
- highest levels of homelessness in a city that boasts the highest standard of living in the country;
- law & order issues - with our police at lowest number per capita in Australia; proliferation of criminal gangs in the ACT; drugs, street violence and general criminality;
- reported highest median house prices and rents in the country for dwellings of questionable quality;
- questionable land deals at taxpayer expense;^{12 13}
- land prices out of control as a result of Government monopoly and consequent manipulation of the market (to who's benefit? Obviously not to Canberrans in general);
- public housing on decline;
- an inadequate yet costly ACTION bus network, catering for only 8 per cent of commuters;¹⁴
- contempt and discrimination against the many valuable clubs of the ACT that are not affiliated with the Labor Party;
- a gaol in continual crisis – with drugs and other issues;

¹¹ <https://profile.id.com.au/australia/travel-to-work?WebID=170>

¹² Canberra Times, 14Jul18, "Land deals glow in the dark", Jack Waterford.

¹³ Various ACT Auditor-General Audit Reports published in 2018

¹⁴ Deputy Director, Transport Canberra, at a meeting of the ISCCC, 10Jul18

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- a failed container village by the lake at around \$1 million of taxpayers' money;
- neglected streetscapes and general maintenance (replacement of trees, street-sweeping, potholes, road markings); and
- wholesale destruction of precious trees on our avenues.

Given that expected annual cost for LRS1 (\$75 million pa) has not even started yet, let alone the payment for later, more expensive stages, it is certain that rates will need to rise further and substantially just to hold the unacceptable status quo of community services. So where are all these so-called benefits from 'urban transformation' claimed for light rail to come from, with billions to be poured down our own black hole? The Government has a serious case to answer to Canberra taxpayers.

So, why exactly is light rail wrong for Canberra?

Instead of a far superior public transport option offered by BRT, the Green/Labor government has opted to pursue the light rail despite its limited capacity, inflexibility and cost relative to BRT. More recently, the Government has acknowledged that trams are not economic, but that is willing to will pay whatever the cost and justify it on populist, intangible and ephemeral environmental and social grounds, as it did in fact for LRS1.

There is no doubt that BRT is a far better solution than light rail for Canberra's public transport network, because trams are:

- totally inflexible: Trams use fixed tracks (some proponents think this to be an advantage; to developers perhaps but not to the majority of public transport travellers and taxpayers). Any breakdown brings the line to a halt.
- very limited in coverage for the travelling public: A network of reasonable coverage is simply beyond the financial means of a city-state of even 600,000 people, without incurring serious opportunity costs, ie to the detriment of more beneficial infrastructure.
- lacking in seated capacity: The Government promotes the romance of riding in shiny red trams but does not mention that only 32% of capacity is seating and that travel takes twice as long or longer than rapid buses.
- disruptive of traffic flows: Trams simply hinder not help road traffic, which will continue to grow in Canberra. The Government makes a big issue about trams cutting down on traffic congestion and pollution but, with a growing population, such reductions would be marginal at best and not stop an upward trend. Besides, electric buses would be equally pollution free at a fraction of the cost.
- already compromising the ACTION bus network: This is manifested by the currently planned re-jig of the ACTION network to supposedly integrate with the tram but with a real objective of forcing more people onto trams. This re-jig is causing a great deal of discontent in current users of ACTION. With the money to be wasted on trams, how much better could we serve the travelling public by reassigning such monies to a smart BRT network? It could permit a world class rapid bus network servicing all of Canberra, and of benefit to all Canberrans not just a few like developers and their fellow travellers.
- obsolescent technology: For the smart city that Canberra could be, transportation of the future is not with obsolescent trams but with rail-free and autonomous electric buses, taxis, private and commercial vehicles.
- disruptive development of corridors: Given the endemic and long-standing poor planning, standards and control of building construction in Canberra, trams are a catalyst to the slums of the future; the Government lauds the potential development of the corridors but fails to make its case as to how that is desirable and of benefit to all Canberrans.
- intended to densify development of corridors: This ignores the undesirable environmental and social effects of densification.
- offers a gain to only a very few people: This Government expects all Canberrans to pay for light rail, whether they use it or not, yet it benefits a very few.

We taxpayers really do need to ask ourselves, "What is the point of light rail if it can't deliver faster travel times? What exactly are the real benefits of light rail over the status quo or alternatives, and is it worth the many billions of dollars it will cost to roll out a citywide network?"

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While there is a lot made by the Government about the environmental effects of light rail, it is very quiet about the ill-effects on the environment of densification along the routes and elsewhere. As one critic has said, “*It would be helpful if the current mantra about high density as a solution for housing shortages and city spread was based on more actual data and less proselytising. We need more specifications about what sort of higher density is desirable for retaining green space, cool climate, lasting quality of construction and encouraging a lifestyle that is aesthetically pleasing and progressive, not just for the inhabitants but for the public of the city.*”¹⁵

Light rail is a ‘black hole’, sucking in huge amounts of taxpayer’s money to build and sucking in development resources to the detriment of other areas and severely distorting the physical and social fabric and balance of Canberra as a whole.

The huge investment in trams prevents investment in and condemns the bus network to about current capability (8 per cent commuter patronage). One can expect some growth in the ACTION network proportional to the growth in population but none in patronage.

Imagine the effective and efficient bus network one could create with the billions of dollars needed for a very limited tram network.

Alternative Solution

So, if light rail is a ‘black hole’, what would work?

The future of public transport for smart cities of the future, like Canberra, does not lie with obsolescent trams but with the rapidly developing world of autonomous, electric vehicles (buses, taxis, private vehicles and commercial vehicles), as part of an integrated transport network, enabled by digital technologies, 5G (and future generation) communications, and artificial intelligence.

Modern electric, smart buses and those being rapidly developed can meet all of the criteria put forth to justify the use of trams, including the vaunted ‘urban transformation’, at a fraction of the cost. In particular, a smart BRT network is able to service all of Canberra, not just a few favoured corridors.

In particular, autonomous electric buses are already available in the world, eg Daimler’s eCitaro from Mercedes-Benz and those of large capacity like those existing in China (see boxes).

On lesser but more numerous vehicles, the Google® firm of Waymo® is well on the way to introducing thousands of autonomous (driverless) vehicles onto the streets of Phoenix.¹⁶ These driverless fleets, while generating their own commuter patronage, would complement perfectly any BRT network.

First trackless Autonomous Rail Rapid Transit starts trial operation in China

The world's first trackless Autonomous Rail Rapid Transit (ART) system has started trial operation in central China's Hunan Province. The smart electric vehicle, seen as a crossover between a bus, train and tram, runs on rubber tires and follows double-dashed white lines painted on the road, instead of conventional rail tracks. Sensors on the vehicle can detect the dimensions of the road and send travel information back, which provides the basis for developing it into a driverless vehicle in the future. The three-carriage vehicle is 32 meters long, but has a small turning circle, equivalent of the turning radius of a 12-meter bus and can carry over 300 passengers.¹⁷

China debuts driverless train that only needs white painted lines as tracks.¹⁸

China's latest mode of public transportation is a bus, tram and train rolled into one. Its maker, Chinese rail transit firm CRRC, is calling it a "smart bus," but it's a lot more than that. Like a train, it's modular and carriages can be added on; but like a bus, it runs on the road. Amazingly, the carriage will follow a pre-set path and won't need a driver — but it won't need tracks to be laid, either. The train is equipped with sensors that'll allow it to follow white-dotted lines on the road.



¹⁵ Design Matters, Canberra Times, 15Jul18

¹⁶ See ‘Recent Articles’ on www.canthetram.org

¹⁷ http://www.xinhuanet.com/english/2018-05/09/c_137167178.htm

¹⁸ <https://mashable.com/2017/06/06/train-without-rails-china/#D9HvcnlN7mqB>

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Trams without tracks, poles or wires ABC Science Show, 14 July 2018.

Inner-city trams are being embraced by cities all over the world. They don't come cheap and there is major disruption as they are built. Peter Newman describes a new form of transport, the trackless tram. It follows sensors in the road which are painted on. The trams use lithium batteries avoiding the need for overhead wires. Unlike trams on tracks which can cost around \$120 million per kilometre, the trackless autonomous tram line can be built for \$5 million per kilometre.

[At right: Artist's impression of a trackless tram link to larger image.]



All would not be lost, however, if LRS1 fails as predicted. Perhaps the trams could be sold to the hapless Sydneysiders and the horizontal, concrete slab would become a dedicated BRT right-of-way.

Light rail costs [All figures in 2018 present values]

The following tables provide the latest, independent cost estimates for both LRS1 and LRS2, given new information recently made public about both projects.

In the first instance, Smart Canberra Transport (SCT) has completed a detailed analysis of the real costs of LRS1, based on the ACT Budget for FY2018-19 which, for the first time, has published expected expenditures for LRS1 for FY 2017-18 through FY 2021-22. Second, the ACT Government submission to the JSCNCET revealed an initial cost estimate for LRS2 of \$1.3 billion to \$1.6 billion.

These Government estimates for LRS2 of \$1.3 billion to \$1.6 billion are taken to be:

- for construction only (comparable to the published cost of \$707 million for LRS1)¹⁹;
- do not include a range of other costs (such as relocating optical fibres, deceptively omitted from the published capital cost);
- do not include the costs of capital borrowings or return on equity that may be provided by a (public, Private Partnership (PPP) contractor, repayable over the operations period, like for LRS1; and
- do not include the ongoing costs incurred during the operational period (nominally 20 years as for LRS1), including operations, administration, maintenance, upgrade of plant and associated logistic activities.

The revised, detailed cost estimates for LRS1 are used as a valid basis of assessment of real costs for LRS2, given that it would be almost certain that the PPP consortium for LRS1 would also be contracted for LRS2. The detailed cost estimates for LRS1 are presented in a technical paper, including 12 data tables.²⁰

Table 1 gives the latest revision of costs for LRS1, following detailed analysis of new figures in the ACT Government Budget for FY2018-19.

The main purpose of Table 1 is to show the derivation of LRS1 costs and to determine the ratio of the costs of operations (20 years) to total cost of construction capital. The derived percentage of 39.9 per cent is considered important and valid for application to LRS2.

The total through-life cost to the Canberra community of \$1.529 billion (including the \$375 million Capital Contribution and the hidden but real loan costs thereof).²¹

The annual cost over 20 years is an average of \$76.5 million, being an effective cost of \$12 for each of the projected maximum of 6.3 million passenger-trips per annum.²²

¹⁹ Confirmed by the Deputy Director Transport Canberra, at the meeting of the ISCCC, 10Jul18.

²⁰ Accessible on www.canthetram.org

²¹ The published Government estimate of \$939 million (Jan16) was not comprehensive and was determined by erroneous discounting of through-life estimates of Service Payments.

²² LRS1 Business Case, 2014.

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Important Note: It is necessary to point out here that expenditure figures for LRS1, as newly released in the ACT budget for FY2018-19, are the same as those estimated in the LRS1 Contract Summary of June 2016 and, therefore, are seriously in doubt, not having been updated for at least three years (since January 2016 or earlier) and, apparently, without any knowledge of costs that may be evolving under the PPP contract for LRS1. When eventually known, LRS1 costs could well be significantly higher than shown in Table 1, with consequent growth in estimates for LRS2.

Table 2 shows the derivation of probable costs for LRS2, given the nominal Government estimates for construction of \$1.300 billion to \$1.600 billion, about twice that for LRS1. These figures are not supported in the ACT Government submission to the JSCNCET and are, therefore, recognised very much as preliminary estimates only of considerable uncertainty.

The total through-life cost for LRS2 is estimated at \$3.0 billion to \$3.7 billion.

The annual cost over 20 years is an average of \$150 million to \$185 million, being an effective cost of \$25 to \$31 for each of the projected maximum of six million passengers per annum.²³

If LRS2 is ultimately approved, the two projects would account for a total of \$226 million to \$261 million that would need to be found in the infrastructure component of annual budgets. To put that into perspective, these figures represent about five per cent of the current \$5 billion plus budget but about 40 per cent of the infrastructure component of the budget from which the sacrifice would have to be made. One can only imagine the widespread detrimental effect that that would have on critical infrastructure needs throughout all of Canberra.

Given the possibility of a significant increase in LRS1 project costs, not having been updated for three years or more, estimates for LRS2 could be even higher than developed in Table 2.

Table 1			
Light Rail Stage1 (LRS1) - Real Costs			December 2018 prices
R	Stage	Minimum \$M	[1] Notes
1	LRS1		
2	Basic Data		
3	Nominal cost of construction	706.7	[2]
4	Capital Contribution by ACT Gov	375.0	[2]
5	Capital to be recovered (20Y) via Service Payments	331.7	[3]
6	Refined estimates		
7	\$Cost-Part-Construction + \$Interest (3Y)	551.5	[4] [5]
8	\$Cost-Operations (20Y)	436.0	
9	\$Cost-Contract (23Y)	987.5	
10	\$Capital Contribution (ACT Gov)	375.0	
11	\$ Cost-Project (23Y)	1,362.5	
12	\$Cost-Opportunity of Capital Contribution (20Y)	167.0	[6]
13	\$Cost-Community (20Y)	1,529.5	[7]
14	\$Cost-Community pa	76.5	[8]
15	Relevant Percentage		
16	\$Cost-Construction + \$Interest (3Y)	1,093.5	R7+R4+R12
17	\$Maintenance & Operations (20Y)	436.0	
18	\$Community Cost (20Y)	1,529.5	
19	%[\$Operations/(\$construct cost + \$interest)]	39.9%	[9]
Notes:			
1. Cost estimates are minimums; real contract escalation yet to be revealed.			
2. Published costs			
3. Capital recovered under contract			
4. \$332M + real %Interest @5.42% pa			
5. Excludes \$CapContrib. Estimates from refined analysis of LRS1 costs			
6. %Real Interest Rate for Government loan assumed at 3% pa			
7. \$Project Cost + \$Opportunity Cost to ACT community			
8. \$Real Cost pa to Community (taxpayers) from budget.			
9. Important percentage for application to LRS2			

²³ Presumed to be about 6 million per annum, being reasonably less than the maximum of 6.3 million passenger-trips estimated in the business Case for LRS1.

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Table 2					
Light Rail Stage2 (LRS2) - Real Costs			December 2018 prices [1]		
R	Stage LRS2	Data	Minimum \$M	Maximum \$M	Notes
1	Basic Data				
2	Nominal cost of construction		1,300	1,600	[2]
3	Capital Contribution		-	-	[3]
4	Capital to be recovered (20Y)		1,300	1,600	
5	Operations period (Years) - assumed	20			
6	Real Interest rate on capital borrowings	5.42%			[4]
7	Nominal Interest rate on capital borrowings	8.58%			[4]
8	Estimates				
9	Capital				
10	\$Interest-Real on borrowings		848	1,043	[5]
11	\$Cost-Construction + \$Interest		2,148	2,643	
12	Operations (20Y)				
13	%[\$Operations/(\$construct cost + \$interest)]	39.9%			[6]
14	\$Cost-Operations (20Y)		857	1,055	[7]
15	Capital + Operations				
16	\$Cost-Project (23Y)		3,005	3,698	
17	\$Service Payments pa (over 20Y)		150	185	[8]
	Cost per passenger				
	Passengers pa- Maximum - LRS1 (millions)	6.3			[9]
	Passengers pa- Maximum - LRS2 (millions)	6.0			[10]
	\$Cost-Passenger [through operations period]		25.04	30.82	
	\$Cost-Passenger [after operations period]		7.14	8.79	
	Notes:				
	1. All costs in December 2018 prices (mid-FY2018-19)				
	2. Taken from ACT Government submission to JSCNCET				
	3. Assumption: zero Capital Contribution by ACT Government (unlike for LRS1)				
	4. Nominal and real interest rates on borrowings; established from new data for LRS1.				
	5. At 5.42% real interest rate.				
	6. Determined in Table 1.				
	7. 39.9% of \$Cost-Construction + \$Interest				
	8. Service payments to be made from ACT Budget.				
	9. LRS1 Business Case figure				
	10. Assumed figure. LRS2 is considered less viable than LRS1, in respect to passengers.				

CONCLUSION

Canberra's light rail is a giant 'black hole', a bottomless money pit, which will suck in vast amounts of taxpayer funds, at great and unsustainable opportunity costs and cause serious disruption to the social fabric of Canberra. Additionally, it will concentrate and monopolise development funds to the detriment, distortion and disruption of a balanced and equitable development of Canberra.

M.R. Flint
 Smart Canberra Transport,
 Canberra
 23 July 2018

[M.R. Flint is a retired senior officer of the RAAF, who is a qualified engineer and has a Master of Science Degree (Logistics Management with distinction). He was an acquisition manager of major capital projects in Department of Defence and for many years was a private consultant, specializing in support systems and life cycle costing for major projects.]