

Please note this document replaces the two previous uploaded submissions - this now includes an email response received today from Infrastructure NSW (see Appendix E)

E J Nye & Associates Pty Ltd

Text added Item (I), page 6

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Legislative Council
Public Works Committee

17 June 2021

Dear Members of the Legislative Council,

Daniel Mookhey(Chair), Mark Banasiak(Deputy Chair), Abigail Boyd, Sam Farraway, Trevor Khan, Shayne Mallard and Tara Moriarty

Submission – Inquiry into the impact of the Western Harbour Tunnel and Beaches Link.

Please find enclosed our submission for the inquiry.

The attached documents include responses to the inquiry Terms of Reference items a) to m) plus supporting documents in Appendices A to F. In Appendix F is a copy of my CV, which summarises my experience on major infrastructure transport projects over the past 40 years. I was also the Design Team Leader of the land tunnels of the Sydney Harbour Road tunnel.

Please note that there are links to various videos in the attached including a presentation I gave to an Engineers Australia audience of 150 professional engineers on rail (the YouTube video link is in the reference list at the end of the published paper included Appendix D).

In respect of the BLRT, we draw your attention to two major issues which prima facie deem the BLRT EIS to be flawed.

- i) the BLRT EIS does not meet its legislative requirements to investigate and report alternative options.
- ii) the economic rationale and the Benefit Cost Ratio (BCR) analysis undertaken for the EIS misrepresents the true value of the proposed BLRT.

I accept the need for the Western Harbour Crossing as necessary for the viability of Westconnex. However, the alternative road tunnel proposals I have put forward will save at least \$4 billion dollars and for all practical purposes eliminate the current road traffic congestion issues around Chatswood.

More importantly, by bypassing North Sydney the North-South tunnel provides not only an improved road network but also road network redundancy (together with the existing road corridor), should there be traffic incident in the vicinity of and on the approaches to the Harbour.

I would be pleased to respond to any questions you may have and would be keen to give an oral presentation to the inquiry committee (with Q & A).

Yours sincerely,



Ted Nye
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Please note this document replaces the two previous uploaded submissions - this now includes an email response received today from Infrastructure NSW (see Appendix E)

Prepared by Ted Nye - B. Eng(Civil), Dip. Eng(Civil), NER, FIAust

Consulting engineer, specialist expertise in underground engineering related to transport (road and Rail). Example projects, Westconnex, the Rozelle Interchange, Northconnex, Lane Cove Tunnel, Eastern Distributor Road Tunnel, Sydney Harbour Tunnel, Airport Rail Link (Sydney), TransApex road tunnels (Brisbane), East Link and Burnley Road tunnels (Melbourne). Summary CV provided in Appendix F.

The headings below have been taken from the Terms of Reference

(a) The adequacy of the business case for the project, including the cost benefits ratio.

Please read the (b) below to see how this project was initiated, it was politically driven and not initiated by the RMS. Given the potential toll road avoidance opportunities (Military Road, the \$600 million upgrade to Warringah Road at Frenchs Forest and the very significant upgrade of Mona Vale Road east of Terry Hills to a dual carriageway, currently under construction), it is therefore highly unlikely that the tunnel, as a toll road, will be financially viable. Two other tolled road tunnels in Sydney, the Lane Cove Tunnel and Cross City Tunnel were sold by the original proponents with significant losses (sold for about half their original build cost to Transurban).

We note that the traffic assessment undertaken by Jacobs, as reported in the EIS, forecasts relatively small numbers of road users that would divert to the BLRT (10,000 vehicles per day). The traffic relief at Spit Bridge and along Military Road is relatively small reduced from 60,000 veh/day to 50,000 (and would be replaced by about 5 years of natural traffic growth).

The construction cost of the BLRT (let us say between \$3 and \$5 billion) is high. There is a *prima facie* case for expecting a negative BCR. Yet the EIS states a positive ratio.

We contest the economic rationale and basis for the BLRT and seriously question the BCR assessment. In fact, we believe that the assessment and therefore the EIS is flawed.

(b) The adequacy of the consideration of alternative options.

Alternative modes of transport have not seriously been considered. Generally, they have been discounted for the purpose of ensuring the pre-selected road alternative and alignment option moves forward (please refer to my deconstruction a section the BLRT - EIS in Appendix E)

The genesis of this project can be traced back the announcement made by the then sacked Health Minister, Jillian Skinner (and Gladys Berejiklian has just become Premier) then published a newsletter with the information that the BLRT was going ahead. From all accounts she was not authorised to make this announcement, and it appears this was some form of political payback (she would not resign from Parliament as promised). She was in the seat of Northshore). Please read the attached three articles, firstly the ABC article (dated 15 Feb 2017), then from the AFR (dated 16 February 2017) and lastly the Manly Daily (dated 25 February 2017). Also, the article published in the Manly Daily (dated 24 Nov 2017) canned rail by the Transport Minister, Andrew Constance. And the article in the Manly Daily (where I was mentioned and dated 2 March 2019), where Tony Abbott (a Federal politician) again cans rail. Please refer to Appendix A for copies of the newspaper articles referred to above.

So, this whole process has been, in my opinion, politically driven with a preselected outcome since Jillian Skinners 2017 newsletter. A solution pushed by politicians and not by planners and engineers, and certainly not by the RMS. It is no wonder that the EIS for the WHC and BLRT EIS process does not comply with the EIS legislation that states all alternatives be considered.

For the BLRT the alignment corridor is the same as the surface alignment developed by the then Department of Main Roads in the 1960s (refer to my EIS Submission, Appendix D, Figure 4), except it is underground being combination of bored and an immersed tube tunnel. The WHC to meet the BLRT on the Warringah Expressway must be constructed at a high level (hence immersed tube tunnel) for the two tunnels to meet.

This is the same scenario that played out for the design of the Sydney Harbour Tunnel. The elevation of the Warringah Expressway meant that the SHT had to be an immersed tunnel if the SHT tunnel grade was going to reach the Warringah Expressway before Military Road, for example.

The options study report dated 2017 only compares alignment options in a predefined corridor between North Sydney and Manly. e.g. it does not include options north of Crows Nest and to Chatswood etc.

(c) The cost of the project, including the reasons for overruns.

We have requested through a GIPA (submitted 2 June 2021) for the Government's cost estimate of both the WHC and the BLRT, which organisation prepared the cost estimate and what was the basis of this cost estimate. To date we have not received a response. An ABC news item (Jan 2021) states that the WHC will cost \$14 billion (however, I assume this includes the BLRT as well). Hence another reason for the requested information via the GIPA.

The only other cost estimate I am aware of was published in the Manly Daily (dated 25 Feb 2017, article attached), at \$3 billion for the BLRT. Even allowing for inflation I would assume this figure did not take account of the cost of an immersed tube tunnel across Middle Harbour.

Cost overruns are likely caused on major infrastructure projects for any number of reasons; however, one likely cause is that a contractor has under bid at tender and then tries to recover costs via project claims. For marine works, cost estimates have a much higher risk to determine than land-based works. i.e. Here we are referring to the dry dock works for fabricating the immersed tube unit sections which are then floated out to the dredged trench for laying across the Harbour. Cofferdams are to be constructed on both sides of the respective harbours (that is 4 coffer dams in all) to facilitate the connections to the land-based tunnels. Then there is the sinking and backfilling over the immersed tube tunnel units (these units would be around 100m long and weight around 30,000 tonnes each, the seals between units include very large rubber gaskets).

In our proposed alternative tunnel alignments, there are no marine works, i.e. no coffer and dams, no dredging and no immersed tube tunnels (no marine ecological impacts!).

For the long length bored road tunnels in Sydney Sandstone the major Tier 1 contractors have opted to use road headers as opposed to Tunnel Boring Machines (TBMs). There are two reasons for this. Firstly, the tunnel profile for a 3-lane wide road tunnel is wider than it is high. A circular full-face TBM over-excavates this profile with wasted effort excavating the invert of the tunnel below the road pavement (in contrast the Sydney Metro single track tunnels are excavated by 7m

diameter TBMs, circular being an efficient profile in this case). The second and major reason is that the risk of breakdown with using road headers is spread across multiple machines (typically 10 or more for projects of this scale). In contrast only 1 or 2 TBMs would be required for each of the WHC and BLRT projects. For a single pass excavation these TBMs would be around 16m in diameter and represent a significant risk compared to multiple road headers if one breaks down. Note this discussion is based on Sydney geology. In other cities, like Brisbane, the rock is too hard for road headers, so TBMs been used in Brisbane for this reason.

(d) The consideration of the governance and the structure of the project including the use of a 'development partner' model.

This submission is focused principally on the alternative of a more cost effective and long-term road network solution of a North-South and East-West Road tunnel (refer to Appendices B and D. This option leaves wide open the further development of complimentary public transport on the Northshore (light rail/metro, and the metro could also be an extension of the Illawarra Line from Bondi Junction as per the reference papers included in this submission).

Savings compared to the current proposal could be the order of \$4 billion, and with a shorter construction period.

We do not address Item (d) in this submission.

(e) The extent to which the project is meeting the original goals of the project.

One of the goals was to take traffic of Military Road through Mosman. This same goal could also be achieved by our proposed North-South and East-West tunnel. That is directing more traffic away from Military Road. Boundary Road leading into Warringah Road and the Roseville Bridge are currently the main east-west access pathway into the Northern Beaches and the alternative we have put forward enhances this role.

Warringah Road has had a significant upgrade at Frenchs Forest and additional upgrades could include grade separations at Forestville and Beacon Hill.

The both the North-south and east-west tunnels would for all practical purposes remove the traffic congestion in the vicinity of Chatswood. A goal that is not addressed at all with the current proposal.

As mentioned previously the current BLRT alignment has been taken from the 1960s. Since that time, we have had constructed or planned the Lane Cove Tunnel, the Sydney Harbour Tunnel, the Eastern Distributor and now of course Westconnex. The Western Harbour Crossing is required to ensure that Westconnex is financially viable as a toll road. The BLRT is not a requirement for this.

The alternative road tunnel that we have put forward by-passes North Sydney and this ensures that there is **redundancy in the road network** (please refer to the accident/incident data in Appendix C and please watch the three YouTube videos below, and these examples are why you need redundancy in the road network!!!).

Fire inside Sydney Harbour Tunnel – Channel 9 News – 25 August 2020

<https://www.youtube.com/watch?v=sNRcsIOxFnk>

Fatal accident on the Sydney Harbour Bridge - Channel 7 News - 26 August 2020

<https://www.youtube.com/watch?v=0LFDEI5IX3M>

Crane-truck broken down in Sydney Harbour Tunnel – Channel 7 News – 9 June 2021

<https://www.youtube.com/watch?v=1H0QbbuFzjg>

For the Northconnex road tunnel (under Pennant Hills Road), which is part of the National Highway, I was part of a Federal Government study (2003-2005, when working at Sinclair Knight Merz, now Jacobs Associates) that assessed three possible routes connecting the M1 to the Sydney Orbital. One of the tunnel routes studied was from the M1 down to and past Chatswood following the Pacific Highway. The WHC idea had not been conceived of at that time (please refer to Appendix B and D, which includes this alternative North-South tunnel connected to the WHC).

(f) The consultation methods and effectiveness, both with affected communities and stakeholders.

Have attended some community lead group meetings and watched a webinar presentation with Q & A from the public given by TfNSW Western Harbour Crossing Team.

Also, I have sent email correspondence to the WHC team in North Sydney and met once with their Transport Lead for an hour to discuss project alternatives (this was earlier this year).

Made a submission to the BLRT EIS (Appendix D) and have since sent additional information to Belinda Scott at the Department of Planning. The EIS submission contains a letter I sent to the Minister for Transport and Roads, fob off letter response received.

Meet with about 4 team members of the TfNSW WHC team for at least 1 hour with 2 residents of Birchgrove who invited me to attend the meeting as their technical advisor. The TfNSW WHC team were also aware that I had a proposal to by-pass North Sydney with a tunnel to Chatswood. *They stated that they were not given a choice and that the WHC tunnel had to connect with the BLRT inside the Warringah Expressway.*

In a telephone conversation with a senior RMS Project Manager, I was told that the only reason for the BLRT was that the Premier Gladys Berejiklian wanted it, and if it was left to the RMS they would not do it. He also stated that the traffic volumes on Military Road, from the RMS's own modelling will be back to their original levels within 5 years. This is not surprising given the facts presented in (b) above.

Have had to become familiar with the NSW GIPA process and have made four separate submissions. For GIPA No. 21T-1281 TfNSW passed it onto Infrastructure NSW, it would appear to avoid providing a response. In this case, therefore, I will be making a submission to the NSW Civil Administrative Tribunal (NCAT). Another GIPA has been partially answered and for the remaining two I am waiting for a response. GIPA No. 21T-1281 relates the first statement from the EIS given in the table in Appendix E.

(g) The extent to which changes in population growth, work, and travel patterns due to the Covid-19 pandemic have impacted on the original cost benefit ratio.

We see the Covid-19 pandemic as having a short-term impact in the context of a project of this size and given the completion date could be as late as 2028. Within 5 years hopefully it will be a distant memory. The expected population growth also has to be considered, the ABS predicts Sydney's population will be around 10 million by 2066.

(h) Whether the NSW Government should publish the base-case financial model and benefit cost ratio for the project and its component parts.

The focus of this submission is to demonstrate that there are numerous alternative solutions and that these have been deliberatively discarded or not even mentioned so that a predetermined outcome, without adequate justification, is proceeded with (refer to Appendix E).

In the process of this review, we believe we have identified a more viable road tunnel option. However, this is just another alternative that should be assessed along with other potential alternatives including improved public transport (here we mean both light rail and a metro, not buses for a long-term solution).

(i) Whether the project is subject to the appropriate levels of transparency and accountability that would be expected of a project delivered by a public sector body.

In our opinion clearly it is not. It is politically driven with the outcome predetermined.

Other sections of this submission clearly identify the statements above.

(j) The impact on the environment, including marine ecosystems.

Others no doubt will comment on the potential impacts due to the dredging required for the construction of the two immersed tube tunnels in the current concept design. The immersed tube tunnel in Sydney Harbour to the west of the Harbour Bridge is likely to disturb contaminated sediments because of its close proximity to Darling Harbour/Blackwattle Bay and other commercial and defence marine facilities on the north shoreline opposite tunnel alignment across the Harbour (i.e. more so than the first immersed tube tunnel on the east side of the Harbour Bridge).

The bored tunnel alignment that we propose does not require an immersed tube tunnel (and hence dredging of the harbour floor). Firstly, the BLRT does not exist in our road tunnels proposal (so the immersed tube tunnel is gone). This is replaced by the East-West Tunnel under Chatswood. Secondly, as there is no requirement to connect to the Warringah Expressway our North-South Tunnel would be a bored tunnel in rock under the Sydney Harbour. Thus, the need for dredging and any consequential damage to the marine ecosystem has mitigated.

(k) The adequacy of the process for assessing and responding to noise, vibration, and other impacts on residents, during construction and operational.

My personal experience with these issues most recently has been on the Rozelle Interchange. There is an RMS document that sets out procedures for managing these issues that is quite comprehensive, if used correctly.

(l) The impact of the project on nearby public sites, including Yurulbin Point and Dawn Fraser Baths, and

The tunnel proposal we have put forward will have no impact on the Dawn Fraser Baths and Yurulbin Point because the bored tunnel passes well below at a depth of at least 30m. There are no coffer dams in the Sydney Harbour on either foreshore.

Because in our proposal there no Beaches Link Road Tunnel, Cammeray Golf is not impacted upon, and the Balgowlah Golf remains. Also, there is no interaction with the Flat Rock Landfill which could disturb potentially high levels of contamination.

(m) Any other related matter

I want to emphasise that I believe the whole process has been politically driven and not technically driven which should have led to a multitude of alternatives being assessed given the potential cost of this project of between \$10 and \$15 billion, depending on which scheme you are talking about.

Remember that whole idea both rail and road being bought under one transport ministry was so that all options were professionally assessed without bias.

Appendix A – Selected Newspaper Articles

Jillian Skinner, dumped health minister, 'missing in action' as NSW Parliament resumes

By state political reporter [Brigid Glanville](#) (the ABC)
Posted Wed 15 Feb 2017 at 12:38pm, updated Wed 15 Feb at 12:52pm



Jillian Skinner's retirement will trigger a by-election in her seat of North Shore. (*AAP: Dan Himbrechts*)

Jillian Skinner is thought to be missing in action after being a no-show at New South Wales Parliament today.

Key points:

- Veteran MP Jillian Skinner was elected to her North Shore seat in 1994
- Her retirement continues a period of upheaval for the NSW Government
- As Health Minister, she endured several scandals, particularly 2016

The former NSW health minister is yet to resign from Parliament, [despite saying she would leave two weeks ago](#).

She was also absent yesterday but was given a "pair" for the day — a common political practice which ensures voting status quo is not impacted while a member is not in the house.

But today she was not at Macquarie Street and did not have a pair.

This means she will be paid as a member of Parliament despite failing to turn up for work.

The ABC was told a "delegation" was sent to her home yesterday to find out when she was going to resign. It is believed she will do so this week or next.

Some MPs believe she did this to harm the Premier, because [Gladys Berejiklian dumped her from cabinet last month](#).

Her failure to put in her resignation has left many MPs angry.

"It's pretty outrageous, this is how she ends her political career," one Parliamentary colleague said.

"She should be in there battling for her seat against amalgamations instead she's MIA."

By-election looms in North Shore

A by-election date will be set for Ms Skinner's seat of North Shore as soon as she resigns.

The longer she takes the more harmful it could be to the Liberals.

ABC election analyst Antony Green said the long lead time into last November's by-election in Orange gave the Shooters, Fishers and Farmers party an advantage as they had more time to campaign.

"The Liberals want the by-election as soon as possible before other candidates come forward," he said.

The seat was previously held by Independents Ted Mack and Robyn Read from 1981 to 1991.

There will also be by-elections in [Manly and Gosford](#).

Posted 15 Feb 2017, updated 15 Feb 2017

— Rear Window

Jillian Skinner not budging until she gets her tunnel

Bryce Corbett Columnist



Feb 16, 2017 – 10:30pm

[Save](#) [Share](#)

What's a major infrastructure project between old friends? Quite a lot it transpires – especially if you are the recently-installed Premier of NSW, Gladys Berejiklian and her recently-deposed health minister colleague, Jillian Skinner.

Skinner has been making headlines in the premier state this week for her reluctance to formally resign from Parliament despite announcing her intention to do so more than two weeks ago after she was ingloriously reshuffled out of the portfolio she has clung to since penicillin was invented.

A by-election for Skinner's seat of North Shore can't be called until the MP hands her resignation letter to the Speaker of the lower house.



If looks could kill ... Jillian Skinner to Gladys Berejiklian: show me the tunnel! Chris Lane

It's a stand-off over council amalgamations, the reports say. It's a deliberate ploy by Skinner to make Can-Do Gladys' life as difficult as possible. And it may well be both of those things. But it's also about a tunnel, according to sources. And specifically, the Northern Beaches link – a proposed stretch of subterranean bitumen under The Spit and beneath the exalted turf of Mosman designed to allow all those merchant bankers to get more efficiently into the CBD from their modest Palm Beach weekenders. Or something.

We hear she is determined to hold out until Premier Gladys announces sods will finally be turned on the tunnel so she can bask in some of the reflected glory. Premier Gladys would prefer to delay the announcement of said sods until the by-election to replace Skinner. Because, well, it's a rolled-gold vote winner. And so, we have ourselves a stand-off.

It's a legacy play for Skinner – and understandable too. After all, who wants to otherwise be remembered for being at the controls when NSW hospitals were accidentally killing off babies?

Comment was sought from Skinner, but none was forthcoming. No doubt she was too busy not showing up to Parliament.

North Shore MP announces \$3 billion northern beaches tunnel to solve travel woes

THE NSW State Government has reportedly given the green light to build the \$3 billion northern beaches tunnel that bypasses the Spit Bridge bottleneck.

Outgoing Health Minister and member for North Shore Jillian Skinner announced the long awaited road infrastructure in her final newsletter before she resigned.

The newsletter claims a feasibility study has “proved its worth” and plans for the tunnel will be released within months.



Outgoing Health Minister and member for North Shore Jillian Skinner. Picture: (AAP Image/Dan Himbrechts)

“I’ve seen them and I can tell you they surpass even my wildest expectations with three lanes proposed each way including a dedicated bus lane,” the newsletter said.

The tunnel reportedly connects the Burnt Bridge Creek Deviation to the Warringah Freeway. It will bypass 21 traffic lights and is expected to only take five minutes.



Warringah MP Tony Abbott and Mackellar MP Jason Falinski. Picture: Virginia Young

Liberal party members, including Davidson MP Jonathan O’Dea and Federal members Tony Abbott and Jason Falinski have been putting pressure on newly appointed Premier Gladys Berejiklian to allocate funds and a timeline to the long awaited project.

It is believed Ms Berejiklian planned to make this announcement in the upcoming by-elections for Manly and North Shore

NORTHERN BEACHES

24 November, 2017

Tunnel vision for transport strategy

Mackellar MP Falinski re-ignites calls for train line on the beaches

Robbie Patterson

A PUSH to have a train considered as part of the northern beaches transport vision has again entered the debate on the eve of an over-haul of bus routes around the B-Line.

Mackellar MP Jason Falinski has called on Northern Beaches Council and State Government to focus on an east-west rail line if they want a bigger slice of federal funding.

It comes as Northern Beaches Mayor Michael Regan called on Mr Falinski and the beaches' four state MPs to match the council dollar-for-dollar to help fund a council-led transport strategy. But Mr Falinski said the time for talk about transport strategy was over and urged planners to think of things other than road-based solutions to heavy traffic.

Cr Regan called for a report to come back to the council early next year outlining various options.

It follows the announcement of up to 10,000 dwellings in Frenchs Forest surrounding the Northern Beaches Hospital, which is acking a transport hub.

Mr Falinski said: "People are a bit sick and tired of transport strategy."

"They want us to get on and make things better."

Previously the *Manly Daily* reported on plans from



2002 with designs created by then-co-ordinator general of rail Ron Christie.

They showed an arm of rail extending from Chatswood to Dee Why, which was touted for the "extreme long-term".

Mr Falinski said a strategy had been mooted more recently by the State Government.

"The irony is the State Government is spending \$72 billion on infrastructure and they have announced plans for another \$120 billion," he said.

"But effectively it just mimics the strategy put out by Bradfield in 1915 ... all the strategies, all the studies commissioned over time, you could have saved your money on consultants and just got on with it."

However, Mr Falinski cautioned that the Beaches Link tunnel must be completed before attention turned to

Jason Falinski joins a long list of federal MPs telling the state how to spend infrastructure money ... We are currently spending \$12 billion a year on transport infrastructure

Transport Minister Andrew Constance (left)

rail, pointing out that Labor leader Luke Foley had promised to scrap the project if elected to government.

"If we all turn our attention to the rail line we will end up missing out on the Beaches Link, which is a game changer and more than 50 years overdue. Bradfield actually had that tunnel in his initial plans," he said.

Mr Falinski has previously indicated his vision of a driverless metro from Beacon Hill to Chatswood, with a major interchange at Frenchs Forest.

He argues that value capture should play a part, meaning that a percentage from the rise in value of property at Frenchs Forest could be used to help fund rail.

The plan has not attracted much support, with Cr Regan saying it could see increased density.

However, he said Mr Falinski's enthusiasm was

"great" and suggested he help fund a study into a rapid road-based project as well as rail.

"We can compare that with his idea for a train link and go to the community to compare the pros and cons and then we can say for sure what will be best," he said.

"A rapid transport solution is available now at a fraction of the cost (of rail) and solves existing problems while catering for very limited growth around the hospital."

Mr Falinski said there were many ways to do value share projects and not all involved increased density.

Transport Minister Andrew Constance was dismissive of the rail plan.

"Jason Falinski joins a long list of federal MPs telling the state how to spend infrastructure money," Mr Constance told the *Manly Daily*.

"The little detail given by the Federal Government of the \$10 billion rail fund shows it is meant to cover the whole country - meaning NSW would only get \$350 million a year if we managed to get our fair share."

"We are currently spending \$12 billion a year on transport infrastructure."

The State Government is seeking feedback on its draft Future Transport Strategy, outlining its vision for the next 10, 20 and 40 years.

New rep gives east west link green light

NORTHERN BEACHES Mayor Michael Regan pointed to the latest from the Greater Sydney Commission for east-west rail as the strongest sign yet of commitment to better infrastructure.

Cr Regan has previously promised to investigate electric bus, known as guided electric train system, as a possible alternative to rail.

He also suggested council review of transport should look into linking between Mona Vale and Macquarie Park.

He called on the State Federal government to match dollar-for-dollar the council's contribution strategy.

"They need to have ownership as well. It can't just be the council doing it on its own," he said.

"We need to factor in the tunnel and how that will change things and the Beaches Link, how that changes things and how we can improve connectivity to the wharf."

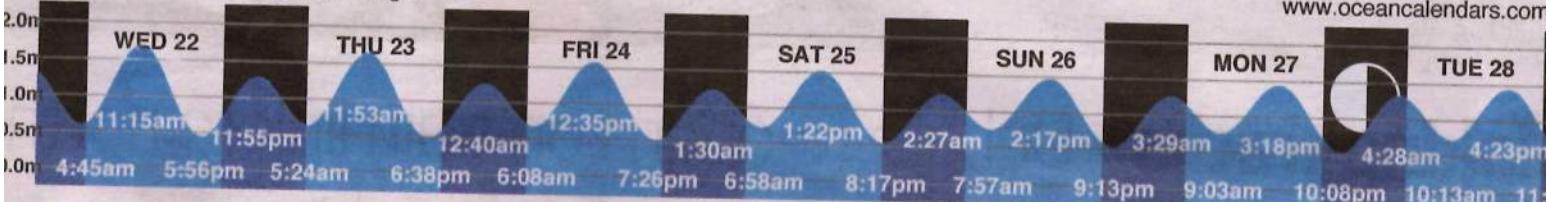
Pittwater state Liberal Rob Stokes said he would work with the council.

"I'm really keen to work with the council in improving transport. We are moving into some of seemingly intractable transport challenges on the northern beaches," he said.

He was particularly interested in the Mona Vale-Macquarie Park corridor.

"We are happy to work with them but we don't know what they are asking for yet," he said.

NSW tide times - first light to last light



www.oceancalendars.com

How we can get a Move on

Robbie Patterson

CARS are killing us. That is the message from Northern Beaches Council as it releases its transport discussion paper, titled Move.

Among a number of options to be considered to get people out of their cars and into public transport is an expansion of the Manly area's Hop Skip & Jump buses across the peninsula.

Another vital link and a key focus for the council is to lobby the State Government for an east-west rapid transport, whether that be a metro rail line, B-Line type buses or the tram-style electric buses known as GETS.

The Guided Electric Transit Systems have been long touted as a viable solution by Mayor Michael Regan but he said he would not rule anything in or out until the community had its say.

He said traffic congestion was crippling the northern beaches, with the Pittwater/Spit/Military Rd corridor the most congested in Sydney and Warringah Rd already exceeding capacity.

"More than half our households have more than two motor vehicles and three out of five local residents use a car to get to work," Cr Regan said.

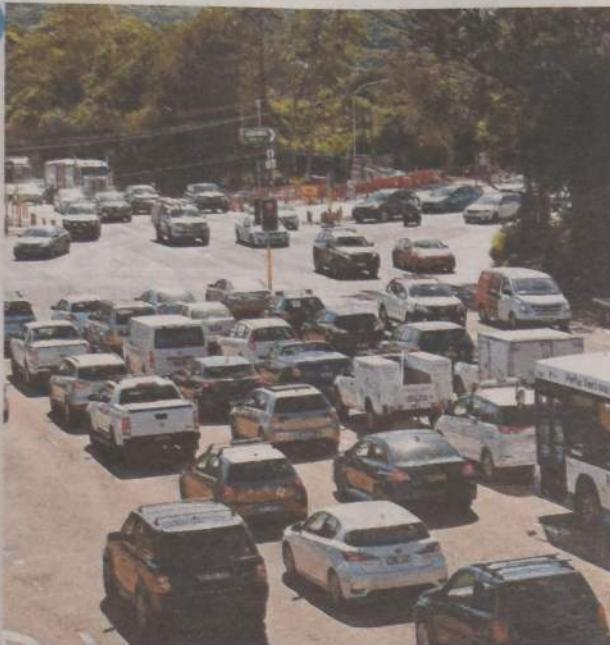
The council's 53-page report highlights the impact traffic has on not only the northern beaches but Australia's economy.

"According to a 2015 Infrastructure Australia report, northern beaches' traffic congestion costs the national economy more than \$48 million," the report said.

It said freight movements

The discussion points

- » A metro rail line from Chatswood to Dee Why is one of many options discussed, along with light rail.
- » Road-based solutions to east-west congestion could include electric tram-style buses or a rapid bus system similar to the B-Line.
- » Expansion of Manly's Hop Skip & Jump Bus or a similar model across the entire northern beaches.
- » Most plans hinge on promised infrastructure improvements including the Beaches Link tunnel and Mona Vale Rd widening.
- » The report points to a move away from cars by building better walking and cycle paths – partly achieved by the under-construction Manly to Palm Beach walkway.
- » The 30-minute city concept raised by the Greater Sydney Planning Commission would mean people live within a 30 minute journey of their workplace. The council has raised Frenchs Forest, Dee Why and Brookvale as sites for more job development.
- » Increased online delivery will mean more trucks on the northern beaches. It is a challenge given the 19m height limits on The Spit Bridge and Warringah Rd.
- » A review of parking would include but not be limited to: better carshare platforms and ensuring parking permit schemes are fair and balanced.



YOU'VE GOT THE POWER

THE power is in the hands of residents to mould a transport network that suits them.

The council's transport discussion paper aims to stimulate input into a 20-year strategy for the region.

"We are open to all options and all suggestions," Mayor Michael Regan said.

"I am not going to rule anything in or out. I don't want to commit council without more discussion."

In a bid to get people out of cars, a number of ideas have been put forward including rail, more rapid buses, light rail or electric buses.

"This discussion paper is an opportunity for our residents to help guide council's advocacy of both the NSW Government and commercial transport providers to improve the northern beaches transport network," Cr Regan said.

"The council's size and strategic capacity make us a capable partner with the NSW Government agencies and transport providers and enables us to have a strong voice for our community."

He said community input was essential to ensure a future transport strategy that reflected local priorities.

From resident feedback over the next two months the council will form a strategy to then go on public exhibition. Plans would be finalised by August.

A number of activities where residents can have their say will take place including drop-in sessions, listening posts and an online survey.

Have your say at northernbeaches.nsw.gov.au

Future transport options put forward as a 20-year plan takes shape

on the beaches were constrained due to the state of our major roads, hindering business growth.

Cr Regan said the main focus for the council was an east-west mode of transport between Chatswood and Dee Why via the new Northern Beaches Hospital at Frenchs Forest.

"Macquarie Park is a major employment centre — the fastest-growing in Sydney — but it takes an hour and 20 minutes on the 197 bus to travel 20km from Mona Vale," he said.

"The Dee Why to Chatswood route is a major trans-

port corridor and home to the Northern Beaches Hospital but it takes over an hour on the 136 bus to travel 14km.

"Traffic will only get worse unless we improve public and active transport options and links so the community has a reason to get out of their cars."

The average afternoon peak traffic speed on The Spit Bridge is 13km/h and Warringah Rd traffic averages 30 to 40km/h during the week.

About 60 per cent of northern beaches residents use their car to get to work.

And forecasts show that by 2036 the number of residents

will increase by 46,250, meaning a public transport solution is vital.

"In the school holidays there is six per cent less people driving but look how much of a difference that makes," Cr Regan said.

"If we can convert just six per cent of the car users into public transport that makes a huge difference.

"If it is quick, cheap and efficient and roughly the same as using a car, why wouldn't you?"

Among some of the plans to ease the traffic burden is a bus that goes express between Warringah Mall and

Manly Wharf. It would allow people to get off the B-Line and straight to Manly Wharf to get to Circular Quay.

"If we could get that going it might free up seats on the bus for passengers further beyond Manly Vale," Cr Regan said.

He said the Hop Skip & Jump bus — a free service that moves people around the former Manly council area — could be used by the government as a model for expansion.

The on-demand bus trials in Manly and Pittwater to get to and from the B-Line was another example.

es Hospital. Road upgrades under way would allow for 3000 more dwellings.

But Cr Regan said meeting the 10,000 dwellings hoped for by the State Government would not happen without better infrastructure. He suggested another mode of public transport could be tram-style electric buses.

"Warringah Rd is quite wide, there is potential to alter it sufficiently so there is a middle lane down the road," he said. "The majority of that road has that potential opportunity, from Dee Why to Frenchs Forest and to the Roseville Bridge."

No tunnel vision but rail debate back on track

RAIL has been put back on the table by Northern Beaches Council as one of the best solutions to traffic congestion.

But it comes with a warning that any costly infrastructure project, including a metro line connecting Dee Why to Chatswood, would come at the expense of highrise.

"New light rail and metro options to the city and Chatswood could provide faster connections," the council's transport discussion paper said. "Densities of the areas surrounding stations would likely be required to justify government investment."

Mayor Michael Regan

said: "We would have a non road-based solution in an ideal world but the reality is we are not going to get one without all the problems that come with it."

A transport corridor will be needed in Frenchs Forest to cope with increased density around Northern Beach-

Plan for 'rail' tunnel under Sydney Heads

Jim O'Rourke

A RADICAL plan to build a 60km rail tunnel under Sydney Heads to link the northern beaches to the CBD is being touted as a solution to transport congestion woes.

The tunnel would extend the existing Eastern Suburbs line from Bondi Junction to North Bondi and then head north under the Harbour at South Head.

Ted Nye, the specialist in tunnelling and major transport infrastructure who prepared the proposal, said stage one of the line would have underground stations at Manly, Brookvale, Dee Why, Collaroy, Warriewood and Mona Vale.

Mr Nye said the line could

be extended to Newcastle via the Central Coast.

A part of the plan Brookvale could be redeveloped as a "satellite CBD".

The new link would connect the northern beaches directly with the Illawarra Line, which includes Town Hall, Martin Place and Central stations. It would slash the journey time from Brookvale to the centre of Sydney to 20 minutes.

Mr Nye has been presenting his plan at engineering conferences and will discuss it at a transport symposium, hosted by federal and NSW Labor Party candidates at the upcoming elections, at Balgowlah Golf Club tomorrow.

He told the *Manly Daily*

that his Sydney Heads rail tunnel could exist along with the proposed Beaches Link road tunnel that is opposed by the ALP.

"If Brookvale went ahead as a satellite CBD, then you would probably need both road and rail tunnels," Mr Nye said.

He suggested that high density housing would occur near the new stations.

Transport for NSW said it was not considering a proposal to build a rail line under Sydney Heads because the project brought "significant engineering challenges and costs".

A spokesman said the NSW Government has already added more than 4,200 weekly bus services on the

peninsula since 2017.

Federal MP for Warringah, Tony Abbott, a firm backer of the Beaches Link road tunnel, said a train line would lead to greater population densities.

"If we want forests of high-rise marching up the peninsula a (rail) system makes that inevitable and I don't think we do want that," Mr Abbott said.

"This is essentially a distraction and a diversion from the (Beaches Link) proposal that we have."

NSW Labor candidate for Manly, Natasha Phillips-Mason, invited Mr Nye to speak at tomorrow's transport symposium, co-hosted by Federal ALP candidate for Warringah Dean Harris.



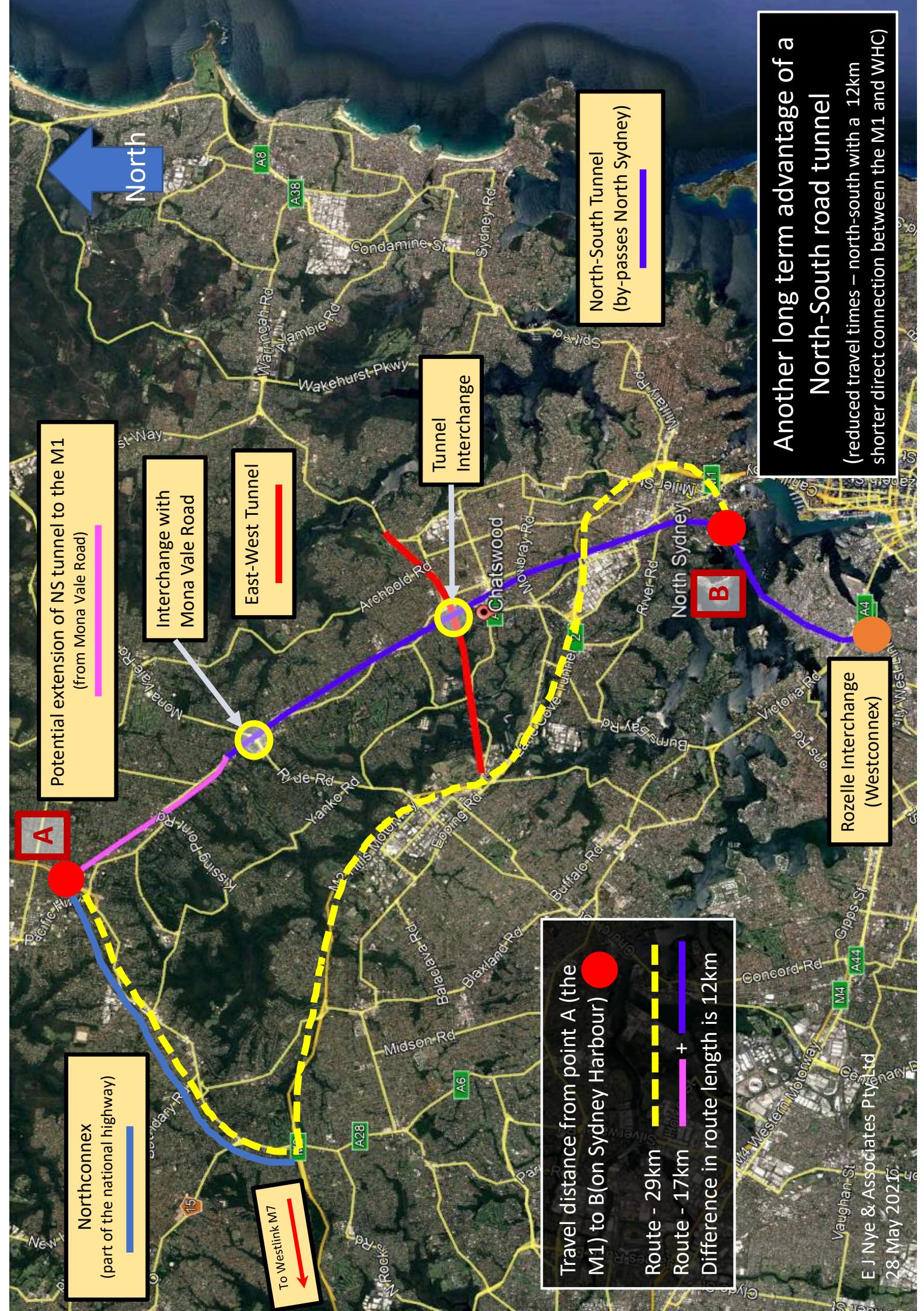
AGENTS ASK SYDNEY HEADS

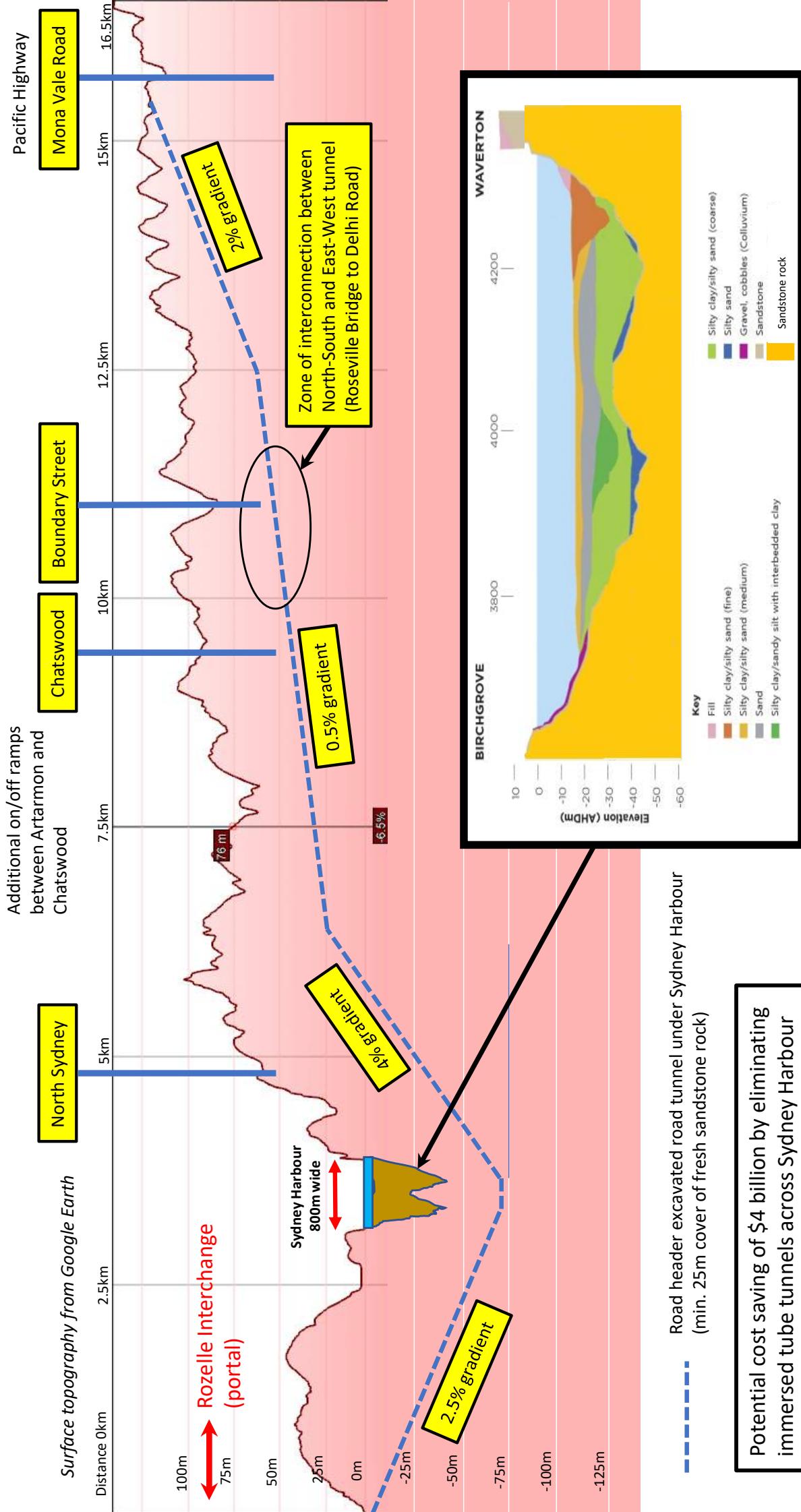
A POPULAR CO-OP developer estate agent for thousands of local country houses has sold his Sydney day-to-day paper, *Sydney Daily Paper*, which pictures 300 people living in 200 homes in 100 different developments in 2017. For more on the story go to manlydaily.com.au

Appendix B – North-South and East- West Tunnels

(these new alignments eliminate the need for two expensive immersed tube tunnels)

Plus 2 inserts of Linkedin Posts with viewer statistics





Alternative alignment for the Western Harbour Crossing (concept for a bored tunnel under Sydney Harbour)



Ted Nye

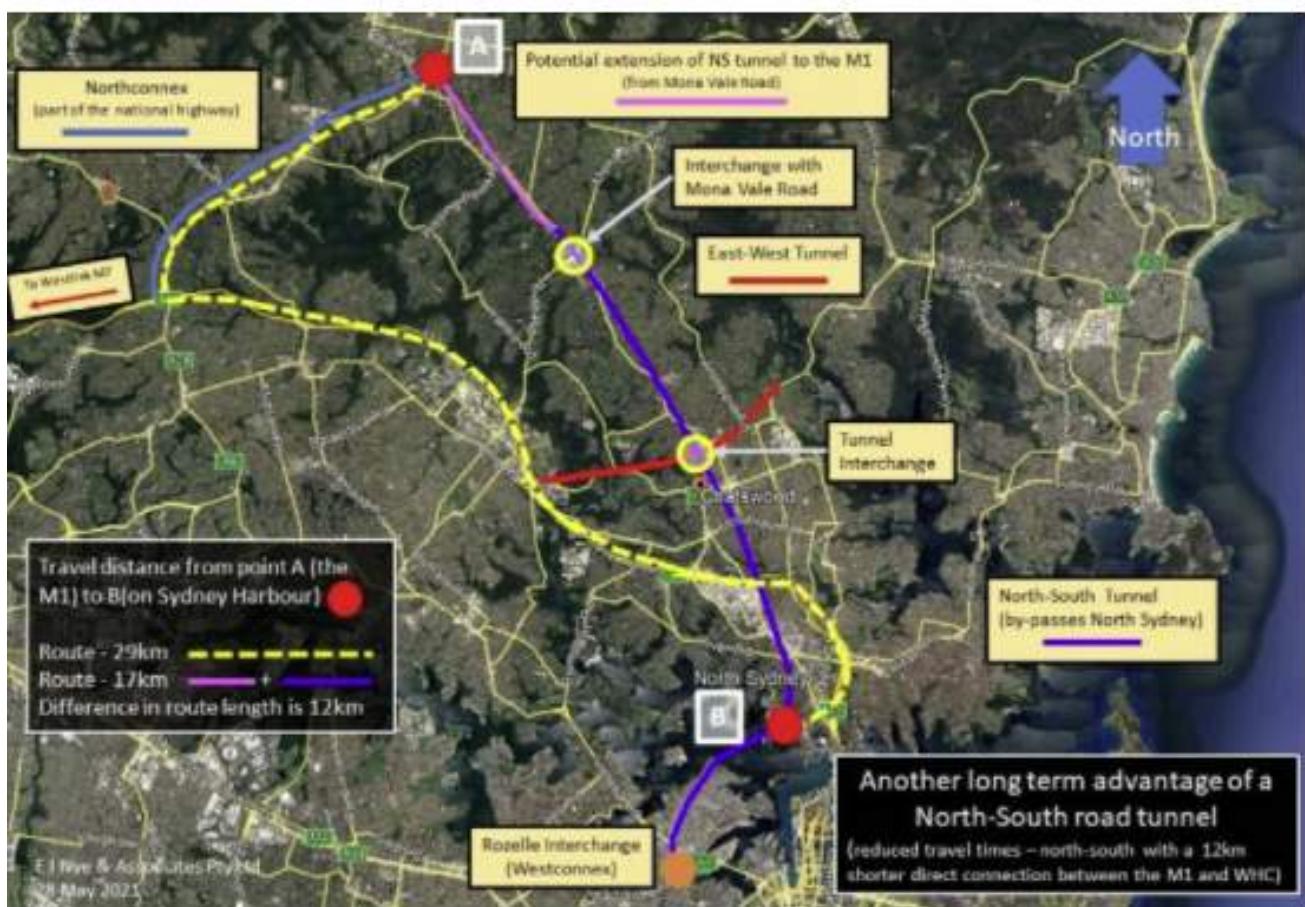
Director - Underground Engineering

2w • Edited •

• • •

Western Harbour Tunnel Bored Tunnel Alternative - Part 2

A bored North-South road tunnel by-passing North Sydney (and no BLRT, a tunnel to nowhere) definitely has many more benefits (than just saving \$4 billion in construction costs by eliminating the two immersed tube tunnels) for the Sydney road network. And will of course take years off the current projected construction time for a tunnel under Sydney Harbour and along with the East-West tunnel, eliminate all the current traffic congestion headaches in the vicinity of Chatswood (the largest CBD outside all the other CBDs in Australia). This graphic will of course be included in my submission to the Legislative Council - Public Works Committee - inquiry into the impact of WHC and BL. #Westconnex #BeachesLink #infrastructure #construction #roads #transportplanning



71

Your post posted on May 27, 2021

71 reactions

7,257 views

3 reshares



106 people from CPB Contractors viewed your post



331 people who have the title Civil Engineer viewed your post



1,205 people viewed your post from Sydney, Australia

John Holland	86	Engineer	251	Melbourne, Australia	383
Mott MacDonald	54	Salesperson	224	Brisbane, Australia	257
Lendlease	40	Project Manager	223	Perth, Australia	99
Bouygues Construction Australia	38	Executive Director	177	New South Wales, Australia	72
AECOM	37	Construction Engineer	170	Newcastle, Australia	50
Jacobs	33	Technology Manager	103	London, United Kingdom	46
Cardno	31	Operations Specialist	99	Adelaide, Australia	32
Arcadis	29	Mechanic and Maintenance Tradesperson	90	Canberra, Australia	24

16 June 2021 – 7pm

Alternative Tunnel Alignment - Page 2 of 2



Ted Nye

Director - Underground Engineering

6d • Edited •

• • •

Western Harbour Tunnel Bored Tunnel Alternative - Part 3

If you have been following my posts then this is just another example of a traffic incident and the consequences that will follow in the Gore Hill/Warringah Expressway, Lane Cove Tunnel, Sydney Harbour Bridge, Harbour Tunnel corridor and beyond in which the frequency of traffic incidents will increase, given both the increased traffic volumes and increased complexity of the corridor, if the WHC and BLRT (the tunnel to nowhere) are constructed in their current form.

Watch - 7News item video – 9June2021:

<https://lnkd.in/dQ8pqxe>

#Westconnex #BeachesLink #infrastructure #construction #roads
#transportplanning #WesternHarbourCrossing



9 • 1 comment

Your post posted on June 9, 2021
9 reactions · 1 comment

5,820 views



70 people from CPB Contractors viewed your post



367 people who have the title Civil Engineer viewed your post



1,069 people viewed your post from Sydney, Australia

Matt MacDonald	66	Project Manager	144	Brisbane, Australia	266
SMEC	50	Engineer	142	Melbourne, Australia	191
John Holland	47	Construction Engineer	113	Perth, Australia	51
AECOM	46	Salesperson	102	New South Wales, Australia	35
Arcadis	36	Executive Director	98	Newcastle, Australia	31
HKA	35	Technology Manager	81	London, United Kingdom	21
WSP in Australia	32	Operations Specialist	60	Adelaide, Australia	20
Aurecon	32	Computer Aided Designer	55	Queensland, Australia	19

16 June 2021 – 7pm

Tunnel Chaos - Page 2 of 2

Appendix C – Accident-Incidents

Lane Cove Tunnel
Gore Hill / Warringah Expressway
Sydney Harbour Tunnel
Sydney Harbour Bridge

Fire inside Sydney Harbour Tunnel – Channel 9 News – 25 August 2020

<https://www.youtube.com/watch?v=sNRcsIOxFnk>

Fatal accident on the Sydney Harbour Bridge - Channel 7 News - 26 August 2020

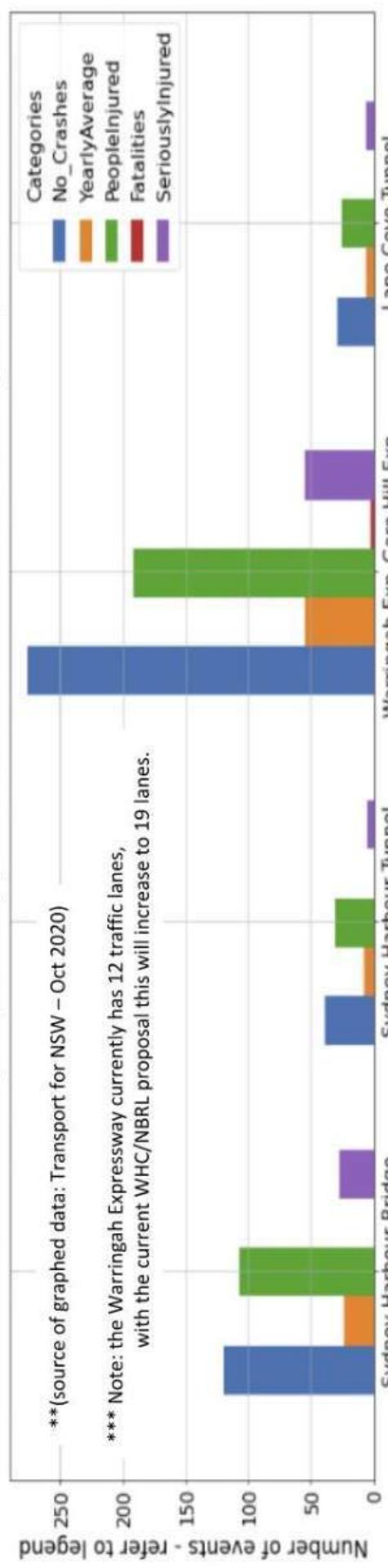
<https://www.youtube.com/watch?v=0LFDEI5IX3M>

Crane-truck broken down in Sydney Harbour Tunnel – Channel 7 News – 9 June 2021

<https://www.youtube.com/watch?v=1H0QbbuFzjg>

Figure 1

Traffic Accidents Summary - reported by police for each Road Corridor, over 5 year period 2014-2018



Sydney Harbour Bridge

Figure 1. Warringah/Gore Hill Expressway and 3 other road corridors that converge onto it

Totals of the categories from each road corridor, 2014-2018

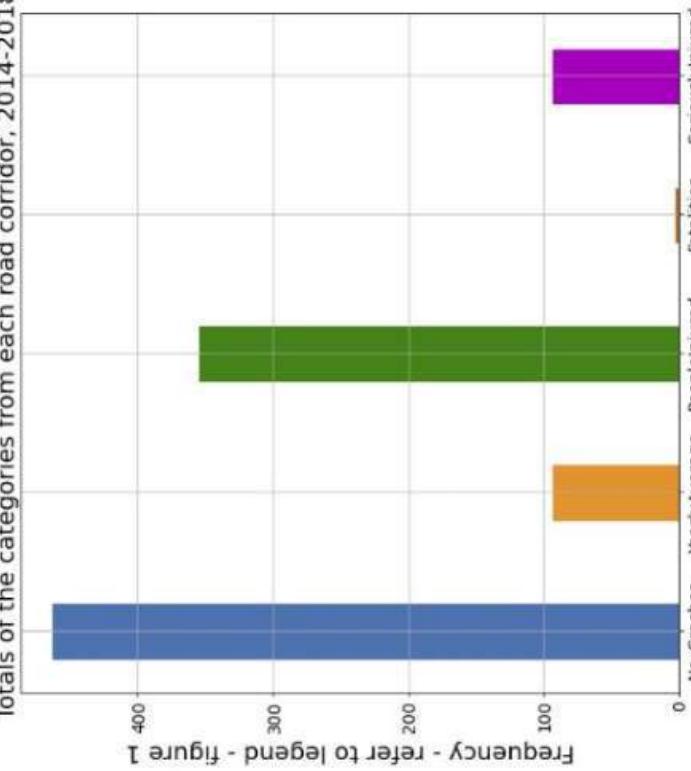


Figure 2. Combined event categories from Figure 1



Appendix D – E J Nye & Associates BLRT EIS submission

Beaches Link and Gore Hill Freeway Connection

EIS Submission:

Modification of the WHC alignment to a north-south tunnel to go beyond Chatswood (portals on the Pacific Highway) and replace the Beaches Link Tunnel with an east-west tunnel under Chatswood (Roseville Bridge to Delhi Road/Sydney Orbital)

Roseville Bridge

East portals location in Warringah Road



Tunnel passes under Boundary Road, Chatswood, Lane Cove River to Delhi Road and the Sydney Orbital



Executive Summary

should be 45 years not 35

Sydney's population is expected to grow from the current 5 million to 10 million by 2066 (ABS – 2017). That is only **35 years** away, and on a timescale for major infrastructure, not that far into the future. For example, the Sydney Harbour Tunnel is already 30 years old and the Sydney Harbour Bridge will be 100 years old in 2033.

It is important, therefore, that we get our major infrastructure right! Especially if the capital cost is in the billions of dollars. There are also significant flaws in the current proposal with regards to road safety and delay.

Unfortunately, both the Western Harbour Crossing (WHC) and the Beaches Link Road Tunnel (BLRT), fall well short of what I would consider the most cost-effective solution, without even considering other factors.

The BLRT concept in the current proposal has been taken straight from the old Department of Main Roads (DMR) 1969 archives, and the WHC has just been tacked on to it through an already compromised Warringah Expressway.

It is obvious that credible alternatives schemes have not been assessed and a lot has happened since 1969! Which requires new thinking.

Without giving an endless list of these changes, perhaps the most important is the growth of Chatswood and its potential to grow going forward as a regional CBD. This growth will accelerate soon with the completion and full operation of the Sydney Metro Rail Project in 2024.

Chatswood already has significant traffic congestion issues, both for east-west and north-south traffic. Chatswood is already Australia's largest commercial centre outside city CBDs

The BLRT does nothing for the wider road network on the North Shore because it deposits all its traffic at the southern end of the Northern Beaches (weekends will be even worse).

Just one issue on road safety/delay will be mentioned here, as an example, the risk of head-on collisions on the Sydney Harbour Bridge. The lane widths do not comply with current road standards and a movable road barrier should be installed along the full length of the bridge to prevent these collisions. Concentrating road traffic through the Warringah/Gore Hill Expressway there is no redundancy in the road network should a traffic accident occur and will occur, no matter how many "safety in design" principles are applied.

This submission is not about providing a commentary on possible tweaks to the WHC and the BLRT, it is about getting a complete rethink of the combined projects to improve traffic flow and road safety north of the harbour, improve the economic viability of Westconnex (by directing more traffic to it) and not leaving lose ends around, like the traffic congestion at Chatswood, both now and into the future.

The EIS fails to satisfy the EIS legislative requirements of reporting Alternative solutions.

(note the front cover photograph, of the Roseville Bridge at the time of completion, no vegetation on the embankments (and hence the potential to accommodate widening and tunnel portals appears quite visible)! The Roseville Bridge was completed in 1966.

Executive Summary

Commentary

Contents

1. List of reasons for a rethink! (with 4 figures attached, Figure 3, updated).
(for meeting with the WHBL - Traffic Leader, 11 Feb 20102 – North Sydney)
2. Text and images - 4 posts made to ‘Linkedin’ over several months
(during 2020 and 2021).
3. Memo to the Minister for Transport and Roads (dated 18 Nov 2020)
(minus the updated figures given in Item 1 above).

Attached to this EIS submission is a paper published last year – “Sydney Heads Rail Tunnel – a treasure trove of planning opportunities” just to show there are also alternative or complimentary transport modes that should be considered when planning the growth of the North Shore and beyond (it not all about transport either, but city planning).

Commentary

I am sure others will address the traffic distribution predictions given in the EIS between the various road corridors. The shifts in traffic volumes are insignificant given the cost of the project. A tolled BLRT will never get the volumes of traffic predicted in the EIS because the tunnel is a side issue in the overall road network on the North Shore. This is for both east-west and north-south traffic.

The Roseville Bridge is a significant asset *whose full potential has not been realised* and the EIS traffic numbers predicted *degrade its importance*. Toll avoidance, however, will ensure that it keeps its status, along with Warringah Road, as the major east-west traffic route within the North Beaches.

For all the money being potentially spent, the Spit Bridge remains in its current form. I have a potential solution for this, but this is not included in this submission, and it is not a high-level bridge replacement.

(i) The EIS fails to satisfy the EIS legislative requirements of reporting Alternative solutions.

It is evident that the study area has been limited to immediate connections to the existing network in and around North Sydney and has not taken a strategic planning approach.

It fails therefore to investigate north-south traffic improvement alternatives to and from the Warringah Freeway and WHC to the north of Chatswood.

Glaringly, the EIS also fails to report alternative solutions to the proposed BLRT.

The proposed BLRT is unlikely to provide much benefit to East-West traffic movements into and out of the Northern Beaches.

Investment in the Warringah Road corridor, which is the main access corridor into and out of Northern Beaches would result in higher economic returns compared with the BLRT.

Rail access from the Sydney CBD to the Northern Beaches, which would be a far more sustainable solution and would support the future commercial and economic development of the Northern Beaches, has not been reported.

ii) Inconsistent Planning and Design Approaches

It is also evident from the EIS that the proposed WHC northern connections to the Warringah Freeway are at a lower standard compared with its southern connections with WestConnex.

This would result in lower levels of service on the northern side of the Harbour. This is a flaw in the planning design, largely because of the limited study area given to the design team and failure to investigate and report alternative solutions.

1. List of reasons for a rethink! (with 4 figures attached, Figure 3, updated).
(for meeting with the WHBL - Traffic Leader, 11 Feb 20102 – North Sydney)

A. North-south Connection

1. Given the potential increase in traffic with a rising population the Western Harbour Crossing connection with the Warringah/Gore Hill Expressway is unsustainable as the number of accidents (impacting on road safety and delay) will increase over time (refer to Figure 1 attached).
2. The standard of motorway design on the north side is not compatible with the high standards adopted for Westconnex on the south side of the Harbour. An example from the south side being the Rozelle Interchange (refer to Figure 2 attached).
3. The current proposal, while it in part addresses the north-south traffic, it does not extend sufficiently north to Chatswood and the Pacific Highway. Our proposal would strategically locate on-and-off ramps along its length.
4. Chatswood is expected to have significant employment growth of 38% by 2031, from a current base of 95,000(2015 study) to 130,000 workers. Chatswood is both a very significant traffic generator/attractor and has increasing traffic congestion problems (both north-south and east west).

B. East-west Connection

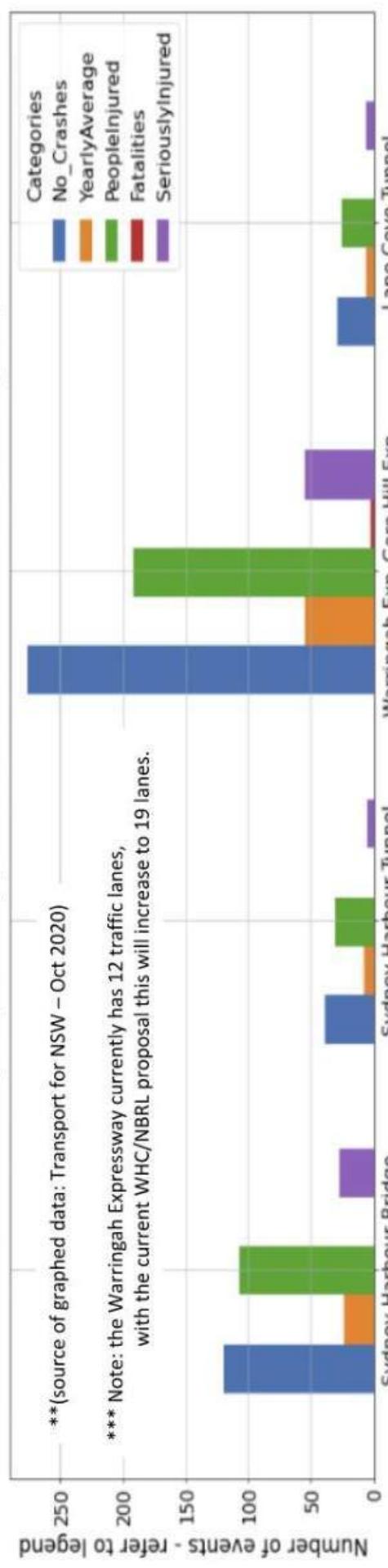
5. Boundary St (Chatswood)/Warringah Road are currently the main east-west arterial roads bringing traffic into the Northern Beaches (2014 report, at 80,000 vehicles per day) and the route should continue to be improved. The NSW Government has already spent \$600m on road works on Warringah Road, grade separating Forest Way and Wakehurst Parkway in Frenchs Forest and increasing the railway bridge span over Boundary Street.
6. An east-west tunnel from the west side of the Roseville Bridge to Dehli Road, Ryde and connecting with the Sydney Orbital is a logical route given the current and future growth of Western Sydney to improve east-west traffic flow.
7. The Beaches Road Tunnel Link(BRTL) entry and exits are at the south end of the northern beaches and with the “double toll” (BRTL and Lane Cove Tunnels) and extra travel distance and time is unlikely to attract east-west traffic from most of the Northern Beaches. Note also the pinch point at the east portals of the LCT, only 2 lanes.
8. Without an east-west tunnel the rabbit runs and traffic on Dehli Road west of the Pacific Highway will continue to be used together with the long route to Macquarie and Lane Cove Road etc via Forest Way/Mona Vale Road to the north of Warringah Road.

C. Alternative Route – Plan

9. The attached concept plan is an alternative to the current Government proposal, and it has been developed to address the issues raised above (refer to Figure 3 attached).
10. The outcome of this short list is to persuade the WHC/BRTL team to assess this alternative given the billions of dollars involved in projects of this type and the problems, in my opinion, that have been highlighted with the current proposal.
11. The combined north-south and east-west tunnel is designed to direct as much traffic as possible into/from the Westconnex network on the south side of the harbour.
12. Please also refer to Figure 4 and the notes. This is the 1969 DMR concept for the BRTL.

Figure 1

Traffic Accidents Summary - reported by police for each Road Corridor, over 5 year period 2014-2018



Sydney Harbour Bridge

Figure 1. Warringah/Gore Hill Expressway and 3 other road corridors that converge onto it

Totals of the categories from each road corridor, 2014-2018

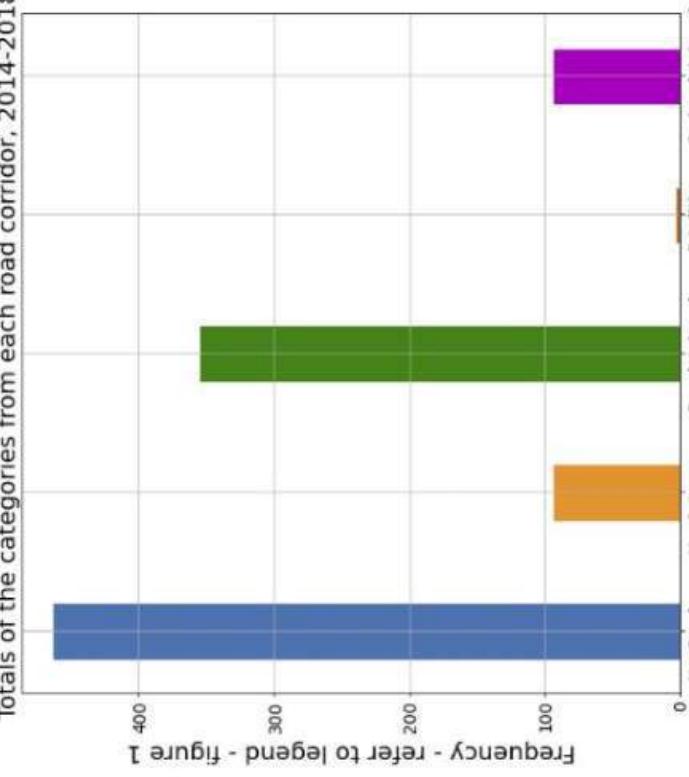
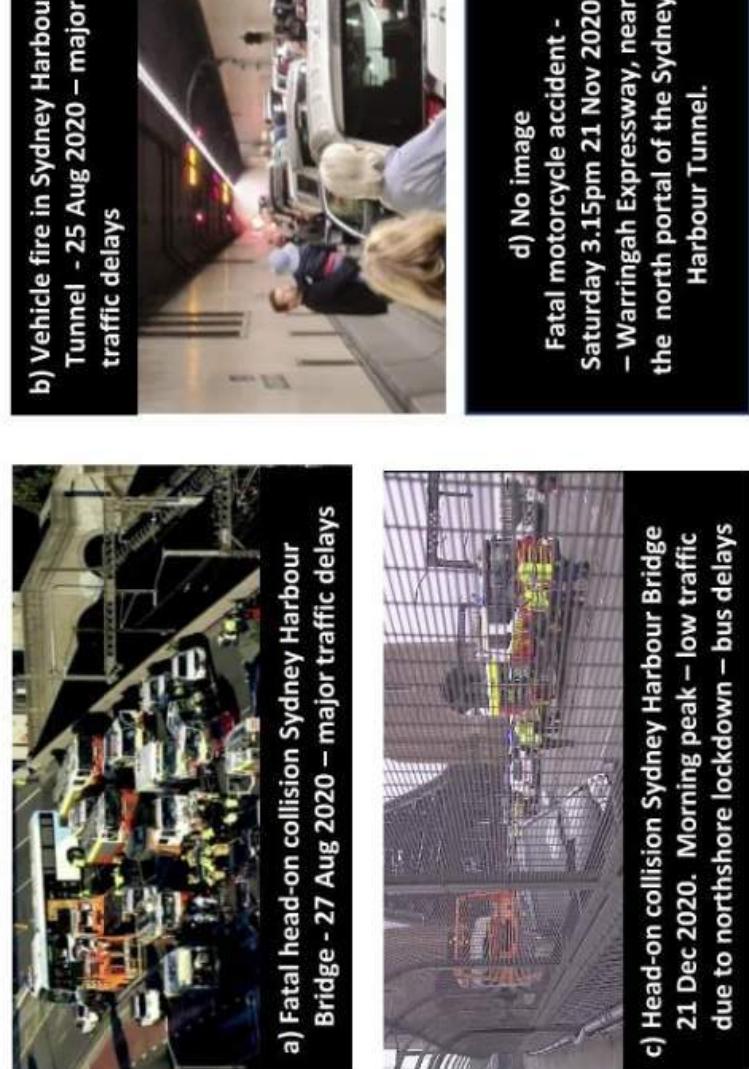


Figure 2. Combined event categories from Figure 1



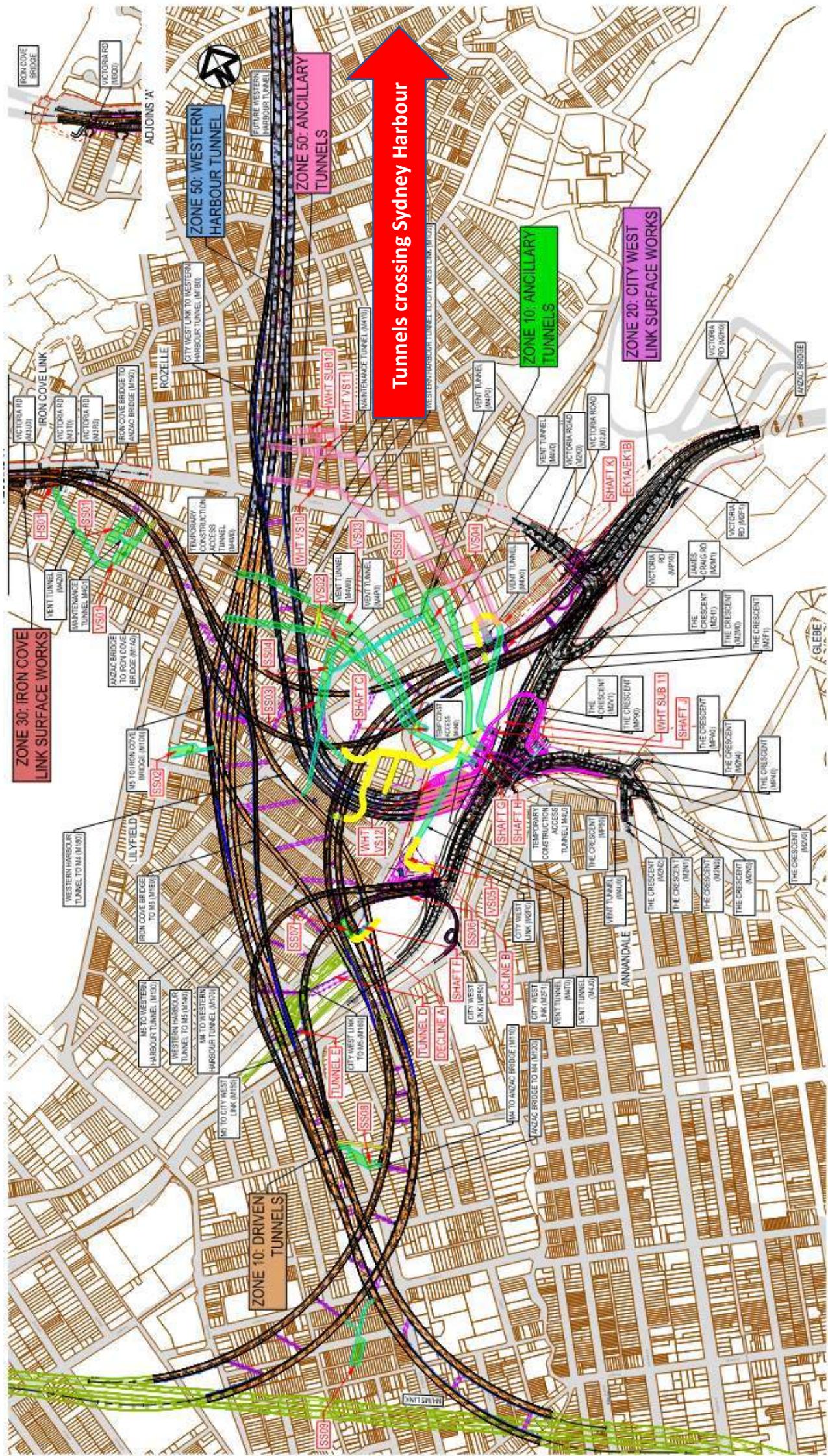
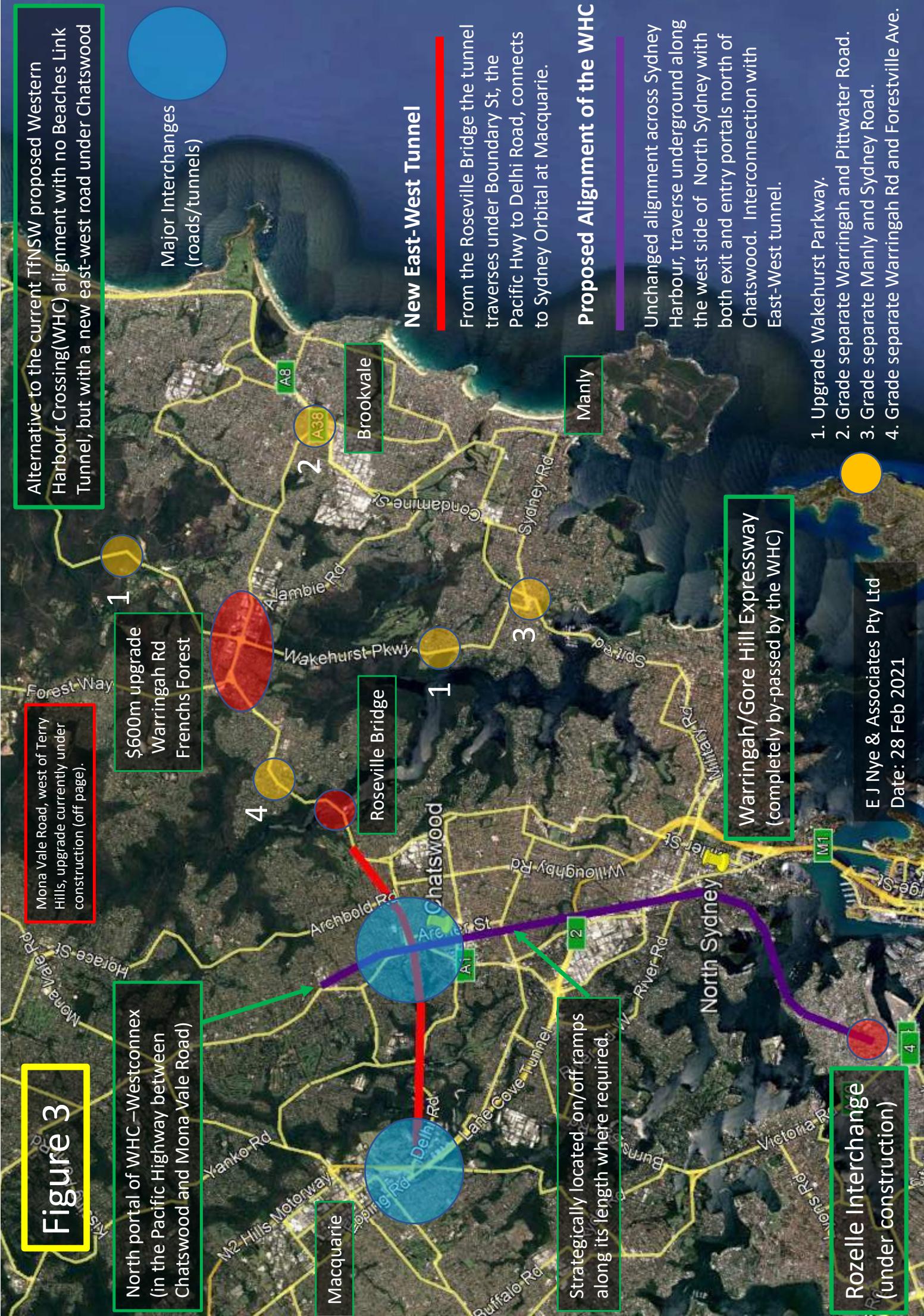


Figure 2 – Westconnex - Rozelle Interchange
 (these are all tunnels -around 20km of them) except for lower centre and lower right)

Figure 3

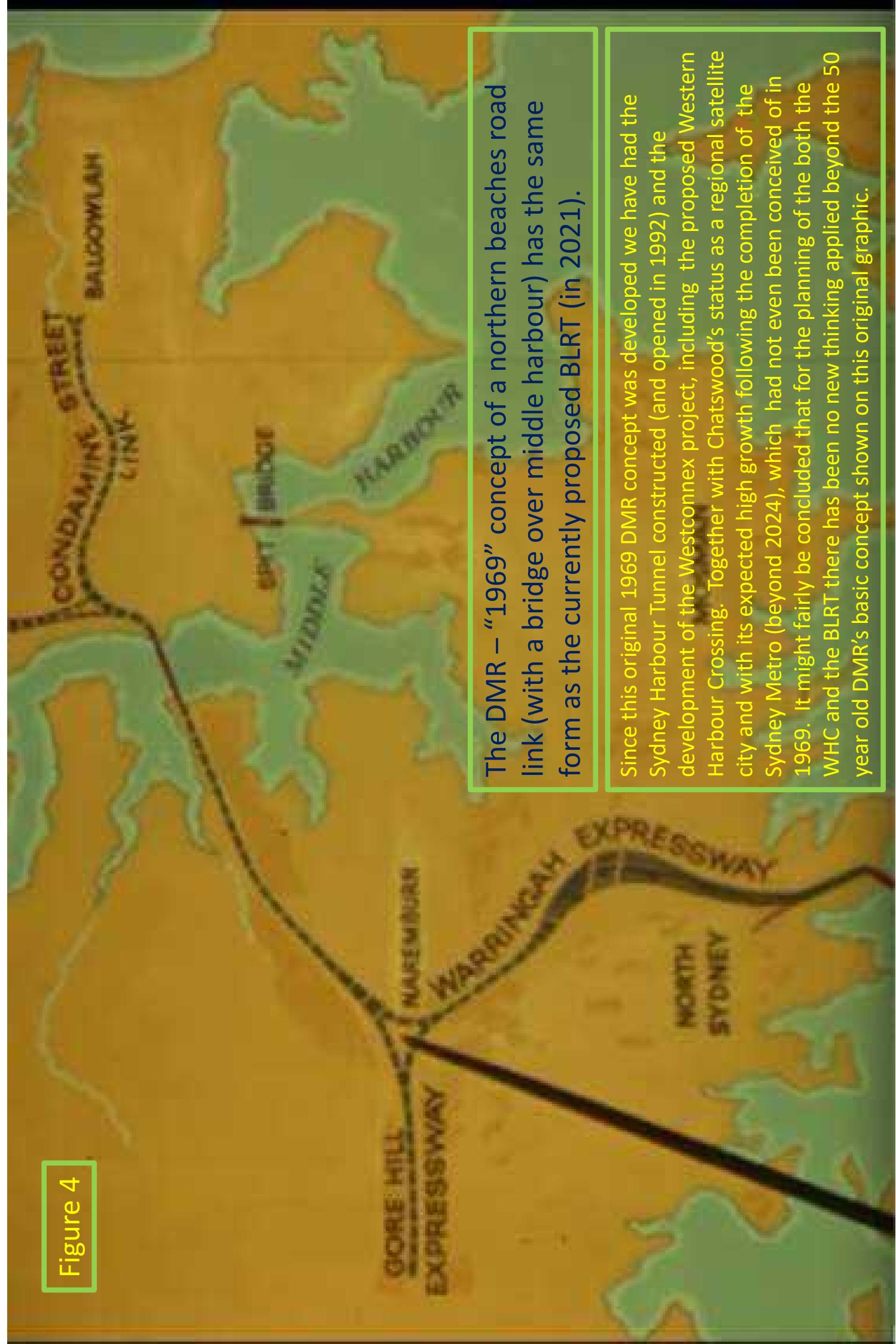
Alternative to the current TfNSW proposed Western Harbour Crossing(WHC) alignment with no Beaches Link Tunnel, but with a new east-west road under Chatswood



Rozelle Intermediate
(under construction)

E J Nye & Associates Pty Ltd
Date: 28 Feb 2021

Figure 4



The DMR – “1969” concept of a northern beaches road link (with a bridge over middle harbour) has the same form as the currently proposed BLRT (in 2021).

Since this original 1969 DMR concept was developed we have had the Sydney Harbour Tunnel constructed (and opened in 1992) and the development of the Westconnex project, including the proposed Western Harbour Crossing. Together with Chatswood’s status as a regional satellite city and with its expected high growth following the completion of the Sydney Metro (beyond 2024), which had not even been conceived of in 1969. It might fairly be concluded that for the planning of the both the WHC and the BLRT there has been no new thinking applied beyond the 50 year old DMR’s basic concept shown on this original graphic.

2. Text and images - 4 posts made to ‘Linkedin’ over several months
(during 2020 and 2021).

A. 7 Months ago

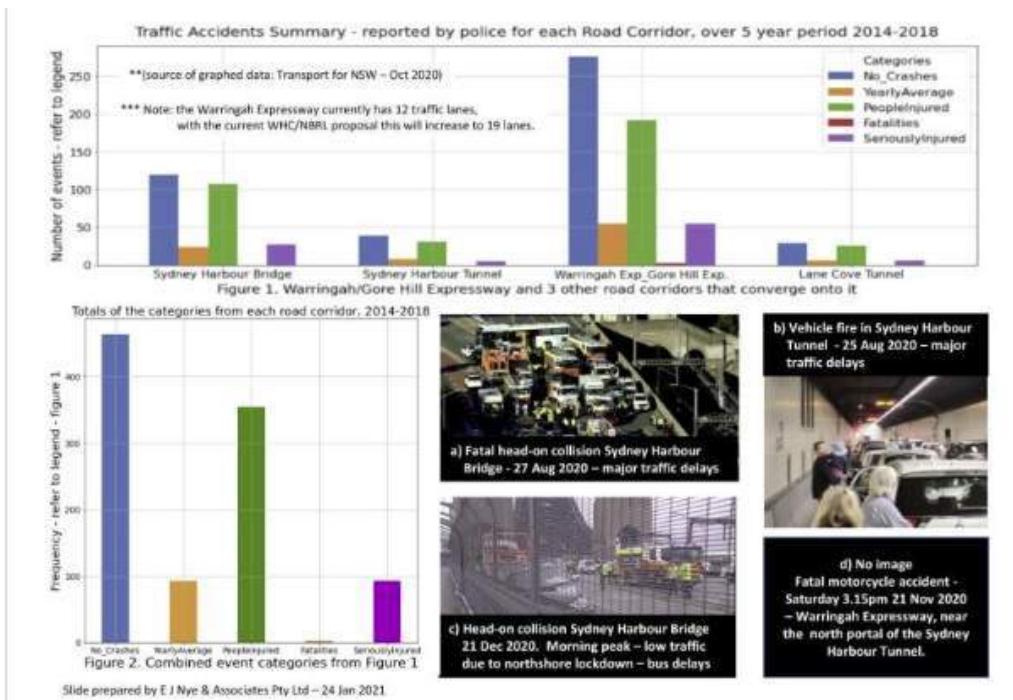
Pleased to publish another paper, "Sydney Heads Rail Tunnel – a Treasure Trove of Planning Opportunities" at the virtual WTC2020 Congress (September) from KL Malaysia. The paper also touches on the flaws in the Northern Beaches Road Tunnel (which should be scraped) and the north shore alignment of the proposed Western Harbour Crossing (keeping the currently proposed harbour crossing, but re-aligned to go north towards Chatswood, not North Sydney). The upgraded Warringah Road (at Frenchs Forest, see photograph below) could be a significant traffic attractor (away from Military Road) together with the duplication of Mona Vale Road, currently under construction. The biggest missing links on the north shore are a Boundary Street to Delhi Road tunnel connection (starting at the west end of the Roseville bridge) and upgrades to the Pacific Highway (via at least a north south tunnel by-passing Chatswood). The Federal Government initiated Northconnex tunnel study (2005) also considered a tunnel route under the Pacific Highway, traffic congestion at Chatswoods being significant issue. [#Transport](#)



B. 1 month ago

Western Harbour Crossing(WHC) and Road Safety (Warringah Expressway(WE)) "Thank you for your interest in road safety" the opening text to a letter from Transport for NSW in October 2020, following my request for accident data - Lane Cove Tunnel, Warringah/Gore Hill Expressway(W/GH), Sydney Harbour Tunnel and Bridge. Note the spike in traffic incidents for the W/GH Expressway. The frequency of traffic incidents will increase during construction and after, due to the number of traffic lanes in the WE increasing from 12 to 19. If completed in its current form, the number of traffic incidents along this whole, already compromised road corridor, will also increase with traffic volumes/population and the sheer complexity of the road network. I have posted previously a description of a better option, which extends the WHC tunnel up to Chatswood and replaces the Beaches Link with a road tunnel connecting Warringah Road (just west of the Roseville Bridge) to Delhi Road, under the Pacific Hwy. The WHC then is not reliant on the WE. There will be a significant increase in road accidents in this corridor and road safety and the network will be compromised compared with more effective alternatives.

[#roadsafety](#) [#sydneyconstruction](#) [#westernharbourtunnel](#) [#transportfornsw](#)

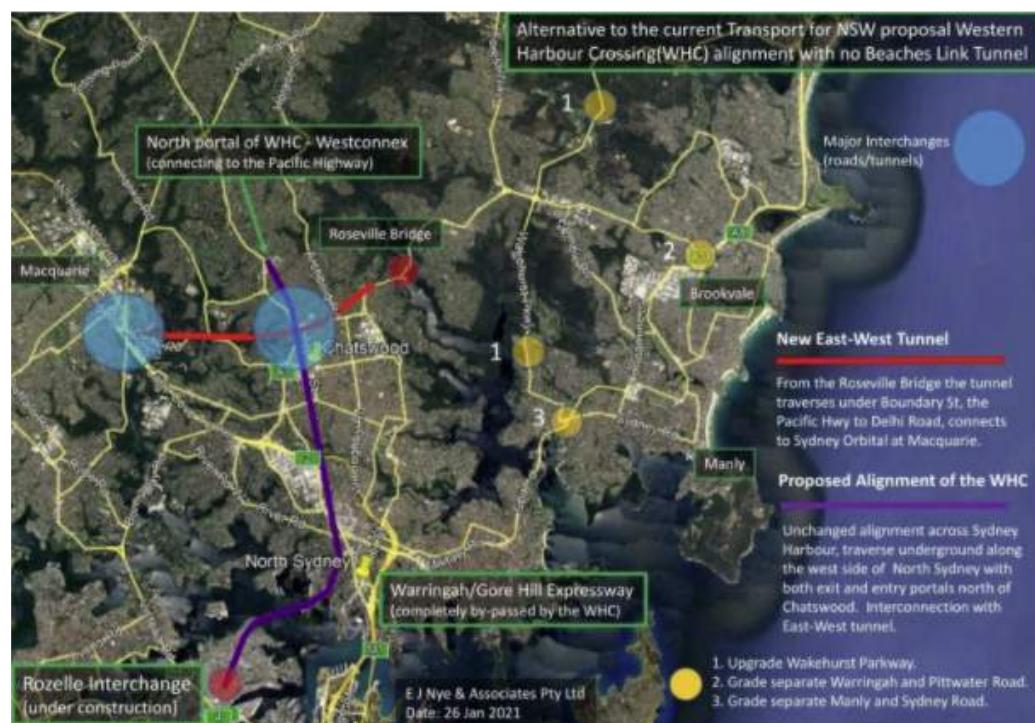


Slide prepared by E J Nye & Associates Pty Ltd – 24 Jan 2021.

C. 1 month ago

Proposed Western Harbour Crossing(WHC) - Warringah Expressway(WE) connection a design folly and professional embarrassment.

Major strategic infrastructure must have a 100-year design life, an example of this is the Sydney Harbour Bridge which will have been in operation since 1933. The Government's proposal to connect the WHC to the Northshore road network would fail this test. The graphic is my concept for a better alternative to the currently proposed WHC and Beaches Link Road Tunnel (BLRT). As a local resident of the Northshore and an engineer experienced in the design of strategic infrastructure projects, what is currently on offer is a professional embarrassment. As per my post of a few days ago the WE is an already compromised road corridor. The BLRT also has no social or economic justification. The obvious missing road upgrade is between Warringah Road (west of the Roseville Bridge) and Delhi Road, Ryde, and as anyone living in Sydney would know Delhi Road, across the Lane Cove River, is a goat track at peak times. There are also numerous rabbit runs across to Macquarie, west of the Pacific Highway, if you use Boundary Street at Chatswood. Locals travel north up Forest Way to Mona Vale Road, across and then south again to get to Macquarie and Lane Cove Road.

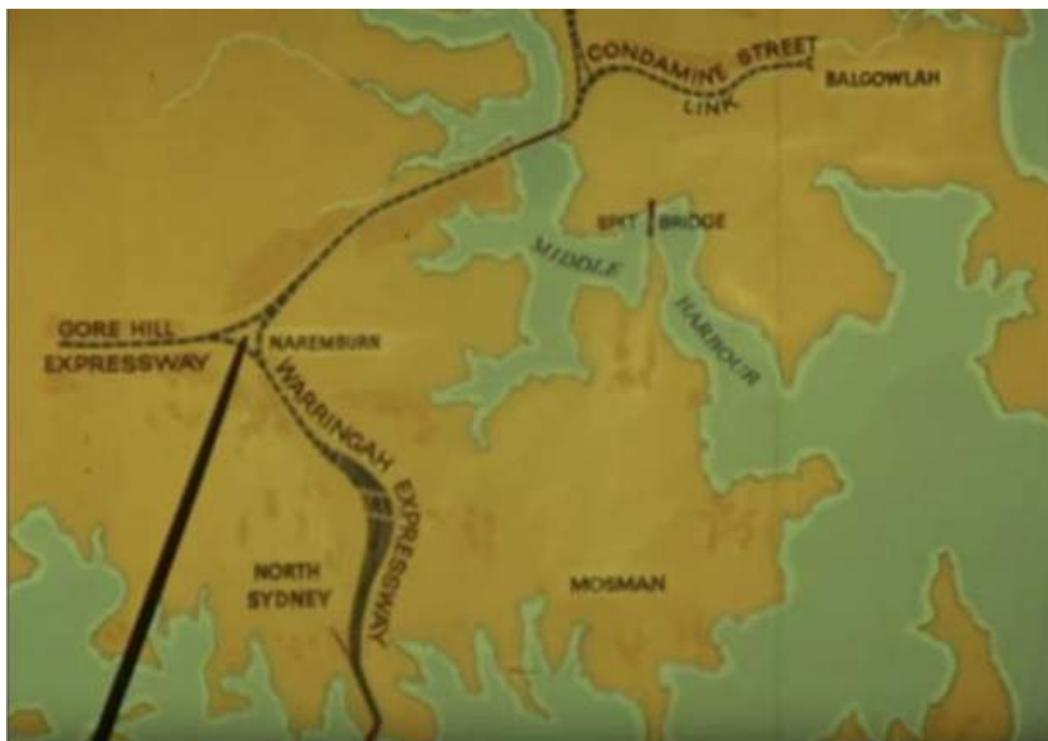


The above figure has been updated as in Section 1.

D. 5 days ago

Beaches Link Road Tunnel - a NSW Government rabbit hole/money pit

A project out of the old DMR's 1969 archive – that is the graphic below! (identical form to BLRT). No acknowledgement, future growth of Chatswood and the impact of the new Sydney Metro on this growth. Chatswood has both significant east-west and north-south (Pacific Hwy) traffic congestion issues. Warringah Road is the main east-west access road corridor with the Northern Beaches, ignored future potential even after a \$600m upgrade at Frenchs Forest (potential for new road tunnel link to Delhi Road, Ryde and the Sydney Orbital starting at the 6 lane wide Roseville Bridge). WHC and the BLRT will be constrained by the pair of 2 traffic lanes only east portals of the Lane Cove Tunnel at peak times. No awareness of road safety and delay on the Warringah Expressway and Harbour Bridge road corridor and the negative impact on both that will follow from the increased complexity of the road network. Too many ways to avoid this tolled road tunnel. Military Road, Warringah Road and Mona Vale Road (major upgrade east of Terry Hills, under construction). Please view previous post for one alternative that aims to address all the above issues which should divert more traffic to the WHC and Westconnex.



3. Memo to the Minister for Transport and Roads (dated 18 Nov 2020)
(minus the updated figures given in Item 1 above).

Attention: Andrew Constance, Minister for Transport and Roads

(uploaded to the NSW Government website, Contact Ministers))

From: Ted Nye **Date:** 18 Nov 2020
E. J. Nye & Associates Pty Ltd Mobile: 0422003275
10 Malbara Crescent Email: ted.nye@nyeconsulting-eng.com.au
Frenchs Forest, NSW, 2086

Dear Sir,

**Re: Western Harbour Crossing and Northern Beaches Road Tunnel
Alternative Alignments**

I am professional engineer with over 40 years' experience in major transport projects, both road and rail (from concept to commissioning). At the end of this letter I have provided a list of some of the projects and places around the world where I have developed this expertise.

I am writing to you because I do not believe the current tunnel alignments on the north shore for both the Western Harbour Crossing(WHC) and the Northern Beaches Road Tunnel(NBRT) are commercially and economically viable or enhance road safety nor minimise potential delays.

This is particularly so with regards to road safety and delay and within the road corridor that includes the Gore Hill - Warringah Expressways and the Sydney Harbour Bridge. The current alignments being proposed for both these tunnels will direct more traffic onto to this corridor (it already has 160,000 + vehicles/day). This will result in a greater number of traffic accidents and incidents within the corridor and the feeder roads to this corridor (i.e. the Lane Cove Tunnel, the Sydney Harbour Tunnel and the other remaining surface feeder roads e.g. Military Road).

When there are traffic accidents/incidents in the feeder tunnels or on the Harbour Bridge they have the potential to cause significant traffic grid lock over a wide area of the Sydney's road network and this will occur irrespective of the WHC and NBT tunnels being linked together under the Warringah Expressway.

This corridor is currently the northern gateway into/from the WHC and ultimately the whole of Westconnex.

Westconnex includes a road network investment of many billions of dollars. For example, just one element of Westconnex, the Rozelle Interchange alone will cost around \$3billion (and it includes numerous multi-level tunnels for the purposes of providing grade separation).

On 10 August I messaged the Minister for Planning and Public Spaces, Rob Stokes, and outlined the above concerns with reference to the inadequacies of the EIS (please see the

attached correspondence). Unfortunately, with regards to both road safety and traffic disruption my concerns were graphically realised on the 25 and 27 August, just a few weeks later! (please see Attachment 1).

I then requested from TfNSW the traffic accident statistics for the Lane Cove Tunnel, Sydney Harbour Tunnel, Warringah Expressway and the Sydney Harbour Bridge(the response is Attachment No. 2) I have also prepared a graph of the data provided (Attachment No. 3). You can easily compare the accident statistics for each infrastructure transport element from the graph.

Sydney, with a population heading towards 10 million in 2066, deserves two completely independent major road crossings of the harbour in the areas relevant to this discussion to minimise the issues raised above. At least with one throughfare fully operational the Sydney traffic is not completely grid locked around the Harbour.

In order to achieve this, I have proposed the alternative alignments for both the WHC (land tunnels only) and the NBRT outlined in Figure 2 (Attachment No. 4). The concept provides redundancy to the road network i.e. Westconnex/WHC and the Warringah Expressway /Sydney Harbour Bridge operate completely independently from one another.

The replacement tunnel for the NBRT also provides an important missing link, connecting Warrringah Road with Dehli Road (and the Sydney Orbital) starting from a portal just west of the existing Roseville Bridge (Attachment No. 4).

My proposal, I believe, is also consistent with the large scale thinking behind Westconnex, while the ad hoc solution around the Warringah Expressway corridor is not (i.e. with numerous additional merging and diverging traffic lanes, plus disruption to traffic flow and actual delays associated with the Sydney Harbour Bridge in particular). I wonder how emergency services will cope with major accident scenarios within this expanded and compromised corridor (refer an actual scenario described in Attachment 1).

From a commercial and economic viewpoint, in my proposal the traffic catchment area is also significantly larger than the Government's current proposal. The NBRT, given its limited catchment area, will I predict, have a similar fate to the Cross City Tunnel. There are numerous opportunities to avoid this tolled tunnel (Military Road, Warringah Road and Mona Vale Road.). This, however, leads to another problem of increased traffic congestion on Boundary St, Eastern Valley Way and around Chatswood, the rabbit runs to Dehli Road from the Pacific Highway and on Lane Cove Road, north of the Sydney Orbital, heading down to Macquarie.

The Government's current project proposal does nothing for the Pacific Highway and traffic congestion around and through Chatswood. Chatswood could be expected to grow significantly once Stage II of the Sydney Metro is up and running.

As mentioned previously, Sydney's population is currently is 5 million and is projected to be 10 million by 2066(ABS figure). A high proportion of this population increase will eventually occur on the Northern Beaches and in the not too distance future heavy rail will have to be

considered. More roads will not solve the problem as the area densifies (for example, the proposed Frenchs Forest Town Centre on Warringah Road).

The Gore Hill/Warringah Expressway and the Sydney Harbour Bridge corridor should be avoided by any new project with traffic diverted elsewhere to ensure the viability of Westconnex and to not degrade the efficiency of this already constrained and compromised road corridor. The key words here to hold are “ensure redundancy” within the road network.

In conclusion, there is a well-known engineering expression - if it doesn't look right, it probably isn't. This, in my opinion, clearly this applies to the current proposals for both the WHC and the NBRT north of the Harbour. Today and in the future, there is a desperate need for alternative routes across the Harbour.

I would be happy to come to your office and give a presentation on the above to you and your transport planning team.

Yours sincerely,

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Cc Rod Staples - Secretary Transport
Tim Reardon - Secretary – Department of the Premier and Cabinet
Rod Stokes MP – Minister for Planning and Public Spaces

Enc. Attachments 1 to 4 (not repeated here)

Addendum: Summary List of My Involvement in Projects Past & Present (not given here).

Sydney Heads Rail Tunnel – a Treasure Trove of Planning Opportunities

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ABSTRACT: Sydney is a fast-growing city with a population of over 5 million. By 2066 this is expected to increase to 10 million people. Road congestion is a growing problem, particularly if measured by the ever-increasing travel times experienced by private and commercial vehicles. Given these concerns it is imperative that Sydney's rail network be expanded to both improve the rail network and enhance the quality of life. This project would involve over 60km of twin bored rail tunnel construction in both rock and soft ground. Two very wide water crossings, one being at the Heads to Sydney Harbour and the other at Pittwater will be required. The paper describes the project concept and options and touches on the likely construction duration and cost.

KEYWORDS: Rail, Transport, Tunnelling, Urban, Density, Housing, Population, Water-crossing

1. INTRODUCTION

1.1 Current Status of Tunnelling in Sydney

Two significant tunnel projects have recently been completed in 2019, the 4km long M4 road tunnel(part of Westconnex) and Stage 1 of the new Sydney Metro which includes 12km of twin bored tunnels (an additional 12km of rail tunnel for this project was the upgraded Epping to Chatswood Rail Link). The 10km long Northconnex and 9km long New M5(Westconnex) road tunnels will open this year, 2020. The 12km long tunnel excavation for the Sydney Metro Stage 2 in 2024. The Westconnex Rozelle Interchange construction commenced in 2020 while the 7.5km long M4-M5 Link tunnel started construction 2019. The Rozelle Interchange will connect all the Westconnex tunnels including the future Western Harbour Crossing. All road tunnels to date have been excavated using road headers and both stages of Sydney Metro are excavated by 7m diameter TBMs. The bored tunnel section crossing the harbour, just to the west of the Sydney Harbour Bridge, is a slurry TBM from Herrenknecht.

1.2 The Existing Rail Network

Apart from the Eastern Suburbs Railway, the existing rail network, including the Sydney Metro Stage 1 and 2, lie to the west of the Sydney CBD. The State Government at the time of writing have not provided publicly the details of the proposed Sydney Metro West alignment from the Sydney CBD to Parramatta and especially no details of the connection into the Sydney CBD. The existing northern rail line into Sydney that passes through Gosford and Hornsby carries both freight rail and passenger traffic. Freight rail is growing at about 3-4% per year and the freight trains can be up to 1.5km in length. On this line there also are around 360 passenger trains per day. Much of this rail passenger traffic would be transferred to the Sydney Harbour Crossing line with the proposal described in this paper, thus freeing this line for more freight rail traffic.

1.3 Expanding the Rail Network Across the Harbour

The Sydney Heads Rail Tunnel proposal expands the rail network to the east and north of the Sydney CBD by extending the Eastern Suburbs Railway further to the east to North Bondi, then under the Sydney Harbour Heads and then along the east coast up to Gosford with a total length of approximately 70km of twin bored tunnels.

The current urban sprawl in Sydney is to the west and south west. This is generally very low-density housing that will in the long term not be practical to be serviced efficiently by public transport, particularly rail, as Sydney's population climbs to 10 million by 2066 (reference 1). To get some time perspective on major transport infrastructure the city circle underground railway in Sydney was completed in the 1930s. The Sydney Harbour Bridge (SHB) will be 100 years old in 2032, just 12 years away.

The references listed at the end of this paper provide more details than can be included here. The ideas initially put forward in the 2017 paper have been progressively developed over time.

2. ALIGNMENT OPTIONS

2.1 Option 1 – Newcastle to Canberra

Option 1 – Stage 1 is just an extension of the Illawarra Line which passes through Town Hall Station before heading east to the existing Bondi Junction Railway Station. There is at least 300m of existing twin tunnel east of this station. At both ends of the station there are rail cross-overs. The western cross-over was completed in 2006. New tunnels would extend the Illawarra Line from this station to a new station North Bondi (well back from Bondi Beach). An underground car park with at least 2000 car spaces would be built as part of the station complex. The tunnel would then continue under Sydney Heads and under Manly. There could be new stations at Dee Why and at the Warriewood Industrial Park. The tunnels then divert west and north as the railway would cross Pittwater on a bridge or through a tunnel before skirting around Woy Woy to the east then to continue the tunnel in sandstone rock to Gosford and possibly beyond. The length of twin tunnel between Bondi Junction Stations and Gosford Stations is around 60km (Figure 1).

2.2 Option 2 – Newcastle to Parramatta

Option 2 – is an extension of the proposed Sydney Metro West, construction of which might commence in the next few years. Sydney Metro West connects the Sydney CBD with the satellite CBD of Parramatta. We are proposing that the existing Martin Place Station connects directly with Sydney Metro West and hence to the Eastern Suburbs Railway line which as described above extends to the existing Bondi Junction Railway Station.

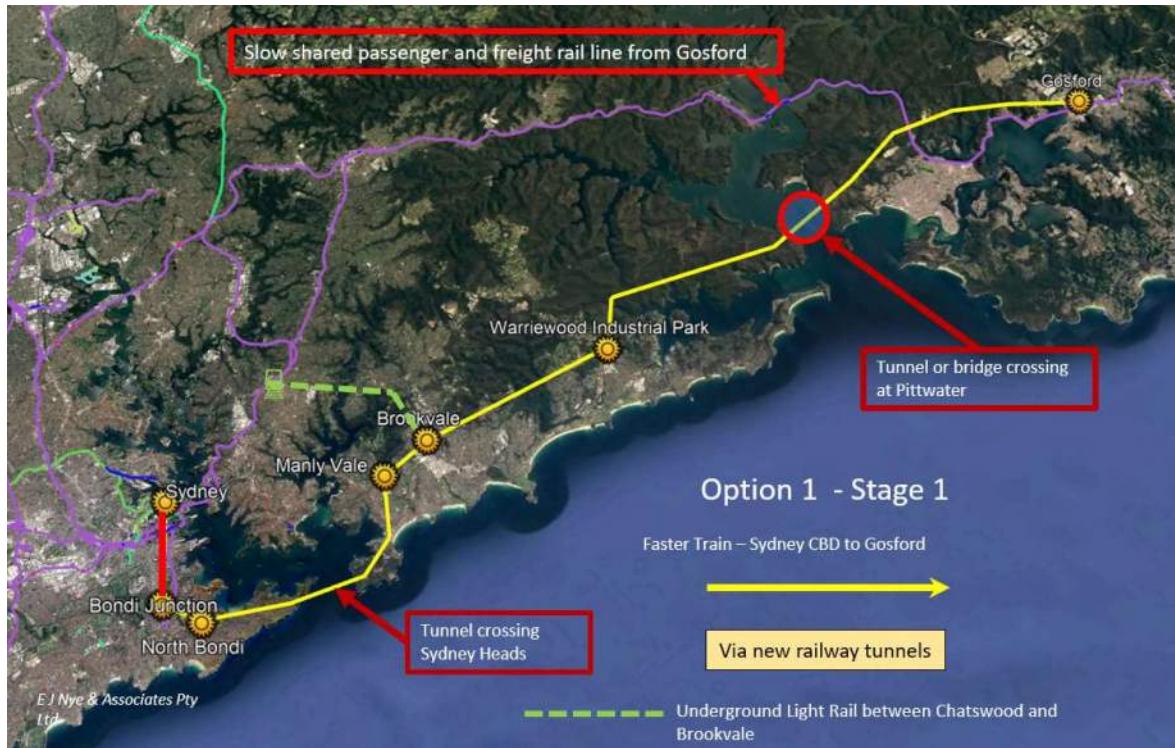


Figure 1 Alignment of proposed tunnels and light rail tunnels (dashed line)

The tunnels at Town Hall Station having been disconnected from Martin Place Station, would be extend north and swing around under the Stage 2 Sydney Metro Tunnels and then head south to a new station platform constructed under the existing St James Station. St James Station is only 12m in depth, below which is high strength sandstone rock. This new rail tunnel would continue south, possibly to Malabar.

2.3 St James Station

St James Station was constructed in the 1920s as part of the City Circle Loop. It was a cut and cover construction and is only 12m in depth. In Option 2 it is envisaged that a new station would be constructed in a rock chamber directly below. The central station platforms (which have never been used) would provide the spaced for lifts and escalator declines to the new station below. The ATS Journal reference (2018) includes plans and sections of the tunnel and station configuration.

An existing abandoned rail tunnel north of St James Station (this station was completed in 1925), the original plan for the underground developed by Bradfield in the early part of the 20th century linked St James Station directly to Town Hall Station and would be utilised as a 300m long pedestrian tunnel linking the St James Station to the existing Martin Place Station. The existing Martin Place Station will have a pedestrian link to the new Martin Place Station being constructed as part of Sydney Metro Stage 2.

3.0 GEOLOGY ALONG THE EAST COAST

The intention would be to tunnel in Sydney Sandstone where -ever possible. This can be partially achieved by having a tunnel alignment well back from the coast. Obviously, this is not possible at the Sydney Harbour Heads.

There are four areas of significance for potential soft ground tunnelling along the proposed Sydney Heads route. Firstly, the area between Rose Bay and Bondi, secondly the crossing between the North and South Head, then through the Manly Spit and finally, at the

Narrabeen Lakes. Only the first two will be addressed in this paper. The Manly Spit and Narrabeen Lakes are being less of a concern at this stage.

Past seismic traverse from Rose Bay to Bondi shows that the depth of sand would be at least 60m. The tunnel along this section would be relatively shallow until it heads north towards Sydney Heads. This is due to the level of the proposed connection to the Bondi Junction Station and the steep topography and near sea level of the surface between Rose Bay and Bondi Beach. The topography then rises rapidly towards North Head, the sandstone rock cliff face at the Heads rises from the sea by at least 50m. To cross Sydney Heads the tunnel can either traverse the soft ground between North and South Head or be excavated at 100m below sea level in good sandstone rock.

4. LIVABILITY

4.1 Three Mega Cities and the Coastal Development

The Greater Sydney Commission has published a report in March 2018 recommending Sydney has three 'mega' cities in the greater Sydney area, two west of the Sydney CBD. However, the Sydney CBD is linked to numerous satellite CBDs and this is a trend we would expect to continue and encourage. To this end the retail and industrial area known as Brookvale, which is east of the CBD and SHB (it has a foot-print size three times that of the North Sydney CBD), should be redeveloped as another satellite CBD along with Gosford to the north on the east coast. This complements the current three 'mega' city proposal as it enhances population growth management. A major University could also be sited at Warriewood on the new rail line alignment, since currently there are none on Sydney's north shore. Liverpool has recently been rezoned to allow high-rise commercial and residential development and along with Parramatta will also be a satellite CBD. Along the alignment of Sydney Metro Stages 1 and 2, over time, we would expect other significant satellite CBDs to further develop or emerge (e.g. the Northwest Business Park, Macquarie Park and Bankstown). If the Option 1 alignment was adopted, Macarthur Park on the southern fringe of Sydney would likely develop into a significant satellite CBD.

4.2 Turn Down the Heat

Seven local Councils in Western Sydney launched a campaign in the latter part of 2018 called “Turn Down the Heat”. This is in response to the rising population in Western Sydney and the double impact urbanisation and the natural difference in temperature between the cooler urban coastal environment of Sydney. On hot summer day this difference can be as much as 9 °C. There is a direct correlation between mortality rates where temperatures are in the region of 40 °C, especially for the young and old. There are also more days above 35 °C in the west of Sydney than along the coast. This project would provide development opportunities on the cooler east side of the Sydney CBD.

inflow through the head of the TBM, using an open face TBM, must be addressed with the potential low rock cover under this scenario. These are not the only alternatives to consider. The table below summarises some TBM options. There are numerous technical issues with any TBM tunnel but one in particular, from a risk and cost perspective is perhaps quite unique to this project. If a specialised TBM is required to traverse the paleochannel and to reduce cost, the same machine might be used twice, for say twin 7m diameter tunnels, or should the paleochannel be traversed by a single large diameter TBM, hence only one bore would traverse Sydney Heads.

By referring to Figure 1 the length of soft ground tunnel can be seen to vary depending on the depth of the tunnel below the seabed. With 20m of ground cover the expected length of the soft ground tunnel

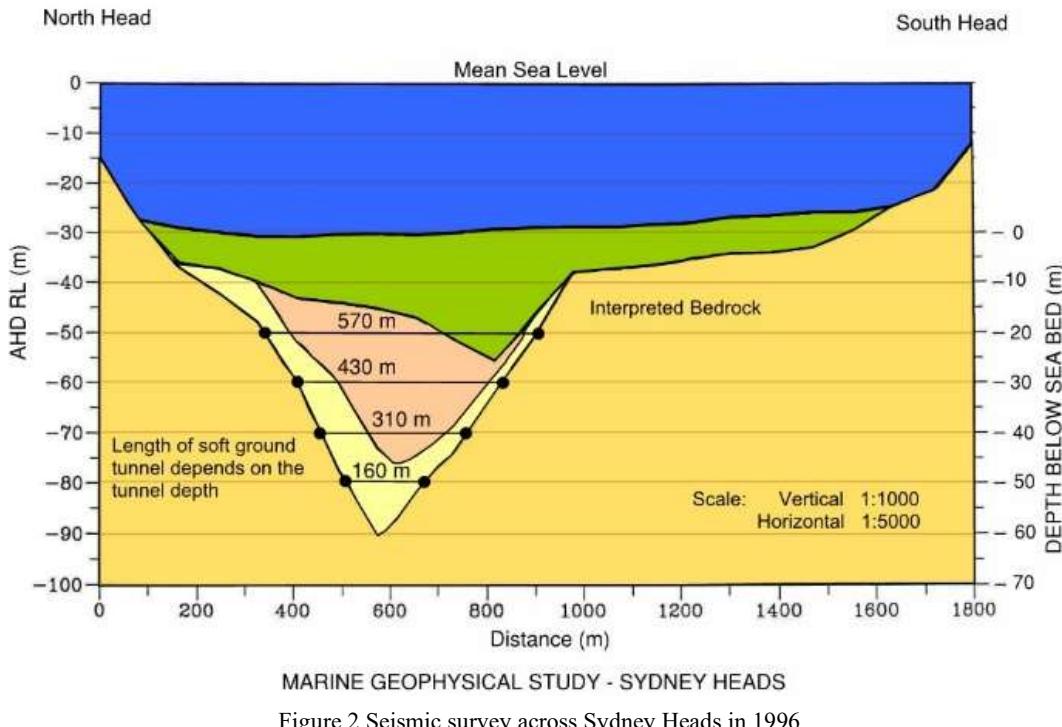


Figure 2 Seismic survey across Sydney Heads in 1996

4.3 Freight Line Capacity

The rail freight capacity between Gosford and Hornsby, on the current meandering and slow shared passenger and freight rail line, could be increased because much of the passenger rail traffic would be diverted to the new line from Gosford through to Brookvale and the Sydney CBD. It is also inevitable that the Central Coast will grow rapidly with the opening of the NorthConnex road tunnel this year. This will place significant pressure on this section of the northern rail line over time. To do nothing is not an option. Further discussion on these and other issues are given in the references listed for this paper.

5. TUNNELLING BETWEEN SYDNEY HEADS

As mentioned previously the most efficient TBM tunnel excavation would be one excavated purely in rock. Given their recent experience on the Sydney Metro Stage 1, an open face double shielded machine, with a segmental lining erected in the tail shield would suffice. Apart from providing a near dry low maintenance tunnel for train operation, the segmental lining, despite the experience on the Northshore Storage Tunnel, also provides a level of tunnel flooding security, during construction, through the use of this lining type. However, on this project the 23m rock cover under the Manly Spit paleochannel on the Northshore Storage Tunnel project, is unlikely to be achieved under the paleochannel at the Sydney Heads. The issue of water

would be 570m and at 50m depth below the seabed, 160m. The application of a specialised TBM, capable of traversing through the paleochannel, would not be expected to be as productive as dedicated TBMs for the excavation of long lengths of rock tunnel. Table 1 summarises three tunnelling options for traversing the Sydney Heads crossing.

The Sydney Heads tunnel crossing will have a large rock tunnel element, irrespective of the vertical alignment chosen. Site investigation will be required to confirm the actual percentage of rock and soft ground tunnel and the final alignment along the coastal zone will also impact on the actual percentages of the ground conditions encountered by tunnelling.

6. EXISTING BONDI JUNCTION STATION

It is worth providing some specific information about this railway station and the history of the Eastern Suburbs Railway Line. The interesting aspect of the Eastern Suburbs Line and this station is that there are already existing twin tunnels extending beyond the station. The first 200m of twin tunnel are in use with a crossover between tunnels so that trains could switch platforms for the return journey. However, an additional length of tunnel was also excavated and abandoned in 1974 when it was decided, for financial reasons, not to extend the line. The original proposal then included five additional stations (Charing Cross, Frenchman's Rd, Randwick, UNSW and

Kingsford), but the alignment would have been south away from the Harbour.

The original Bradfield Plan in 1946 for this line was for it to be extended to Bondi Beach. In 2000 a private group proposed extending the line 2.6km in a single tunnel to Bondi Beach, however, for several reasons the project did not materialise.

An additional cross-over between the tunnels on the city side of the station was completed in 2006. Spoil was removed by train in a 3-hour window at night. The new cross-over allows the frequency on the line to increase from 14 trains /hour to 20 trains/hour, however, beyond 2021 additional capacity improvements will be required.

7. CONSTRUCTION PROGRAM AND COSTS

Excluding initial planning, finance, approvals and tendering, the design and construction duration of this project, based on current Sydney underground rail projects, would be around 6 years. Without cost escalation, the total cost of the project would likely be in the range of \$15 - \$20 billion, without stations. The new stations could be paid for by developers given the development potential around and above station sites. The new stations would be built on brown field sites, but none are required to be constructed within the Sydney CBD (For Option 2 - a new St James Station would be incorporated in the new South- East Line). In the CBD this significantly reduces both the construction cost and land purchase costs. Published information indicates that a single CBD station costs around \$400 million.

The combination of using existing CBD stations and long rock tunnel drives would be a cost benefit when a business case is developed for this project. Further work on cost benefit calculations will be carried out in the future. The business case could also address a light rail link between Brookvale and Chatswood. Brookvale could be developed into a large commercial precinct of a similar scale to Chatswood. The Sydney Heads Metro could also be extended north to Gosford, taking pressure of the current northern, shared freight and passenger rail corridor south of Gosford, by providing an alternative dedicated passenger service to the Sydney CBD.

The crossing of Pittwater could be either a major bridge or bored tunnel. An immersed tunnel would also have to be considered in any study. As is the Sydney Heads crossing any structure would have to traverse 2000m wide waterway.

8. COMPARING SYDNEY ROAD AND RAIL TUNNELS

As mentioned in the introduction road headers are used in Sydney for the excavation of road tunnels while TBMs are used to bore the twin tunnels in the more recent rail tunnels in Sydney(Epping Chatswood) and Sydney Metro Stages 1 and 2. A whole paper could be devoted to discussing this topic, however, here we are just highlighting the efficiency of rail in terms of construction cost and carrying capacity compared to a typical road tunnel in Sydney geology. Table 2 below is one way of presenting these differences for a typical 3-lane road tunnel and 7m dimeter TBM bored rail tunnel.

Table 1 Road and Rail Tunnels – Sydney Sandstone

Item	Description
Road	3-lane - tunnel face area = 100m ²
Tunnel	Excavation rate = 40m/week
	Capacity 6000 – 8000 people/hour
	Capacity/cum rock excavated = 80p/m ²
Rail	Single track – tunnel face area = 39m ²
Tunnel	Excavation rate = 200m/week
	Capacity 32,000 people per hour
	People capacity/cum rock excavated = 820p/m ²

9. OTHER POTENTIAL TUNNEL PROJECTS

In the process of developing the concept for this project other new tunnel options and modification to planned tunnels on the North Shore of Sydney were also conceived. Although only a passing description is given here it is worth noting that all major transport proposals should not be developed in isolation. If the Sydney Heads Rail Tunnel were to be included in the 2056 NSW Government Transport 2056 plan, I am sure the following tunnel options would even be even more relevant.

9.1 WHC and NBRT

The Western Harbour Crossing (WHC) currently proposed would join the Warringah Expressway on the east side of North Sydney. While a concept design has already been developed a timetable for its construction is not firm. This will link with the proposed Northern Beaches Road Tunnel, also surfacing at the Warringah Expressway on the east side of North Sydney. However, an alternative solution would be for the NBRT as proposed to not go ahead but be replaced by a tunnel from Warringah Road (just west of the Roseville Bridge, Roseville), then pass under Chatswood and join Dehli Road in North Ryde.

The WHC would surface on the west side of North Sydney on the Pacific Highway north of St Leonards. The Warringah Expressway is also the major link into the Sydney Harbour Bridge from the north. By removing the WHC and NBRT from the Warringah Expressway corridor the potential for road grid lock has been eliminated if there is a major incident on the Warringah Expressway. These two-alternative alignments to the current plan would ensure that the road network has some redundancy.

This compliments Sydney Heads Rail Tunnel Crossing which would reduce road traffic entering the road network including along Military Road, traffic that would normally cross the Spit Bridge.

Note also that the recent \$600 million upgrade to Warringah Road at Frenchs Forest will be a significant traffic attractor, again diverting traffic away from Military Road, but unfortunately ending at a t-intersection at the Pacific Highway, Chatswood.

9.2 Underground Light Rail – Brookvale to Chatswood

To provide a transport link between Brookvale and Chatswood it is proposed an underground light rail be constructed. This would be independent of the existing rail network. Sydney Metro Stage 1 currently terminates at Chatswood but will extend to the Sydney CBD and beyond after 2024. A new city centre is being developed at Frenchs Forest where a new \$600 million hospital has recently been completed and a \$500 million Warringah Road will be completed this year. Frenchs Forest will become a satellite CBD with at least 6000 new residents. It is located midway between Brookvale and Chatswood.

10. BRIEF HISTORICAL CONTEXT

In Sydney in the early 1920's, John Bradfield planned and built the hugely visionary underground CBD City rail loop (1926 and 1932), which together with the connected Harbour Bridge crossing (1932), has been the single most important economic infrastructure in which the city has invested. The Harbour Bridge allowed the North Shore rail line (1890) to connect to the City Loop, giving CBD rail access from the northern suburbs. The underground CBD City loop became the centre-piece of the rail network allowing direct rail access to city destinations from the western suburbs (Western line,1855), the southern suburbs (Illawarra line,1932), the eastern suburbs (East Hills line, 1939,1948,1956) and more recently the Eastern Suburbs line (1979), the last suburban rail line funded and built by government.

Sydney has grown five-fold since Bradfield's City loop was built, to over 5 million people today. It had been nearly 40 years since the State Government invested in urban rail which has coincided with a period of high population growth, increasing economic development and increasing traffic congestion. Over this period State and Federal governments' have consistently relied on a policy of prioritising roads over rail to manage increasing movement demand.

Over this same period the State's land use policies, which have been a largely unbalanced and short-sighted response to the population increase and resultant housing demand, have been the largest contributor to the city's growing road traffic volumes and high levels of congestion. Lazy land use planning has allowed low-density urban development to take place across an increasing city footprint, especially in the west. Therefore, the city has very high car ownership levels and high road investments that are just too easy to justify, politically and economically. This can be compared with rail investment which has not been seen to be justified because of the land use policies of Government. The historically low-density land use policies and resultant reliance on cars and buses is also a major reason for increasing average trip lengths, as well as traffic congestion and its resultant high economic production costs.

There can be no doubt as to the social and environmental advantages of underground transport.

Today's tunnel boring machine technology and Sydney's geologically stable sandstone provide competitive construction costs, making a stronger economic and financial case for more rail tunnels in Sydney.

The stage one development of the Proposal of a new rail tunnel under Sydney Heads to the north of Sydney could reduce rail passenger travel times to and from Newcastle/Gosford and the Sydney CBD by up to 40 minutes compared with the existing service and existing route alignment.

The Proposal could enable a new city on the Northern Beaches larger in size than North Sydney and improve accessibility from Brookvale to the Sydney CBD with rail transit times of only 20 minutes, compared with the average existing transit time by bus of 40 minutes. A new large university could be located at Warriewood as currently there is none on Sydney's north shore.

11. PLANNING OPPORTUNITIES

This paper provides an overview of the merits of a proposed rail tunnel under Sydney Heads to provide a context technical discussion given the route alignment proposed. A search of the literature appears to confirm that this alignment has never been publicly proposed before i.e. a transport crossing of the Sydney Heads by tunnel, 7 km to the east of the existing crossings and all serving the Sydney CBD. Sydney also has limited to non-existent rail services to the east and north of the CBD. The project will form a vital missing link, positively impacting on all modes of surface transport in the Sydney metropolitan area and providing further expansion potential of the rail network east of the CBD and to the North Shore and beyond. Extending the Eastern Suburbs rail line from Bondi Junction across the Harbour connects the North Shore directly with three existing CBD stations and over 50 existing stations south of the CBD including a more direct rail route to both Sydney Airport and Sydney's proposed new western airport at Badgerys Creek. The CBD stations may require some upgrading (including fire and life) but in the context of a new station are essentially free. Any new CBD station would add about \$400 million to the project cost. Bondi is a very high-density residential suburb with very limited off-street parking. North Bondi and North Shore residents will be able to travel to the CBD on one mode of transport and will not be impacted upon by surface road traffic (very large bus stations are currently located at both Bondi Junction and Brookvale).

Martin Place Station in the CBD will become an interchange station on the new Sydney Metro Stage 2 currently under construction: this project will enhance the functionality of this interchange station.

The cost benefits of tunnelling in Sydney geology is well known and measurable, very high rates of TBM advance can be achieved in Sydney's sandstone. Tunnelling under the Sydney Harbour poses some engineering challenges. However, with the knowledge gained from completed projects like the Northside Storage Tunnel and the completed Sydney Metro Stage 2 project (completion 2024) which also includes a bored tunnel harbour crossing with similar geological issues. With all this additional construction and geotechnical knowledge, these risks can be further managed. It is envisaged that a slurry TBM would be the ideal TBM for the Harbour crossing at Sydney Heads, if the alignment intersects the paleochannel.

There is also the potential to have a light rail connection between the new Brookvale and the existing Chatswood Station, via the new Frenchs Forest Town Centre. This independent transport mode would not impact on the operation of the Sydney Trains rail network. Brookvale could be developed into a large commercial prescient of a similar size to Chatswood with this direct rail link to the Sydney CBD.

12. SUMMARY AND CONCLUSION

The project is more than just another tunnel rail project. The advantages of a rail tunnel under the Sydney Heads include a treasure trove of planning opportunities that will have multiple benefits, including population growth management. Some of these are, reduced dependency on the SHB with a new and only land crossing 7.5km east of the bridge, reduced road traffic congestion by getting more people on to a faster rail service and a reduction in the urban sprawl by having higher density development around new railway stations. The Central Coast is a major asset for the growth of Sydney and its inhabitants with coastal access, higher rainfall and lower average mean temperatures than Western Sydney and importantly access to lower cost housing. Travel times from the central coast by train to the Sydney CBD could be reduced from the current 90 minutes (on a good day) to less than 60 minutes. Large visionary projects of this kind are required for Sydney because its population will double in size within 50 years. This "distant" time is only half the age of the existing SHB!

This paper presents one case which, if investigated further would most likely generate the real prospect of starting to seriously plan for and then develop new cities along a future Newcastle/Sydney-Canberra axis, also in the near future new satellite CBDs/cities in Brookvale and Gosford as Sydney's population grows to 10 million heading towards 2066.

14. REFERENCES

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- WSROC website <https://wsroc.com.au/projects/project-turn-down-the-heat>

Appendix E – BLRT EIS Chapter 4 Pages 13 and 14 Deconstruct!

Also included -

- 1. GIPA 21T-1281 Decision
- 2. Email response from INSW - dated 17 June 2021
- 3. James Griffin MP letter EIS submission Feb 2021
- 4. An example of a Light Rail Option
(for demonstration purposes only)

#	By E J Nye & Associates Pty Ltd Line by line text from Chapter 4 pages 13 and 14 - under the heading of "Improvements to the rail network <i>Improvements to the rail network</i>	Comment/opinion	Elaboration on comment
1	<i>The physical and urban geography of the Northern Beaches region presents barriers to the consideration of rail-based solutions in addressing the transport challenges faced by the region.</i>	<i>this statement is false</i>	<p>Please provide supporting evidence AND reference to the investigation and report which gives rise to this statement. It appears to be a statement without foundation. It is likely this statement was included in the EIS for the purpose of avoiding the assessment of a rail alternative (this statement could be repeated for every item below, including the references to light rail).</p> <p>Please explain why there are sub-tunnels/panels at North Sydney in the Sydney Metro tunnels for a future Northshore metro?</p>
2	<i>The hilly, harbour-based Eastern Harbour City with its established urban area and therefore limited available space to develop a rail corridor, means that provision of rail infrastructure would be expensive with a long lead time to development.</i>	<i>these statements are false</i>	<p>Please provide supporting evidence AND reference to the investigation and report which gives rise to this statement. It is likely this statement was included in the EIS for the purpose of avoiding the assessment of a rail alternative and other alternatives.</p> <p>This statement refers to traditional surface corridor development. The statement ignores available, feasible tunnel solutions which are now the norm in Sydney. The inclusion of the words "established urban area and therefore limited available space to develop a rail corridor" completely contradicts the argument put forward below re the low density of the Northern Beaches, see Item 9.</p> <p>So called long lead times have not been a deterrent to the State Government pushing forward a metro and other rail projects to the west of the Sydney CBD.</p>
3	<i>The topography on either side of Middle Harbour introduces challenges for constructing a tunnel with a gradient that would be acceptable in terms of engineering design and safety for rail infrastructure, with steep elevation changes as well as geology characterised by substantial rock fracturing.</i>	<i>these statements are false</i>	<p>These challenges also apply to a road tunnel. There is no evidence to support this statement. Why confine comment just to Middle Harbour? In fact the inclusion of stub tunnels on the new metro at North Sydney confirms that a study was made by TfNSW and that it confirmed the feasibility of a rail tunnel between North Sydney and the Northern Beaches. The tunnel also does not necessarily need to cross Middle Harbour (see note below as well, re Harbour Crossing). Please provide supporting evidence. It is likely this statement was included in the EIS for the purpose of avoiding the assessment of a rail alternative. This statement shows the author to have limited strategic vision, nor an understanding of the available underground rail corridors and their potential significantly greater benefits than the proposed road tunnel.</p> <p>Please note the attached paper on a crossing Sydney Heads by a rail tunnel (included in my EIS submission). The 2017 referenced paper was sent to the Secretary of Transport and others in State government at the same time (all members on the Northshore).</p> <p>This feasible alternative has even been referenced by the EIS. It avoids the Northern Beaches "hilly topography" altogether and would result in flat grades, underground stations and fast commuter services (20 minutes transit from Brookvale to the Sydney CBD).</p> <p>", with steep elevation changes as well as geology characterised by substantial rock fracturing.", Clearly a statement designed to mislead and has no relevance at all.</p>
4	<i>The necessity to build deep station boxes for a tunneled rail link under Middle Harbour was another key consideration when developing the preferred solution.</i>	<i>not true</i>	<p>Firstly, there would be no need to locate a station at Middle Harbour. There are numerous alignment alternatives. But in any case a station could be located there quite easily. The geology varies along the route so a variety of construction methods would be used. In rock, rock chambers (similar to the Epping Chatswood Rail Line caverns - now part of the Northwest Metro), in soft ground, diaphragm walls, similar to the construction of the stations on the Airport Line (in this case the diaphragm walls are 35m in depth). If needed an immersed tube tunnel for rail could be utilised at Middle Harbour.</p>
5	<i>These physical constraints would result in substantial challenges for engineering, with large implications for cost and amenity during construction.</i>	<i>this statement is deliberately misleading.</i>	<p>Please outline the unique challenges that have not already been overcome on similar rail projects in Sydney. For example the use of a 10m dia slurry TBM for the Airport Line and on Sydney Metro to traverse Sydney Harbour. Deep diaphragm walls on three stations on the Airport Line. The costs (apart from inflation) would be very similar to those encountered on previous Sydney projects. There is nothing unique about the Northern Beaches topography (on the appropriate alignment) or geology that would cause any issues that have not already been overcome on other Sydney projects.</p> <p>It could be argued that having two immersed tube tunnels for the proposed Beaches Road Tunnel has substantial environmental, engineering, cost and amenity during construction. My understanding is that the EIS for the Sydney Metro under Sydney Harbour agreed for a bored tunnel because of the environmental impact of an immersed tube. Please also address this latter point.</p>

#	By E J Nye & Associates Pty Ltd Line by line text from Chapter 4 pages 13 and 14 - under the heading of "Improvements to the rail network <i>Improvements to the rail network</i>	Comment/opinion	Elaboration on comment
6	<i>The provision of rail infrastructure is also reliant on the location of and accessibility to high density residential or commercial property close to the proposed location of stations as well as along its route.</i>	<i>this statement is deliberately misleading.</i>	Warriewood, Dee Why, Brookvale and Manly Vale could be ideal locations for railway stations. They are all residential and commercial centres with potential for significant growth. If what the EIS is saying then please explain the justification of the Beaches Link Road Tunnel. There are numerous examples of high density housing on the Northern Beaches. Warriewood, Dee Why, Manly Vale and Manly. There now a Northern Beaches Hospital at Frenchs Forest with plans for a new Frenchs Forest City Centre with 6000 additional residents against this statement.
7	<i>Given the high cost of constructing and operating rail infrastructure and the low density nature of the Northern Beaches, it is considered that demand would not be high enough to make investing in a specific or dedicated rail link to the Sydney CBD a viable alternative.</i>	<i>this statement is deliberately misleading.</i>	The Sydney Harbour Bridge was constructed when Sydney had a small population(1 million) and is now approaching 100 years old. It is in heavy daily use. The Minister for Transport and Roads is quoted as stating at the opening of Sydney Metro Norwest that the project rivals that of the Sydney Harbour Bridge! The ABS predicts that Sydney basin population will be 10 million in 2066, double the current number. Why then is TfNSW, inconsistently, building a rail line to an underutilised Second Sydney airport and its adjacent low density development. The potential development of Brookvale and the other commercial centres on the Northern Beaches is far higher and of greater value than that of the new airport precinct.
8	<i>Similarly, provision of light rail would entail high capital and operating costs which would require high passenger demand in order to be a viable solution.</i>	<i>this statement is deliberately misleading.</i>	Also refer back to Item 6 for comment. So why do we have light rail in George Street(over budget because of underground services impact and also negative impact on businesses because the construction period disruption was well beyond the predicted time). And also light rail now under construction in Parramatta.
9	<i>Due to the low population density and population growth rate for the Northern Beaches region, when considering the distances proposed, light rail would not be considered a suitable mass transit solution.</i>	<i>this statement is deliberately misleading.</i>	A partially underground light rail between Brookvale and Chatswood would in the future be a viable option. The question is will Sydney ever expand or will Government policy encourage urban consolidation. Urban consolidation around public transport hubs/stations is a viable option which if properly implemented will not encroach on the surrounding urban area. The proposed North Beaches Hospital and adjacent proposed new Frenchs Forest Town Centre would be an ideal location for a light rail station. Using the same argument above, how are the new metros currently in planning or out to tender to the west, some in areas of extremely in very low population density justified. Some of these trains are likely to run near empty for next 30 years, that is assuming that population growth projections are even correct. Coastal urban land in Sydney will always be in demand. Sydneys population is projected to grow to at least 10 million in 2066(ABS figure). In this scenario every section of urban Sydney can be expected to have high population growth.
10	<i>Light rail also performs best when completely separated from other road traffic, so that the introduction of light rail into an already congested road transport network would have the potential to further reduce road capacity where a segregated light rail corridor would replace traffic lanes.</i>	<i>this statement is deliberately misleading.</i>	This statement completely contradicts the existing TfNSW light in the CBD and the light rail currently under construction in Parramatta being constructed on the surface in existing road corridors. Any proposals mine in particular for light rail on the Northshore has light rail underground exactly to the purpose of separating it from surface traffic. The EIS statement is contradicts this Government implementation of the CBD light rail and the Parramatta Light Rail which are both on the surface in already congested roadways.
11	<i>Due to the high cost and long lead time for a heavy or light rail solution, the alternative approach for public transport improvement is to focus on improving the speed and reliability of road based public transport such as bus services – for example, by implementing bus priority measures and developing rapid bus services.</i>	<i>this statement is deliberately misleading</i>	A buses on the Northern Beaches is a short term public transport solution. They ultimately have to compete with for decreasing road space over time. This includes local roads, not just the major throughfares. Why is the TfNSW pressing with rail in low density areas of the Western Sydney and in particular Western Sydney Airport.
12	<i>Such investment can be delivered as part of a long- term, staged approach to increasing corridor capacity, as and when required, at substantially lower cost than heavy and light rail infrastructure.</i>		What does this statement really mean?
13	<i>With a relatively high carrying capacity, rapid or express bus services offer a mass transit solution for bus corridors where a rail based solution is unsuitable.</i>	<i>no true compared to a light rail and metro. Both could be underground.</i>	Buses are NOT mass transit modes, neither can they compete against rail. Buses are NOT a long term public transport solution for the Northern Beaches. This statement demonstrates either a lack of understanding of transport planning, or it shows laziness in the EIS work.

#	By E J Nye & Associates Pty Ltd Line by line text from Chapter 4 pages 13 and 14 - under the heading of "Improvements to the rail network <i>Improvements to the rail network</i>	Comment/opinion	Elaboration on comment
14	<i>As such, adequate, reliable and efficient public transport using road infrastructure (ie rapid and express bus services) is considered a more suitable and appropriate public transport solution for the area.</i>	<i>this statement cannot be justified.</i>	Read previous items. This is another motherhood statement.
15	<i>The Northern Beaches Transport Action Plan (Transport for NSW, 2016), outlined proposed rail</i>	<i>pass</i>	Please elaborate
16	<i>These included a second harbour rail crossing as well as a new rail line to the Sydney CBD. Subsequently, this new rail line to the CBD was realised by the Sydney Metro City & Southwest project, which is a 30 kilometre extension of metro rail line from the end of the existing Sydney Metro Northwest terminus at Chatswood.</i>		Read Item 17 below.
17	<i>The Sydney Metro City & Southwest project will travel from Chatswood, under Sydney Harbour, through newly established stations in the Sydney CBD through to Bankstown in the south west of the city.</i>	<i>you have to travel by road on congested to get to Chatswood before you can catch a train.</i>	90% of the rail network in Sydney is located on the west side of the Sydney CBD. Therefore this statement is not relevant to the Northern Beaches.
18	<i>The Sydney Metro City & Southwest project will enhance the Sydney rail network and enable it to carry an additional 100,000 people per hour in peak periods, delivering sufficient capacity to serve the city well into the future.</i>	<i>you have to travel by road on congested to get to Chatswood before you can catch a train.</i>	90% of the rail network in Sydney is located on the west side of the Sydney CBD. Therefore this statement is not relevant to the Northern Beaches.
19	<i>Supplemented by a rapid bus service between Dee Why and Chatswood that is currently being planned, this means more people are likely to travel by rail, helping to reduce the number of buses travelling into the Sydney CBD from locations north of Sydney Harbour.</i>	<i>You have to travel by road on congested to get to Chatswood before you can catch a train.</i>	Buses on this route will have to compete with cars for road space. This is a particularly so around the Warringah Road/Forest Way intersection at peak times and along Boundary Street, Chatswood.
20	<i>This would also provide increased capacity for buses and cars travelling from the Northern Beaches to the Sydney CBD.</i>	<i>Really!</i>	This is contrary to Government policy to restrict the numbers of cars and buses travelling to the Sydney CBD.
21	<i>While these projects would contribute to reducing congestion on the existing road network, they would not be sufficient to resolve the existing road network capacity constraints between the lower North Shore and the Northern Beaches. This means that roads remain a critical element in the integrated transport network, servicing buses, freight, commercial and many other individual journey needs.</i>	<i>Please reference the study to prove this?</i>	An intergrated transport systems includes both road and rail, as per the rest of Sydney.
22	<i>This is due to the complexity of journey patterns and trip purposes within Greater Sydney and the dispersed nature of origin and destination points for an individual journey.</i>	<i>How are the Northern Beaches different from anywhere else in Sydney?</i>	An intergrated transport systems includes both road and rail, as per the rest of Sydney.
23	<i>This means that roads remain a critical element in the integrated transport network, servicing buses, freight,</i>	<i>Motherhood statement.</i>	Please read item 21 above.
24	<i>Improvements to the freight rail network would assist with the efficient distribution of freight particularly for</i>	<i>Motherhood statement.</i>	Please read item 21 above.
25	<i>However, a large proportion of Greater Sydney's freight, commercial, and services tasks require distribution of goods and services to customers within the Sydney basin. This requires a diverse and dispersed point-to-point transport system that is most efficiently provided by the road network.</i>	<i>Motherhood statement.</i>	Please read item 21 above.



11 May 2021

Our ref: 21T-1281

Mr Ted Nye
E J Nye & Associates
10 Malbara Crescent
Frenchs Forest NSW 2086

By email: ted.nye@nyeconsulting-eng.com.au

Dear Mr Nye,

**Notice of decision on your access application under the
Government Information (Public Access) Act 2009 (GIPA Act)**

Applicant: E J Nye & Associates

File reference: 21T-2181

Decision maker: Natacha Doust

Received date: 13 April 2021

Due date: 11 May 2021

Date of decision: 11 May 2021

1 Your access application

- 1.1 On 8 April 2021 Transport for NSW (TfNSW) received your access application under the GIPA Act for the following information:

'Justification for not including a rail option assessment in the BLRT EIS.'

Page 4-13, para 4 has the words "The physical and urban geography of the Northern Beaches region presents barriers to the consideration of rail based solutions in addressing the transport challenges faced by the area".

The same paragraph also contains false information regarding the feasibility of tunnelling under Middle Harbour. Where are the station locations as evidence to support concern for steep gradients? In 1996, using old tunnelling technology, the Northside Storage bored tunnel traversed Middle Harbour.

A rail tunnel can also be constructed in an immersed tube, as is currently proposed for the BLRT crossing of this harbour. Hence tunnels are higher than if bored tunnel.

If there has been any work carried out to substantiate any of the above claims please provide it.

Also refer to my EIS submission which includes an alternative rail alignment which crosses Sydney Heads. This paper also includes a light rail "underground" between Chatswood and Brookvale (refer to more misleading information given in para 6).

We already have recent direct evidence of a successful crossing the Harbour with a bored tunnel using a slurry TBM for Sydney Metro Stage II.

Para 5 ignores population growth and the potential to develop a commercial centre on the Northern Beaches e.g. at Brookvale (which already has a major retail centre as a seed for future development). Refer also to ABS projected growth in population of Sydney to 10 million by 2066.

Also refer to a report commissioned by Northern Beaches Council dated 2017 which states that rail is required to ensure a diversity of employment opportunities on the Northern Beaches.

In conclusion, it is a criminal offence to provide false or misleading information in an EIS as per Part 10 of the Environmental Planning and Assessment Act 1979. This is against the "person" who gave this information or a "person" who aided and abetted that offence.'

- 1.2 On 13 April 2021 you provided the following clarification concerning the terms of your request:

'Please provide: "The report(s), working papers and analysis that support the EIS statements which refer to why rail access is dismissed in the BLRT EIS (refer to Page 4-13, para 4, of the EIS for example)."

This is the link. <https://www.planningportal.nsw.gov.au/major-projects/project/10456>

Go down this webpage that comes up to a further link: -BL EIS Part 2 - Executive Summary to Chapter 4. I have extracted Page 4-13 (attached) and also Chapter 4 (compressed down from 13M to 4MB). You can see my interest in the topic (and hopefully knowledge) from the attached paper published in Sep 2020, but with the initial paper published in 2017.'

- 1.3 In your access application you indicated a preference for receiving correspondence by email at ted.nye@nyeconsulting-eng.com.au

2 Searches for information

- 2.1 Under the GIPA Act, we must conduct reasonable searches to locate the government information for which you have applied.
- 2.2 The following areas of TfNSW have conducted searches:
 - Infrastructure and Place
 - Sydney Infrastructure Development
- 2.3 Information has been identified as falling within the scope of your application.
- 2.4 The Infrastructure and Place division has advised that some information falling within the scope of your application, may be held by Infrastructure NSW (**INSW**) rather than TfNSW. This information pre-dates any information held by TfNSW in respect of the subject of your GIPA application. Accordingly, I suggest that you also approach INSW regarding this matter.

3 Decision

- 3.1 I am authorised by the Principal Officer, for the purposes of section 9(3) of the GIPA Act, to decide your access application.
- 3.2 I have decided to refuse to provide access to the information under section 58(1)(d).
- 3.3 Please see below a summary of my decision:

Page Ref.	Information	Act Ref.	Access
N/A	Western Harbour Tunnel and Beaches Link Strategic Business Case 2015	s58(1)(d); Sch. 1 cls. 2(1)(b), 2(1)(e)	Refused

4 Reasons for Decision

- 4.1 Under section 9(1) of the GIPA Act, you have a legally enforceable right to access the information you asked for, unless there is an overriding public interest against its disclosure.
- 4.2 Under section 5 of the GIPA Act, there is a presumption in favour of disclosing government information unless there is an overriding public interest against its disclosure.

Conclusive presumption of an overriding public interest against disclosure

- 4.3 Section 14(1) of the GIPA Act provides:

It is to be conclusively presumed that there is an overriding public interest against disclosure of any of the government information described in Schedule 1.

- 4.4 Clause 2 of Schedule 1 of the GIPA Act relevantly provides:

2 Cabinet information

- (1) *It is to be conclusively presumed that there is an overriding public interest against disclosure of information (referred to in this Act as "Cabinet information") contained in any of the following documents:*
 - (a) ...
 - (b) *a document prepared for the dominant purpose of its being submitted to Cabinet for Cabinet's consideration (whether or not the document is actually submitted to Cabinet),*
 - (c) ...
 - (d) ...
 - (e) *a document prepared before or after Cabinet's deliberation or decision on a matter that reveals or tends to reveal the position that a particular Minister has taken, is taking, will take, is considering taking, or has been recommended to take, on the matter in Cabinet,*
 - (f) ...
- (2) *Information contained in a document is not Cabinet information if:*

- (a) *public disclosure of the document has been approved by the Premier or Cabinet, or*
- (b) *10 years have passed since the end of the calendar year in which the document came into existence.*
- (3) *Information is not Cabinet information merely because it is contained in a document attached to a document referred to in subclause (1).*
- (4) *Information is not Cabinet information to the extent that it consists solely of factual material unless the information would:*
 - (a) *reveal or tend to reveal information concerning any Cabinet decision or determination, or*
 - (b) *reveal or tend to reveal the position that a particular Minister has taken, is taking or will take on a matter in Cabinet.*
- (5) *In this clause, "Cabinet" includes a committee of Cabinet and a subcommittee of a committee of Cabinet.*

Application of Clause 2(1)(b)

- 4.5 The Infrastructure and Place division informs me that information meeting the description of "*report(s), working papers and analysis that support the EIS statements which refer to why rail access is dismissed in the BLRT EIS*" is contained in the Western Harbour Tunnel and Beaches Link Strategic Business Case (**WHTBLSBC**), which was prepared by TfNSW in 2015. The WHTBLSBC included, among other things, an options analysis for the Beaches Link tunnel component, and required the approval of Cabinet. The WHTBLSBC was the subject of a Cabinet submission in late 2015.
- 4.6 Therefore, I consider that the WHTBLSBC, which falls into the scope of your application terms, was prepared for the dominant purpose of its being submitted to Cabinet for its consideration. Accordingly, I find that the document meets the definition of clause 2(1)(b) of Schedule 1 of the GIPA Act.

Application of Clause 2(1)(e)

- 4.7 The Infrastructure and Place division has further informed me that the WHTBLSBC suite of documents was prepared for the purpose of informing and advising Cabinet, and contains information that may reveal or tend to reveal the position of a Minister in relation to the content of Cabinet submissions and attachments.
- 4.8 I have reviewed each document relevant to your application, and I am satisfied that each contains options, recommendations and analysis as well as project updates about a major project undertaken by TfNSW. Accordingly, these documents would reveal or tend to reveal the position that a Minister has taken, is taking, will take, is considering taking, or has been recommended to take on the matters in Cabinet.
- 4.9 Have regard to the above, I am satisfied that the documents fall within the category of documents to which clause 2(1)(e) of Schedule 1 of the GIPA Act applies.

In view of the above, I have decided that the WHTBLSBC is a document to which a conclusive presumption of an overriding public interest against disclosure applies.

- 4.10 I must also consider whether the information is captured by clauses 2(2), 2(3) or 2(4) of Schedule 1 of the GIPA Act. I have considered the application of clause 2(2) of Schedule 1 of the GIPA Act in respect of the documents and have concluded that they have not been subject to approval by the Premier or Cabinet for public disclosure. I note with reference to clause 2(2)(b) that the information is less than 10 years old. For the purposes of clause 2(4) of Schedule 1, I am satisfied that the document contains more than solely factual material.

Indivisibility of cabinet documents

- 4.11 As addressed in the decision of *Robinson v Transport for NSW; Robinson v Roads and Maritime Services* [2017] NSWCATAD 353 at [81], a document which meets the description of information under clauses 2(1)(a) to (f), is subject to an overriding public interest against disclosure of all of the information contained in the document.
- 4.12 Having regard to all of the above, I have decided that there is a conclusive presumption of an overriding public interest against disclosure of this document.
- 4.13 Accordingly, I have decided to refuse access under section 58(1)(d) of the GIPA Act.
- 4.14 As a conclusive presumption of an overriding public interest against disclosure applies, I do not need to perform the public interest test in respect of this information.

5 Processing Charges

- 5.1 Under section 64 of the GIPA Act, we may require you to pay processing charges, at a rate of \$30 per hour, for the time spent dealing with your access application. The application fee of \$30 counts as payment of one hour of the processing charges.
- 5.2 I have decided not to impose any additional processing charges for dealing with your application.

6 Disclosure Log

- 6.1 If information that would be of interest to other members of the public is released in response to a formal access application, an agency must record certain details about the application in its 'disclosure log' (under sections 25 and 26 of the GIPA Act).
- 6.2 In the letter acknowledging receipt of your application, you were told about the disclosure log. You were also advised of your right to object to the inclusion of details about your access application in the disclosure log.
- 6.3 I note that you have not objected to such disclosure.
- 6.4 I have decided not to include details about your access application in the disclosure log.

7 Review rights

- 7.1 If you disagree with my decision, you may apply for this decision to be reviewed by seeking:
 - an internal review by another officer of TfNSW, who is no less senior than me;
 - an external review by the NSW Information Commissioner; or
 - an external review by the NSW Civil and Administrative Tribunal (NCAT).
- 7.2 You have 20 working days from the date of this letter to apply for an internal review and 40 working days to apply for an external review by the NSW Information Commissioner or the NCAT.

8 Further information

- 8.1 For your information and assistance, I have enclosed a fact sheet explaining your rights to have my decision reviewed.

8.2 Please do not hesitate to contact Melanie Maskell by email at melanie.s.maskell@transport.nsw.gov.au if you have any questions about this letter.

Yours sincerely,

Natacha Doust

Natacha Doust
Manager, Information Access

Ted Nye

From: Right To Information <RightToInformation@infrastructure.nsw.gov.au>
Sent: Thursday, 17 June 2021 12:10 PM
To: Ted Nye; Right To Information
Subject: RE: Beaches Link Road Tunnel GIPA 21T-1281 added reference to Sydney Metro Stud Tunnels at North Sydney

Dear Ted,

We have completed our searches and we were unable to find any information that falls within the scope of your request.

While the Beaches Link Road was mentioned in INSW State Infrastructure Strategy in 2012, we were not involved in the consideration of rail based solutions for the Northern Beaches.

Kind regards,
Laura

Laura Iskander
Director, Legal

P 02 9216 5788 M 0439 264 293
E laura.iskander@infrastructure.nsw.gov.au | www.insw.com
Level 27, 201 Kent St, Sydney NSW 2000



On 1 July 2019, the UrbanGrowth NSW Development Corporation was abolished with its functions transferring to Infrastructure NSW.

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From: Ted Nye <Ted.Nye@nyeconsulting-eng.com.au>
Sent: Wednesday, 2 June 2021 5:32 PM
To: Right To Information <RightToInformation@infrastructure.nsw.gov.au>
Subject: RE: Beaches Link Road Tunnel GIPA 21T-1281 added reference to Sydney Metro Stud Tunnels at North Sydney

Att: Laura Iskander

As discussed for your information attached two documents.

Regards

Ted Nye
E. J. Nye & Associates Pty Ltd
Director Dip. Eng(Civil), B. Eng(Civil), NER, FIEAust
10 Malbara Crescent
Frenchs Forest NSW 2086

Phone: 0422003275

From: Right To Information <RightToInformation@infrastructure.nsw.gov.au>
Sent: Monday, 31 May 2021 10:42 AM
To: Ted Nye <Ted.Nye@nyeconsulting-eng.com.au>
Cc: NSW Mail <mail@infrastructure.nsw.gov.au>
Subject: RE: Beaches Link Road Tunnel GIPA 21T-1281 added reference to Sydney Metro Stud Tunnels at North Sydney

Dear Ted,

Thank you for your time on the phone this morning.

As discussed, your email below is not a formal GIPA access application as it does not clearly indicate that it is an access application under the GIPA Act and it is not accompanied by the \$30 fee.

I have discussed your request internally and we do not believe we hold the information requested. I have reached out to Transport for NSW to ask them what information they believe we may hold. I am still waiting to hear back from them.

As soon as I have received a response from TfNSW I will let you know and you can decide whether or not you wish to submit to NSW a formal GIPA access application.

Kind regards,
Laura

Laura Iskander
Director, Legal

P 02 9216 5788 M 0439 264 293
E laura.iskander@infrastructure.nsw.gov.au | www.insw.com
Level 27, 201 Kent St, Sydney NSW 2000



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From: Ted Nye <Ted.Nye@nyeconsulting-eng.com.au>
Sent: Wednesday, 19 May 2021 6:42 AM
To: NSW Mail <mail@infrastructure.nsw.gov.au>
Subject: Beaches Link Road Tunnel GIPA 21T-1281 added reference to Sydney Metro Stud Tunnels at North Sydney

New hopes for northern beaches and ... - We're for Sydney

<https://www.dailytelegraph.com.au/newslocal/mosman-daily/new-hopes-for...>

23/11/2016 · North Sydney Council said it was aware of the replacement of the **stub tunnels** with "flexible tunnel wall" elements in the plans. The council said this would allow a connection to be made to the current proposed Metro line, if a **Northern Beaches Metro** extension was investigated. An artist's impression of the new Metro trains.

Author: Andrea McCullagh Estimated Reading Time: 4 mins

From yesterdays email (18/5/2021) have added the above.

Stub tunnels included in the Sydney Metro confirm the Government's acceptance of rail viability.

Please note the above in your reply.

I have been referred to INSW for a response including the information requested.

This is partially in relationship to why it is considered that:

"The physical and urban geography of the Northern Beaches region presents barriers to the consideration of rail based solutions in addressing the transport challenges of the area" etc
(see my full text under Section 1.1 attached)

I do not consider the above statement in the EIS to be true in fact.

Please note during your review that Middle Harbour has already had a bored tunnel traverse it (see attachment no.1)

I have been involved in the planning/design and construction of numerous underground railway systems. Including Epping to Chatswood, the Sydney Airport Line, Sydney Metro West and the current Melbourne Metro and other major underground transport related projects around Australia and internationally (CV attached).

Have attached are two of my published technical papers – The NSR Project, and Tunnelling under Sydney Heads, as further references of expertise and knowledge.

I am also aware of the Public Works Committee inquiry should I need to make a submission by mid-June.

A copy of the GIPA 21T-1281 has also been sent to Belinda Scott at the NSW Department of Planning.

Regards

Ted Nye
E. J. Nye & Associates Pty Ltd
Director Dip. Eng(Civil), B. Eng(Civil), NER, FIEAust
10 Malbara Crescent
Frenchs Forest NSW 2086

Phone: 0422003275

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JAMES GRIFFIN MP
Parliamentary Secretary for the Environment
Parliamentary Secretary for Veterans
Member for Manly

To Whom It May Concern,

SUBMISSION BEACHES LINK AND GORE HILL FREEWAY CONNECTION EIS

I write to you on behalf of my community for the State Electorate of Manly. From the outset of my submission I would like to convey my support for the Beaches Link Project and appreciation for the work conducted already in consultation and communication with the community.

The Beaches Link Tunnel is one of the largest infrastructure projects undertaken by the NSW Government and will provide a key role in the future of Sydney's transport demands.

Historical context:

The 1983 Commission of Inquiry into the Warringah Transport Corridor found that a new surface road to the Northern Beaches would result in unacceptable levels of community and environmental impact. The inquiry noted that improved future tunnelling technology would alleviate impacts. In 2012, the NSW Long Term Transport Master Plan proposed a bus tunnel bypassing Military Road. In 2015 Roads and Maritime carried out high level conceptual design for the Western Harbour and Beaches Link Program.

The proposed reference design for Western Harbour Tunnel and Beaches Link was released on 26 July 2018, and extensive community engagement was undertaken through to 1 December 2018.

Strategic Alternatives:

Of note, the strategic alternatives to the Beaches Link Tunnel have been considered and determined that with respect to rail “the physical and urban geography of the Northern Beaches region presents barriers to the consideration of rail-based solutions in addressing the transport challenges faced by the region” and that “...the provision of rail infrastructure is also reliant on the location of and accessibility to high density residential or commercial property close to the proposed location of stations as well as along its route .”

Concerns:

I would like to raise a number of concerns on behalf of community members and stakeholders who have contacted me regarding the project. Many of these concerns have also been raised at community meetings and public forums and need to be addressed.

Issues that have been outlined by my community include the following:

- Concerns regarding air quality and particulates released into the environment both during construction and after completion
- Impacts that construction and new roads will have on the local environment including the Burnt Bridge Creek and Manly Dam ecosystems
- Impact of construction on local residents including increased noise, traffic and vibrations, with particular note to the proximity of local schools to planned temporary construction support sites
- Impact of construction on local amenity and public green space
- Increased traffic to residential roads following completion of the project.

I look forward to your response regarding the above issues that have been brought to my attention by local residents and anticipate our further cooperation and work towards satisfactory outcomes at the completion of the project.

For any questions or further information please do not hesitate to contact my office at manly@parliament.nsw.gov.au or on 02 9976 2773.

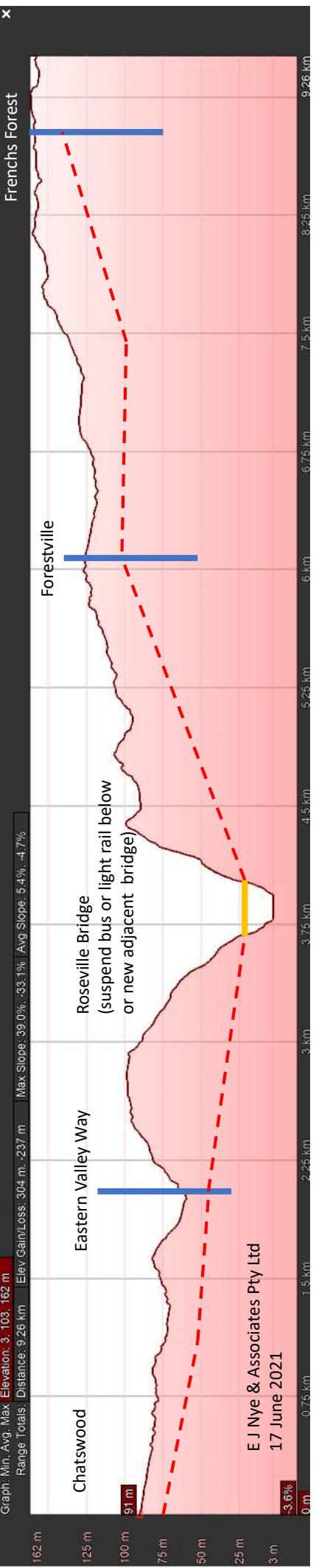
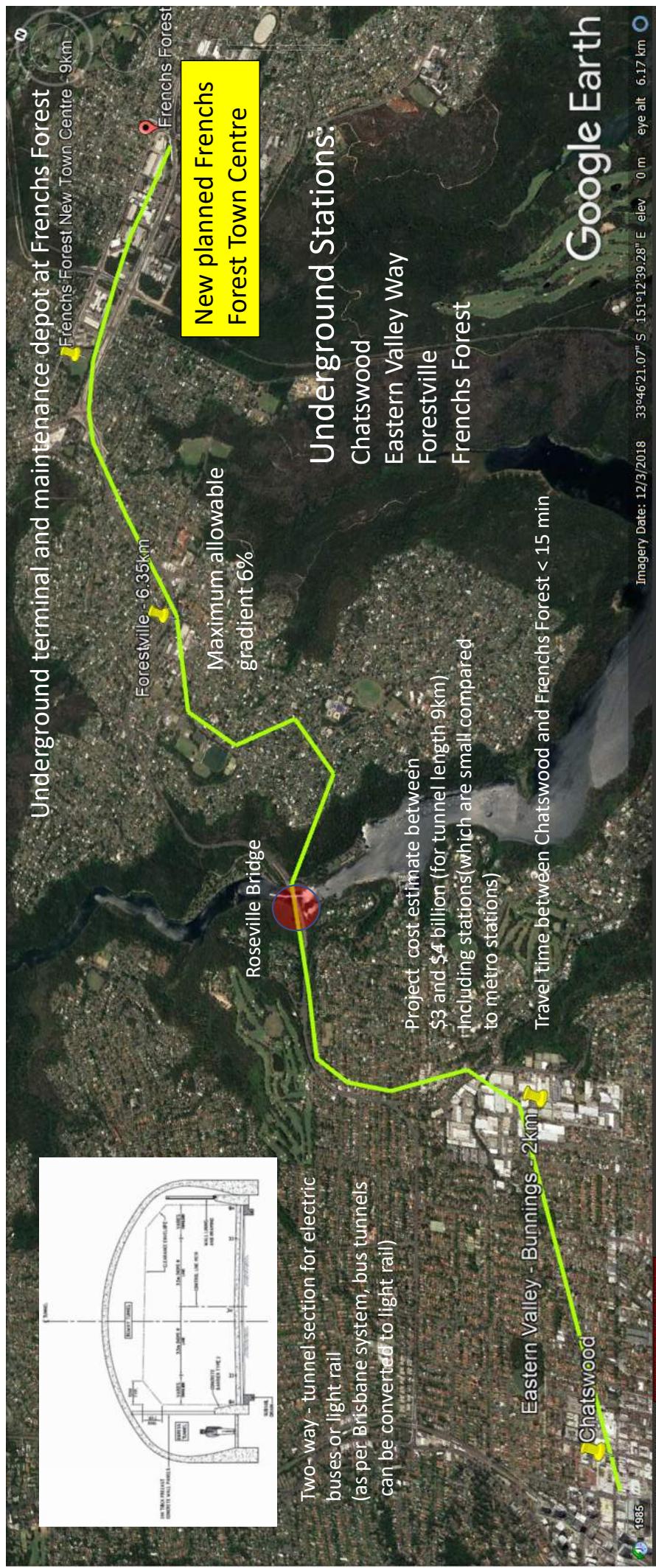
Kind regards



James Griffin MP
Member for Manly

February 2021

To demonstrate what a public transport Light Rail option that could have been included and assessed at part of the BLRT - EIS



Concept for underground public transport connecting Chatswood and Frenchs Forest
(on the basis that the proposed 6000 resident Frenchs Forest New Town Centre goes ahead and can be extended to Dee Why and Brookvale)

Appendix F – Ted Nye CV

Edward (Ted) J Nye

	Nationality	Australian
	Year of Birth	1952
	Profession	Chartered Engineer
	Specialisation	Underground Engineering – Transport
	Position	Director, E J Nye & Associates Pty Ltd
	Key Qualifications	Dip. Eng(Civil), B. Eng(Civil), NER, FIEAust

KEY EXPERTISE

Over 40 years investigative, design and construction experience over a wide range of major transport and related projects (across Australia and in the UK, China, Hong Kong, Singapore, Chile, and the Pacific Islands). Delivery manager, design management, design team leader, tunnel design engineer and associated construction methodologies development. Project concept development for road and rail. Specialist expertise in assessing the interaction between underground and surface structures. Led multi-teams including civil, structural, geotechnical and E & M, including tunnel ventilation and fire safety. Provide leadership and innovative solutions across disciplines. Client side, D & C and Alliance contract experience.

EDUCATION AND PROFESSIONAL STATUS

Verified Certificates - Python for Data Science – UC-San Diego & MIT – Dec 19, Mar 20.

Verified Certificates in C programming - Dartmouth_IMTx - 2020

Bachelor of Engineering (Civil), Swinburne College of Technology, 1977

Diploma of Engineering (Civil), Caulfield Institute of Technology, 1974

Member of the Australian Tunnelling Society (ATS)

Member of the Australasian Geomechanics Society (AGS)

Fellow of the Institution of Engineers, Australia

Chairman of the 15th Australasian Tunnelling Conference, September 2014.

ATS Committee member and past Chairman, 1995 – 2015

Warren Centre – Underground Space Study 1996 – Steering Committee Member, Working Group Chair Austroads Tunnelling Committee, advisor, 2008 to 2013.

During 2015 was a presenter at four overseas conferences (Singapore* – annual guest lecture, Tunnelling Society of Singapore, Shanghai*, New Orleans, Switzerland*), Shanghai* 2016 and Wuhan 2017. (Invited speaker *). Other overseas visits to TBM factories, Herrenknecht, Germany and CREG, Zhengzhou, China (most recent in 2015, but also 1996 and 2005 to Germany).

EXPERIENCE RECORD SUMMARY

Dec 2016 – present E J Nye & Associates Pty Ltd, Tunnel Specialist

Green Square Station – (new study) potential 16-storey building over the south platform tunnel. Peer review role for the design and approval process with Sydney trains. Previous experience with this development opportunity since 2004 with the same client. Client: Toga

Sydney Airport- Domestic Terminal Station – advisor to SACL and their consultants for the replacement of existing car parks between Terminal 2 and 3, over and adjacent to the underground station and railway tunnels. Works resulting from the commencement of the Gateway Project which will be completed in 2024. Client: SACL.

Derailment Risk Assessment – risk assessment for potential derailment of train and then impact into a new building development in Ashfield adjacent to the rail corridor. Client: Buildview/EIAustralia

Waterloo Road Development – Approval application report including finite element analysis to assess potential impact from a building basement excavation on a Sydney Metro cross-over tunnel just west of Macquarie Park Station. Clients: John Holland/Meinhardt.

Westconnex – Rozelle Interchange – Peer reviewer for design, construction, geotechnical, settlement, noise and vibration, monitoring etc. Client: RMS/TSA.

Developments Adjacent to Rail Tunnels – Technical advisor on more than 8 significant projects (Sydney Metro/Airport Line/City Circle), bus transport interchange and car park, MLC Centre, Holiday

Edward (Ted) J Nye

Inn Hotel - Mascot, Green Square Station (building above and just north of the station). Clients: including SACL, Savills, GPT, Roberts Pizzarotti, Toga.

Burrawang to Avon Dam Water Supply Tunnel with potential HEPS - Technical advisor for this potential 20km tunnel, 200m drop shaft and underground hydro-electric power station (240MW), plus connecting 9km long spur pipeline. Client: WaterNSW.

Forrestfield Airport Link – Perth – technical advisor to a contractor on this project. Ground treatment (jet grouting, post construction, jet grouting. 7m diameter twin tunnels. Construction methods and end clients design reviewed. Client: Trevi Aust. Pty Ltd.

Wynyard Place Project - dilapidation surveys related to works adjacent to Wynyard Station. Station column removal/pavement/existing buildings/light rail in George Street, Client: Multiplex.

Access Improvement Study– Concept development of 12km long combined diesel freight and electric passenger train tunnel with a significant river crossing (bored and immersed tube). Client: TfNSW/Kinhill

Faster Rail Project – PM for strategy report to improve existing main line rail access to allow further land development. Client: Walker Corporation.

Northconnex Road Tunnel – Technical reviews on this 10km long road tunnel. Shotcrete and waterproofing issues, specifications, and contractor's submissions. Client: Transurban.

Connector Motorway, Melbourne – Technical assessment and report to resolve a dispute between the operator/owner and the contractors. Joint Clients, Connector Motorway, John Holland and CPB Contractors.

Northshore Transport Options – Development and promotion of a rail tunnel under Sydney Heads and later an alternative to the Western Harbour Crossing and Beaches Link tunnel alignments focusing on Chatswood. Client: none

Mott MacDonald in 2016/17 - Continued involvement on the Norwest Rail Link Project, Project 2C at Sydney Airport and the Sydney Harbour Bridge Toll Plaza removal project.

2011 – 2016 Mott MacDonald Australia Pty Ltd, Tunnel Practice Leader

Led a group of geotechnical, tunnel, ventilation and as required structural engineers.

St James Station - inspection and assessment of disused platforms and tunnels. Client: confidential

Wynyard Place Project – Led a five-person team, dilapidation survey of rail and disused trams tunnels, Wynyard Station, high rise buildings, gardens, and road pavements. Client: Multiplex.

Toll Plaza Removal, Sydney Harbour Bridge – temporary crane load checking and dilapidation survey of the rail and disused trams tunnels approaches on the south end of the bridge. Client: RMS.

Barangaroo Central - advising developers bid team on the interface issues between the development and the proposed Barangaroo Station in Hickson Road. Client: Lend Lease.

Barangaroo South - developed the criteria to design the building foundations to preserve the Sydney Metro rail corridor down to Darling Harbour. Risk assessment for tunnelling. Client: Lend Lease.

Sydney Metro Stage 1 (OTS contract)- team lead, shafts (provided fully tanked solution with tension piles), shallow cover pedestrian tunnels connecting to stations, y-junction interface connection with the ECRL. Inspections of ERCL tunnels associated with upgrades for the driverless trains.

Airport Rail Link – assessment of in-situ concrete lining including testing and strain gauge monitoring. Engaged materials and survey monitoring specialist. Hard rock section. Client: Broadspectrum

Project 2C - Sydney Airport – approvals from Sydney Trains for deep piling, design and construction reviews retaining walls, ground treatment, waterproofing, soft ground design reviews. Client: Contractor

Westminster Road Widening - Developing the concept and supervision of detailed design of a traffic impact barrier along the top of a railway embankment, the barrier is restrained laterally by a row of deep bored piles and a capping beam. Client: RMS.

Westconnex – Initially with contractors tender then contributed to advisory report the authority.

North Strathfield Rail Underpass – Design lead for a very shallow cover tunnel under live railway tracks. Construction supervision. First use of shotcrete only lining and spray-on membrane in in Australia. Shaved three years off construction program with driven tunnel solution. Construction supervision through the site PTT process. Client: SKM/PB JV.

Melbourne Metro – client side - verification tunnels and review of station cavern reference designs. Review of alignments, inspection of SI core, review of standard to be used. Client: Vic. Dep. Transport.

Edward (Ted) J Nye

Sydney Opera House VAPS Project - Technical advisor for initial design and designer selection. The project requires bulk excavation under the monumental stairs and tunnelling under the opera house or access to modified or new lift shafts. Client: Sydney Opera House Trust

M2 Tunnel Widening, Sydney – Design verification for widening by 3.6m of a twin bored hard rock tunnels under high operating road traffic conditions in metropolitan Sydney. Site inspections. Developed the original widening concept for Transurban when at SKM. Client: SKM.

2002 – 2010 Sinclair Knight Merz, Tunnel Engineering Manager

Northern Link, Brisbane – Technical assessment of the EOI for this 4km long road tunnel.

Boggo Road Busway Tunnel, Brisbane – Led the driven tunnel design team. Detailed design of a 15m wide by 430m long busway tunnel with very shallow ground cover. Construction supervision. Client: Alliance - Thiess Contractors, Main Roads and SKM.

Epping Chatswood Rail Link – Project Manager for Railcorp asset assessment report prior to their acceptance of the asset transfer from and delivered by another government department.

Eastlink Freeway Project, Melbourne – Design and site visit construction reviews of the 1.5km long twin three lane road tunnel. Client: South East Integrated Transport Authority.

North South Bypass and TransApex Road Tunnels, Brisbane – Review of construction methods and design, co-ordination, and review of tunnel. Client: Brisbane City Council and State Government.

M2 – F3 Connection (now Northconnex). Design planning, supervision of tunnel ventilation, geotechnical engineering, cost estimator for up to 10km of tunnel. Client: Federal Dep. Transport

Lane Cove Road Tunnel – High level advice to the Lane Cove Tunnel Company throughout project.

Expert Witness - 1 - Claim processed through arbitration following a fatal rock roof fall on the Cross City Tunnel. Specialist advice given on the construction methodology adopted by the contractor.

Expert Witness – 2 – Supreme Court of NSW. Assessed the potential impact of new building development on an existing 1970s cut and cover twin track rail tunnel.

Endeavour Drift Project – Project manager and designer. Concept design for coal surge bins at 500m depth, review of material handling issues related to bin geometry, construction methodologies and analysis of rock with high in-situ stresses and complex geometry. Client: BHP Billiton.

Overseas Assignments. Led team of specialist, geotechnical, cost estimator, construction and TBM. Feasibility of twin 10m diameter tunnels for mine access in the Andes, Chile. Client: Codelco

1989 – 2001 E J Nye and Associates Pty Ltd, Director (Self Employed)

M5 Motorway Road Tunnel – Consultant at tender, design and construction phases. Client: RTA.

Airport Rail Link (Sydney) – EIS construction methodology, interfacing with the FAC, project management, technical reviews, site inspections including deep diaphragm walls. Soft ground tunnel by 11m diameter slurry TBM (6km in length) and the Cooks River Crossing (using circular coffer dams). Client: Rail Access Corporation/Kinhill.

Tunnel Protection. Developed guidelines then reviewed numerous developments along the 11km length of the Airport Rail Link, either for developers, Railcorp or Sydney Airport. Client: RAC

Epping Chatswood/Parramatta Rail Link – EIS construction methodology, client for tender issued design of the station caverns. Tunnelling methods leading into Parramatta. Client: DoT and PRL.

North West Rail Link - Initial planning for the alignment and station locations. Client: Arups

Techbase Software: Marketing and developing applications for this relational database with a 3D graphical interface. Liaison support firms in the US, NZ and Australia. Licensed to major mining companies.

High Speed Train Study. Tunnel technical adviser for a potential HST north of Sydney to Gosford. Long tunnels (> 10km) to be used for both passenger and freight trains. Following an extensive literature search, provided a strategic report on rolling stock, tunnel and tunnel portal design to mitigate transient air pressure impacts. Client: Arup.

Overseas Assignments: Hong Kong, verification, Tai Lam Road Tunnel. Feasibility study, 150km freeway, China (with 54 tunnels and 120 bridges) for the Asian Development Bank including 2 months in China, Three Gorges Dam ship lock site visit, advise the YRRI and cross-country study tour in Europe for the ARL project.

Edward (Ted) J Nye

1974 – 1989 John Connell, Mott, Hay and Anderson - Senior Tunnel Engineer

Shangri la Hotel (ANA Hotel), Sydney. Design team leader all site civil works including over the railway tunnel. Client: CRI

Sydney Harbour Tunnel. Design team leader for the land tunnels. Project design engineer for the feasibility study including the south immersed tube connection. Concept design under the Opera House Forecourt. Client: Transfield/Kumagai.

Melbourne Underground Rail Loop (MURL). Geotechnical monitoring tunnels and all stations then structural design of station booking halls and pedestrian tunnels. Assembly of large diameter plate bearing testing equipment and assessing results. Installation of a very wide range of monitoring sensors including strain gauges, loads cells and extensometers. Ground vibration and noise monitoring due to blasting. Finite Element analyses to compare field data with FE analysis. Viaduct repairs, bonding various materials (including rubber to aluminium and concrete), specifications, and testing. Client: MURLA

Buildings adjacent to Tunnels. Detailed FE analysis to assess potential impacts of three new major buildings, including their basement excavations on the new MURLA tunnels.

Foundation design. Numerous projects including bored piers to rock to liquefaction potential of saturated sand under large structures.

Overseas Assignments. Hong Kong (12 months) slope, retaining wall and tunnel stability and later (4 months) feasibility study for a 5km long road tunnel. London, major bridge and building foundations, study for immersed tube crossing of the English Channel. Large hydro tunnels in Malaysia, contractors claim, rock bursts. Three aid assignments in the Pacific, all site investigations over water with barges, Kiribati (2 no.) and Tonga (3 months each, 3km long causeway, a fishery jetty and a container wharf).

Publications - over 30 published papers - selection only here/ & 1 YouTube video.

"Excavations Adjacent to Tunnels in Rock". A. J. Bennett and E. J. Nye. Conference on Finite Element Methods in Engineering, Melbourne, August 1987.

"Data Collection and Management in Underground Engineering", E. J. Nye. 8th Australian Tunnelling Conference, Sydney, August 1993.

"The Soft Ground Bored Tunnel Under Sydney Airport". Nye, EJ. 10th Australian Tunnelling Conference, Melbourne, March 1999.

"South Coast Electrification Project – Enlargement of the Croom and Bombo Tunnels". E. Nye and S. Sutherland. ITA Conference, Sydney, 2002.

"Buildings Around Tunnels – Case Histories", Nye, EJ. Published at the AGS AUCTA Mini-Symposium: Geotechnical Aspects of Tunnelling for Infrastructure Projects, October 2005.

"North Strathfield Rail Underpass Shallow Cover Driven Tunnel", Ted Nye, RETC Washington DC, June 2013.

"Construction above, adjacent to and under future and existing rail infrastructure". Ted Nye. Core2016 conference, Melbourne, May 2016.

"Sydney Metro Northwest – Design and Construction of the services Facility Shafts", E. Nye et al. 16th Australasian Tunnelling Conference, October 2017.

"Sydney Heads Rail Tunnel – a Treasure Trove of Planning Opportunities". E. Nye, P. Prince and Dr S. Lackey. ITA-AITES World Tunnel Congress, WTC2020, Malaysia, September 2020.

Link to YouTube video – Sydney Heads Rail Tunnel, March 2019. Joint meeting AGS/ATS
<https://www.youtube.com/watch?v=t70kd6eUMfI>

The final project for the edX data science courses from UC-San Diego was titled "Australian Fatal Road Accidents (1989 to 2019)".