

[Planning & Transport](#) >

Sydney Metro & High-Speed Trains

Summary key actions:

1. Cancel the "City & SW Metro", which along with current plans for light rail and WestConnex represent poor value-for-money and are unaffordable anyway (see [attached letter to NSW Premier](#)).
2. Replace most of the existing & planned light rail in Sydney with metro rail.
3. Prioritise earlier delivery of the West Metro, running it from Sydney CBD (connected into the existing City Circle) through the Westconnex tunnel (with less lanes for cars) to Parramatta, then continuing to Penrith on existing rail lines (replacing existing services).
4. (*outdated - too late!*: Run NW Metro trains along existing tracks from Epping to Strathfield then the CBD, to avoid closing and converting Epping-Chatswood until after...)
5. Conversion of the existing harbour-bridge crossing to higher-capacity, single-deck metro trains operating at 30 trains per hour (avoiding any need for the currently planned "Sydney Metro City & SW").
6. Conversion of the entire Sydney Trains network to fast metro trains (which are faster than double-deck trains, due to reduced station delays especially).
7. Build a high-speed train line from Parramatta to Badgerys Creek airport, probably via Liverpool, and plan to extend fast services north and south of Sydney to new/expanded commuter towns (such as Wollongong, Canberra, Gosford & Newcastle).

If you like this alternative Sydney Metro plan, show your support by 'liking' it at this [FROGS Facebook site](#).

The original plan is 5 years old now, but it may not be completely too late - see the 2019 update near the end.

Economic & demographic context

In 2016-17, Australia's economy is at a critical turning point. The world economy faces at best a gloomy growth outlook and many commentators think [a new debt crisis & recession is almost inevitable](#).

As the welcome progress of renewable [energy](#) hits the future prospects and current price of fossil fuels, the situation in the middle east is becoming even more volatile. Refugees pose a huge humanitarian and economic problem for Europe ([but have no-one to represent them](#)), and Australia has failed to develop a supportive response that is compassionate, economically sustainable and effective in deterring dangerous people-smuggling.

Within Australia, the mining boom is over and as "fly out" workers come back to NSW & Sydney, the population surge has temporarily boosted Sydney's housing market, but the resulting [housing affordability](#) pressures are now discouraging further population inflows, so Sydney's property market - the only thing that's been keeping the Australian economy going

- is poised for a slowdown or to [crash 10% or more in a couple of years](#), if not [sooner](#). [Some banks express more optimism but then they can afford to as long as prices don't fall more than 25%](#). I've been unsuccessfully predicting imminent economic crisis for over a year now - my latest forecast being early 2017, in reaction to [government pre-Xmas economic updates](#) & the [losing of AAA ratings](#), although if the [credit rating agencies can't see a problem](#), maybe no-one else will either! (update 16 March 2017 - I got it wrong again, although with [house prices now defying belief](#), maybe it's 'the market' that has got it wrong? And yes, finally, by 22 May 2017, the [credit ratings agencies see a crash coming soon](#)... and it's taken so long for people to face reality, [the correction now occurring in 2018-19 could be that much more painful](#)...)

Given the importance of property stamp duties, these economic risks have potentially major implications for the financial position of the NSW Government, which has sold the profitable TransGrid & other electricity businesses and is also selling further assets to fund major new infrastructure investments, but must ensure such investments promote growth in the economy and tax revenues to offset the lost dividends from these commercial assets over the medium-term. Whilst we need to [transform financial management frameworks](#) to properly assess this, it seems clear to me that [current infrastructure plans are unaffordable \(see attached letter to NSW Premier\)](#), and not good projects anyway.

So what should we do? Although Australia cannot rely forever-more on population growth to support its economy (which would just be a [massive ponzi scheme](#)), in the short to medium-term (i.e. the next few years and perhaps for more than a decade) population growth may be the only thing that can prevent the economy stalling and buy us some time until we can transition from a [dumb reliance on resource-extraction](#) to a knowledge & innovation-based economy (& reap the benefits of other [Australian public sector reforms](#) over the longer term).

Australia has plenty of spare land to support a higher population, but to be economically beneficial, immigrants need to be able to interact with existing high-productivity economic centres. Right now that's constrained by [Australia having too few cities](#), and in both Sydney & Melbourne, having a so-called "Central" Business District (CBD) that's far from the *geographic and population centre* of the metropolitan area (which is now just west of Parramatta for Greater Sydney), which in NSW is largely due to its *extremely slow & inefficient trains*, which make it hard for people in Sydney's west to access the CBD - thus reducing demand to live in outer suburbs. The [high cost of housing](#) concentrated into Australia's few cities (worsened by a cultural history/expectations and restrictive planning rules that make [Australian homes the biggest in the world](#)) also sets a limit on how low welfare benefits can be without making people homeless or forcing them to live in jobless areas (with resulting welfare dependency), and these [high welfare payments reduce work incentives \(though not as much as some claim\)](#), and impose large costs on taxpayers and the economy.

The solution to all this is the same as what every other global city has done - fast trains to connect distant, more affordable land to existing economic centres.

So NSW's economy needs an *affordable* transport investment strategy with world-standard train services to address existing network constraints and to support new affordable housing and population growth in outer areas with acceptable commuting times to existing economic centres (e.g. about 1 hour or less).

But if we build it, will they come? Will people move to outer areas, and how fast will they settle there? In economics (as in [relativity](#)), time matters - otherwise we can't afford the

interest on debt.

Well, besides the diversion of existing Sydney residents seeking more affordable housing, one option would be to *bring in people currently suffering in [Australia's off-shore detention centres](#) or [middle-east refugee camps](#).* I'm sure they will gladly come and contribute positively to continued growth of Australia's economy ([sign this petition if you agree](#)). So will plenty of Brits as they flee the [economic panic from Brexit](#), potentially taking advantage of easier immigration that Britain should now negotiate with sunny Australia!

Fast trains for affordable housing

What infrastructure and service plan can deliver on the above aims?

A fast rail service connecting Sydney CBD and Parramatta is the top priority, to support strategic land-use development as well as relieve existing rail network capacity constraints.

But Sydney's double-decker trains are very slow, infrequent and low capacity (because of their excessive dwell time at stations for boarding & disembarking), so we need more than new rail lines; we need a total transformation of the whole network.

See the files attached at the bottom of this page & summarised following for an **integrated, high-speed solution to Australia's transport, housing, economic and refugee problems:**

['Fast rail for western Sydney'](#) - a strategic economic business case for a new *fast* metro rail line from Sydney CBD to Parramatta (in less than 20 minutes)

- *the strategic solution to improving employment productivity, transport efficiency and housing affordability in Greater Sydney.*

Consistent with my ideas here, see also:

- Reports by *10,000 Friends of Greater Sydney* ('FROGS'):
 - [Land planning perspective](#) - highlighting the Sydney CBD to Parramatta corridor as comparable to Manhattan
 - [Metro Rail Plan Stage 1](#)
 - [Response to Commonwealth High Speed Rail Phase 2 Report](#) - emphasising the importance of staging projects to manage investment risks, e.g:
 - *fast metro from Sydney CBD to Parramatta,*
 - *faster (than current) trains to Wollongong* through partial upgrades to existing tracks (see my [attached slides](#), using a [discount rate that I discuss here](#)),
 - then similarly to [Canberra](#), then north to Gosford & Newcastle,
 - *then major investment in new lines to these locations and beyond with [High Speed Trains](#) (HST), Magnetic Levitation ([Maglev](#)) systems or potentially even [Hyperloop](#) or new [automated vehicle technologies](#).*
- [Summary](#) or [full report by Interfleet on rail network strategy](#) provided as [expert advice](#) for [Infrastructure NSW's 2012 recommended State Infrastructure Strategy](#)
 - emphasising the opportunities to improve the performance and capacity of the Sydney rail network by using high-frequency metro trains, rather than expensive new track and tunnel infrastructure.

'[Sydney Sustainable Housing & Integrated Transport Strategy](#)' - my

submission to [Sydney Metro](#), June 2015:

(NB. original paper had my ball-park 10-year 'funding gap' guesstimate for current NSW Government plans, which is now outdated but [I'd still guess it was over \\$10bn](#) even before Covid-19 hit.)

A detailed, integrated plan for fast "metro" trains (at ≈120 km/h) & High Speed Trains (> 200 km/h) to support new affordable housing supply in Sydney, potentially also combined with a revised WestConnex motorway tunnel.

- builds on Jim Steer's proposed Fast West Metro from Sydney CBD to Parramatta (& Penrith) under Victoria Road, with a Ryde branch to Epping & the North West Metro ([in his report leaked to the SMH](#)),

supplemented with ideas from [Russ Lunney](#) (particularly the CBD bus terminal & the Pyrmont-Barangaroo station under Darling Harbour) and myself, including:

- An alternative & **preferred southern route from Sydney CBD to Parramatta via Strathfield**, which offers significant [value-capture](#) opportunities (as recognised by [consortia that have proposed such a line](#) recently & [in the past](#)), especially at **Sydney Olympic Park** (which needs a consistent [stadium redevelopment strategy](#)).
 - Note trains from the North-West Metro and Hornsby to Epping could potentially run at high-capacity (30 tph) on [existing tracks](#) from Epping through West Ryde to Strathfield (before joining new metro tunnel to Five Dock & White Bay), now that long, slow freight trains are segregated from passenger services by the [North Strathfield Rail Underpass](#) (part of the [Northern Sydney Freight Corridor](#) upgrade of the [Sydney freight rail network](#)).
 - I doubt you need a new tunnel from Parramatta to Blacktown either.
- **A route through Sydney CBD that connects into existing under-utilised CBD stations (Martin Place, St James & Museum).**
 - Existing & new pedestrian tunnels connecting CBD stations with high-speed travelators (potentially using [old rail tunnels](#) such as [those going from St James north towards Martin Place](#) and [south to the intersection of Liverpool and College Streets](#)).
- **Resolves network-wide Sydney Trains capacity constraints** with 30 trains per hour (tph) single-deck metro trains on the entire Sydney network (replacing double-deck trains limited to around 20-22 tph)
 - [Don't buy more double-deck!](#) Just use the existing Waratahs for 'Inter-city' services!
 - Various alternative metro route details could be considered (e.g. following the path of WestConnex/M4 into Parramatta, as per below), subject to a **maximum Sydney CBD to Parramatta travel time of about 20 minutes** in order to:
 1. effectively merge these two economic centres for daytime business-to-business trips (since [time is very scarce if you want to meet the CEO](#) of another business) - as per the [attached strategic business case](#) (which means a maximum of about 5 intermediate stations, to reduce station delays, with any express services - if any are viable at all - only stopping at Strathfield and/or

Homebush/Sydney Olympic Park),
and,

2. ensure all-stop metro services from stations west of Parramatta to Sydney CBD are faster than current double-deck express services, so these high-frequency metro services can *replace* existing double-deck trains and thus also address capacity constraints.

- **Extend the metro from Sydney CBD to the Eastern Suburbs** along the planned light-rail corridor - branching from Central or from Edgecliff to go [via the upgraded SFS](#).
 - Scrap the ridiculous plans for light rail into Sydney CBD and instead use [re-routed and possibly underground buses](#) (NB. See 2019 update below).
 - Subject to affordability and value-for-money, **the metro could be further extended to Maroubra beach and/or from Randwick to Coogee beach and/or Bondi Junction to Bondi beach** (rectifying [past shambles](#)) - connecting more than one beach to avoid overloading a single beach with too many people and to instead enable people to do the wonderful walk between beaches and thereby spread beach demand across both these and the intermediate beaches - ideally encouraged by a year-round rotation of [Sculptures by the Sea](#).
(BTW, Waverley & Randwick councils' failure to fix the coastal footpath along Waverley cemetery at the two councils' boundaries until more than 2 years after the storm damage of June 2016, I take as further good evidence of the need for [council mergers!](#))

- **Fast trains connect employment areas to land for affordable housing:**
 - New metro station supports **urban redevelopment in the Bays precinct**.
 - **HST through Parramatta** connects to cheaper land in [outer Sydney areas](#):
 - **north to Gosford & Newcastle**
(perhaps using the Carlingford line connecting on to the spare lane in the flat-gradient [NorthConnex](#) tunnel [from Pennant Hills/Beecroft to Wahroonga/Hornsby](#) and then [automated vehicles](#) elevated over the freeway median through the difficult terrain to Newcastle),
and,
 - **south to Liverpool (probably), Badgerys Creek & Canberra**
- using 300 km/h [Very High Speed Trains](#) (VHST, e.g. the French TGV),
or 500-600 km/h magnetic levitation ([Maglev](#)) trains,
or even (if it can be proven to work), the 1,200 km/h [Hyperloop](#) system proposed by Telsa's Elon Musk (potentially using lower cost levitation systems than in the active electromagnetic suspension/linear motor used in the German [Transrapid \(commercially operating in Shanghai\)](#), or the Japanese [SCMaglev](#)'s superconducting electrodynamic suspension (EDS), which has reached [600 km/h](#) but is [not due for commercial operation until 2037](#)).

- [CLARA](#) has [proposed to government](#) various HST options to be largely funded by value-capture, and though it has its [doubters](#), it has [won funding for a Melbourne-Shepparton HST business case](#).
- The attached [VHSTcalculations.xls](#) compares travel times for different technologies. Note that the greatest value probably comes from a fast Sydney to Canberra link and most of these benefits could be achieved with existing VHST technology such as TGV (& just regular HST [tilt-trains on existing tracks + perhaps only \\$100m could halve the Sydney-Canberra journey to 2 hours](#) - that's how bad NSW trains are!).
 - Although it may seem contrary, I suspect that a quantitative risk & value analysis could indicate the best approach is to use a proven HST technology from Parramatta to Canberra sooner than later (to meet the pressing economic needs discussed above), with the option to then duplicate this section later with a more costly VHST system that would be better suited to extending the much greater distance to Brisbane, Melbourne & beyond, after having partially demonstrated the demand potential and also possibly reduced the cost and risk of more advanced technology options (like Maglev or Hyperloop).
 - An [Australian Hyperloop](#) system could be developed for passenger and/or freight services, starting with a test-track in South-West Sydney:
 - *A first-stage passenger Hyperloop could extend from Badgerys Creek to Campbelltown (which avoids difficult urban areas for a first system) and then along the Hume Highway to Goulburn & Canberra (initially excluding Bowral until proven switches are developed for off-line stations that avoid delays for express services), as well as north to Parramatta via Liverpool, and then Newcastle and eventually Brisbane. From Canberra it could be extended to Melbourne & potentially Adelaide or even Hobart if [tunnelling is made faster](#) & cheaper (supporting a [merger of Tasmania & Victoria](#)).*
 - *A freight system connecting Moorebank to both Badgerys Creek and Port Botany could potentially be developed sooner, as it could have less stringent safety requirements. Port Botany container-freight handling capacity is currently limited by road and rail access, and options to increase the capacity of these systems (for example through WestConnex &/or amplification of the Southern Sydney Freight Line) suffer from high costs and community opposition due to noise and other environmental impacts. In contrast, Hyperloop's flexible,*

enclosed overhead infrastructure could minimise such impacts, and with its high speed and potential for unloading at a number of distribution points around the Sydney metro area, freight handling capacity could become limited only by the rate at which containers could be loaded at the port - thereby offering the prospect of achieving a significant diversion of freight from trucks on roads.

- Alternatively a test-track at Moorebank could be extended to connect passengers rapidly between Kingsford Smith and Badgerys Creek airports.
- Smaller, more remote towns could be connected to high-speed rail hubs through feeder routes serviced by more efficient [electric planes](#).

'[SydneySHITS.pdf](#)' ☺ is the A3 poster version below (which I did for the 2015-16 [Consult Australia 'Big Idea' value-capture competition](#), but then couldn't enter), which also shows:

- **A new underground Circular Quay station** & turn-back, which would allow the Cahill Expressway to be demolished;
(thanks again to Russ Lunney for the harbour reclaim idea, which seems consistent with [a new Circular Quay Square designed by Cox Richardson](#) that the [Government](#) & [developers are now planning](#)),
 - If the Cahill Expressway were then replaced with an underground road connecting to the Western Distributor south (as well as north as it only does at present), then the current east-to-west, two-lane Cross-City Tunnel (under Druitt/Park Street) may be redundant and could possibly be converted to a two-way underground guided busway (linking western and eastern suburbs' bus services), with a CBD station at the north-east corner of Park & Pitt Streets (where a Sydney Metro train station is currently planned).
- **CBD-White Bay** details refined, including:
 - the **metro using the old freight line at White Bay** (where train stabling could be located) then **replacing the existing [capacity-constrained light rail](#)** to Lilyfield, Leichhardt-North and Dulwich Hill - the metro could then branch at Leichhardt-North to continue to Parramatta via Ashfield/Five Dock (possibly running above ground next to the City West Link);
 - **a possible fork right to Rozelle & Epping/NW Sydney** (similar to Jim Steer's original proposal, perhaps in the longer term when capacity is needed);
 - **a potential [cable car](#)** connecting between Pyrmont's Star Casino and new high-rise buildings at White Bay, Balmain and potentially beyond at Cockatoo Island & Woolwich, and in the other direction from the Star to tall buildings in the City (ideally [above Wynyard train station](#));

pedestrian tunnels, then Sydney Olympic Park (SOP) and possibly Rosehill/Camellia or Rydalmere/UWS (with interchange to the [Carlingford line converted to light-rail](#) if not high-speed trains extending to Epping & beyond, although as INSW recommended in 2012 (see [7.6.2, p.104](#)), a Bus-Rapid-Transit corridor would be more cost-effective).

- The combined metro/road tunnel could continue from a Leichhardt-North metro station (replacing current light rail services) through inner-west suburbs (**central-Leichhardt, Annandale, Camperdown/RPA Hospital/Sydney University** - with possible metro branch to Redfern/Central) and then via Newtown or Erskinville & Macdonaldtown to the [St Peters interchange](#) and [M5 connection](#).
- Adoption of the [City of Sydney council's proposal \(apparently not supported by the NSW Government\)](#) for an upgraded A3/Roberts/King Georges Road replacing WestConnex stage-3 for port trucks going between the M4 & M5, plus an M4-East connection to the Cross-City Tunnel, existing Harbour Tunnel, Eastern-Distributor (ED) & airport/port, with the West Metro reducing car demand to match the capacity of these existing roads.
 - A possible variation on this could be to continue the combined road & metro-rail tunnel from the [Rozelle Interchange](#) on to Barangaroo & Martin Place and connect the road there to the harbour tunnel & ED.
 - The City of Sydney council also propose removing the train station access fees at Sydney Kingsford Smith Airport (KSA), but I'd prefer to moderate car demand by taxing KSA's car parks, as well as applying tolls to the M5 as part of broader [road pricing reforms](#).
- Perhaps using the proposed [Western Harbour Tunnel](#) to connect the West Metro & Inner West directly to Waverton & North Sydney metro trains, &/or maybe to give priority to express electric buses going from WestConnex's proposed Rozelle Interchange via a [short 300m tunnel](#) to a central Balmain bus station in the old [11 million litre reservoir cavern under Gladstone Park](#), then on to ["Beaches Link"](#) express bus services (although [at \\$14bn](#) I think it will be a long time before all this is affordable).

Further transport options could also include:

- A footbridge from **Barangaroo to Balmain East wharf**, possibly also carrying ultra-light, [automated GRT vehicles/pods](#) that continue on overhead pylons along the centre of Darling St. to Balmain, Rozelle and Leichhardt.
- [Electric hydrofoil ferries](#) or even [automated, 30 km/h solar-powered 'flying river taxis'](#) (hydrofoil pods) on Sydney's inner Harbour & Parramatta river (offering better services as well as avoiding water/air pollution and damage to riverbanks).

2019 update

So, more than four years after first proposing this, it looks like the NSW Government has blindly ploughed on with the appalling projects initiated by former Premiers [Barry O'Farrell](#) & Mike Baird (although given prior history it's hard not to blame the bureaucracy rather than politicians). But when [NSW's finances are finally recognised as being out-of-control](#) (surely soon), it may not be too late to recover the situation:

- The [already-built metro line to a new "Victoria Cross" station](#) could connect to the existing line across the harbour bridge (at or just past North Sydney station, which could join with Victoria Cross via pedestrian tunnels), so as to bypass the slow, meandering country-train service via Wollstonecraft & Waverton,
- the [metro tunnel already dug from Marrickville to Waterloo](#) could potentially be used to link the Bankstown line to Green Square & Central, and then round to White Bay and the current light-rail line going back through to Dulwich Hill (as per my diagram below), thus - with conversion to metro - producing a full inner-Sydney "Circle Metro" line, and,
- the [metro tunnel from Barangaroo to Blues Point](#) could possibly be used instead of the longer (& more expensive) planned Western Harbour Tunnel for electric vehicles going between North Sydney and WestConnex - connecting via an underground bus station at Barangaroo (where the metro rail station is planned) to the Rozelle Interchange either via the Western Distributor & Anzac Bridge (with traffic levels somewhat relieved by the M5 connection), or directly with a combined road & metro-rail tunnel from Barangaroo (as suggested above) or alternatively via a separate tunnel from Barangaroo-north to East Balmain & a bus station under Balmain's Gladstone Park (as also suggested above).
- As for the ridiculous, disruptive & ineffective waste that is the [CBD light rail project](#), I suppose we could cut our losses and salvage some value by using it as a temporary means of getting train passengers from Central to Town Hall and Martin Place while building a new train turn-back at Circular Quay (although buses could have done the job much cheaper). Then when people see how dreadfully intrusive it is to have trains (which is effectively what [67m-long twin-coupled trams](#) are) passing by nearly [every 1.5 minutes on George Street shopping mall \(without even providing enough capacity to replace the buses\)](#) - thus blocking pedestrians from crossing for about one in every three minutes and severely disrupting other traffic - they should demand services (& hence capacity) be substantially scaled back as soon as possible - which may be done once the Eastern-Suburbs light-rail line is converted to metro as per the map below - perhaps by operating less frequent, [single-set 33m-trams](#) from Circular Quay to Central and then on to the existing inner-west light rail line, which would terminate at "Rozelle Bay" for interchange to the new West Metro (which could use the existing light rail lines west of there). With less frequent trams on George Street it may then also be possible to allow some [electric buses](#) down it (e.g. operating inner-west routes), using the [in-road 3rd charging rail](#) that the light rail is proposed to use.
- Then converting the Eastern-Suburbs light rail to metro - thus connecting Sydney's beaches to Central, Martin Place, the Inner West & Western Sydney - would involve some further tunnels and wasting the 1km of light-rail surface track now laid on Devonshire street (about 8% of the total, I guess costing less than \$100m), but could possibly still use the surface line now built along Anzac Parade (but enclosed to reduce noise impacts, with

the above-ground tunnel covered in greenery and perhaps having some transparent, double-glazed segments) and would enable developers to benefit from greater "value capture", for example by building a hotel next to the Moore Park stadium station (possibly with the metro branching off the current light rail line and using the Albert 'Tibby' Cotter bridge to get to a station next to the SCG on Driver Avenue), thus [reducing the cost to government of the SFS rebuild](#) (quite possibly by more than the amount wasted on light rail).

- Finally, whilst the now planned mostly-surface [rail line from St Marys to Western Sydney Airport](#) (at Badgerys Creek) would be absurd as [the isolated metro that is currently proposed](#), it could provide a reasonable continuous connection (ideally as express services with limited stops) from some West Metro services going through Parramatta on to Penrith (as I described in the network plan [here](#)) at vastly lower cost than the VHST tunnel indicated in my map, which is unlikely to be affordable and worthwhile for many years (especially post Covid-19 recession), by which time [better & cheaper tunnelling & VHST technology \(such as Hyperloop or maglev\)](#) may be available for a route via Liverpool that also extends north & south of Sydney, like the one I've indicated.

Whether such changes are viable at this late stage I can't be sure, but if they are then overall there may not be too much waste from what's been done to date (as at October 2019).

Show your support for this Sydney Metro plan by 'liking' it at this [FROGS Facebook site](#) (FROGS' SHITS beats Baird's Merde!)



What next?

Current NSW & Sydney train systems and plans must constitute the slowest & most inefficiently used rail assets in the developed world, and are the product of the closed/secretive and politicised practices of the NSW Government over many years (led by [the same bureaucrats](#), who seem obsessed with [building lots of stations](#) of benefit to developers).

These practices need to fundamentally change, as I suggest in "*Seven Habits for Economically Efficient Infrastructure Planning*", attached [here](#).

Network plans have an inherent monopoly nature, but the design of an efficient, world-class network needs an open debate with competing views actively encouraged from multiple professional sources outside of government (including mine amongst others). Once the network strategy is confirmed we should then privatise train operations with the appropriate contract incentives to drive continual incremental improvements ([including for improved maintenance & safety that the current public operator fails to manage adequately](#) and which good private contracting can improve - [noting that between 2004 and 2015 deaths due to accidents on Britain's railways fell by 74%, compared with a 36% fall in the EU as a whole](#)). The best particular form of private sector involvement - [such as franchised operations or "management contracts"](#) - will always depend on the specific

current situation and likely needs over the coming decade or so, and would have to be developed in detail by contracting experts, taking into account the particular risks involved and how and by whom they can best be managed.

And finally, though it may not be the most important thing, the [ridiculous & unpopular alphabetical signage recently rolled out](#) can be easily covered with operator-customised logos based on international standard pictograms ([the round signs that have been rolling out since 2013](#) almost look like they're designed for something better to be stuck on top!).

Bob Meyer FROGS prese...	David Thorp,19 Nov 2019,...	v.1
FROGS Response to Fed...	David Thorp,19 Nov 2019,...	v.1
FROGS Why Fast Metro t...	David Thorp,19 Nov 2019,...	v.1
Fast rail for western Sydn...	David Thorp,8 Mar 2014, ...	v.8
Sydney Sustainable Housi...	David Thorp,25 Feb 2016,...	v.5
Sydney-WollongongROV-f...	David Thorp,4 May 2018, ...	v.1
SydneySHITS.pdf (3839k)	David Thorp,24 Aug 2017,...	v.1
Unsustainable NSW trans...	David Thorp,19 Apr 2018,...	v.1
VHSTcalculations.xls (36k)	David Thorp,11 Oct 2016, ...	v.4