# SUBMISSION REGARDING F3 TO M7/M2 CORRIDOR SELECTION

## INTRODUCTION

I am an individual with no formal qualifications or expertise in road planning or traffic management. Nevertheless, I have observed closely and watched, with at times much dismay, the establishment and subsequent shortcomings of several major infrastructure projects in Sydney, in particular the Airport Railway Tunnel, the M5 East Tunnel, the Cross City Tunnel and the Lane Cove Tunnel.

My observation of Sydney's growing traffic problems and the inadequate and often flawed solutions with which they have been addressed has resulted in my conceiving and developing a traffic management and road design system that is particularly suitable for underground freeways. It has been considered by a few of my associates in the legal and intellectual property professions to be worthy of my applying for patent protection for certain aspects of its design and function, which I have done.

I would like to address what I perceive to be the main problems associated with the preferred options for Corridor A as suggested in the Sinclair Knight Merz and subsequent reports, before offering what I think could be an effective, long term solution to them, using some of the features of my system.

## THE PROBLEMS

During my review of the SKM and MWT reports, I perceived three major problems. I am not sure but suspect that this is at least partly because the parameters within which they were given to work may have been too restrictive in time and scope to achieve a comprehensive, cohesive, long term and adaptable plan.

These problems are:

- (i) The time-scale of the report and its projections are very short term. Given that the construction time of the F3 to M2 Link is expected to be four years or more, it will be at least 2011 before it is completed, even if the project is commenced this year. Yet, the detailed figures are only estimated to 2021, meaning that they encompass only the first 10 years, at most, of actual working life of the Link.

- (ii) While the Purple Option offers at least a short term solution to the current problems on Pennant Hills road - Auslink's "Interim Link" - it offers very little or no relief to the other major north-south thoroughfares, in particular, the Pacific Highway and Ryde Road/Lane Cove Road. Further, it offers very little long-term cohesion with the wider Sydney network, particularly in the eastern and southern metropolitan areas.

- (iii) There is evidence within the SKM and MWT reports that suggests the Link, as well as the F3, could be saturated at times of peak flow - possibly

even before 2021. These capacity issues are what I believe to be the focal point of the problems and from where a solution to many of the challenges presented by this project can be found.

I would like to briefly expand on these points further here, before offering my alternative that I believe can form the basis for this solution to the above problems, in the long term.

(i) The Time Scale. There is not much that needs to be added here except that if a typical period for raising toll revenue on a motorway is 30 years, then it makes sense that a prudent time-scale for its planning, design and financial projections would be close to 30 years as well – not 10 years – even if it has not been established that the road will be tolled. Government planners employ BCR's as an important economical parameter to justify, or otherwise, the completion of new road infrastructure.

(ii) Comprehensiveness. At more than one point in its figures and texts, for example in Section 4.3, p. 4-9, the SKM report briefly acknowledges that the Pacific Highway and/or Ryde Road are now, and will in the future, be equally and at times more saturated at times of peak flow than Pennant Hills Road.

The RTA's AADT figures indicate that close to an equal amount of traffic interacts between the F3 and the Pacific Highway, and the F3 and Pennant Hills Road, (see p.6 Appendix D, enclosed).

Figure 3.2 on p. 3-7 of the SKM report indicates that of the 54% of F3 traffic whose origin/destination is beyond either the Pacific Highway interchange with Ryde Road, or the Pennant Hills Road interchange with the M2, 31% of the total use the Pacific Highway compared with 23% that use Pennant Hills Road.

SKM and MWT also acknowledge that future growth projections for traffic, as well as heavy vehicle usage of the Pacific Highway, in the corridor linking the F3 to its interchange with Ryde Road at Gordon, and south through Chatswood, are very likely restricted as a result of its current physical limitations. (SKM p. 3-6, paragraphs 2-4)

Further, and very importantly, the accident/safety figures for the Pacific Highway in the same corridor appear to be even worse than the appallingly above-average figures for Pennant Hills Road. (SKM p. 3-6, Table 3.3)

Community concerns regarding various aspects of the preferred option are acknowledged but often that is the extent of the response to them.

The more recent MWT figures indicate even more clearly that the Pacific Highway is at least as severely impaired in its current and future ability to service motorists, pedestrians and local residents as Pennant Hills Road. The multitude of cross-roads and curves on the highway assure the Chatswood/Roseville, Gordon/Pymble and Turramurra to Wahroonga sectors of suffering chronic traffic jams at various times of the day, in and out of peak times, including on weekends and holidays.

Ryde Road/Lane Cove Road and, in fact, the rest of Metroad No. 3 south all the way to Blakehurst suffer similar congestion and safety issues, though they are somewhat less severe than those of the Pacific Highway.

Unless something is done to alleviate this hardly tolerable situation, it can never change, and will probably deteriorate further, for the Pacific Highway and Ryde Road/ Lane Cove Road, their motorists and the residents, shoppers and workers of their surrounding suburbs.

Pacific Highway (PH) and Ryde Road/ Lane Cove Road (RR) projections indicate less potential growth than those for Pennant Hills Road (PHR). However, the SKR Report indicates that this could probably be at least partly because the PH is already at or in excess of capacity during the peak hour. MWT indicates this problem often extends into off peak periods.

Yet, these facts appear to be "glossed over" in favour of observations and recommendations in favour of a result that fulfils the singular objective of completing the National Highway Missing Link – solely – and at the expense of any other objectives that the project might have the capability of fulfilling. In other words, there appears to be an "either/or" approach, which I believe needs to be replaced by one that addresses and embraces all practical objectives.

(iii) Capacity. I perceive a fallacy or a paradox in a suggestion in the SKM report of the perceived resistance by motorists to travelling an extra few kilometres east before proceeding north on a freeway under the Yellow Option. Through-travelling motorists, (from the M7 to the F3), will have already paid a toll to travel many more extra kilometres north and then east along the M7 and M2.

There will be far greater resistance to a situation where traffic is slowed or forced to stop/start, if a freeway is often or continually overloaded. This is currently not normally a problem for the M7, hence the positive response to it. It should not be a problem for the M2/F3 Link, if planning is adequate and it is designed correctly, with enough capacity to avoid such problems.

The MWT report indicates, (Appendix A, p. 3 of 4), that Transurban, using the more up-to-date 2004 traffic figures than SKM's 2001 figures, recommends that the Yellow Option may be the preferred option after all, being at least as attractive as the Purple Option that was recommended by SKM. The Yellow Option was rated lowest by SKM. This conflict between the conclusions of the reports is another reason to question the validity of some or all of these conclusions.

Statistics and observations from SKM and MWT repeatedly support – as does pure common sense - the need for capacity requirements to be fulfilled in both the short and long term. The attached Document, "THE FATAL FLAW IN THE FINANCING OF PRIVATE ROAD INFRASTRUCTURE IN AUSTRALIA**"** by John L Goldberg, (APPENDIX A - johngoldberg_ATRF06_paper), concludes (particularly on pp 7 to 11), that traffic and cash flow projections and expectations for toll operators of the Cross City Tunnel, Lane Cove Tunnel, M2 and most other privately financed motorways, are almost certainly achievable – not necessarily because of incorrect

traffic flow planning assumptions, but because of the limitations imparted by the vehicle carrying capacity of the motorways.

This gives more weight to an argument that the real and chronic problem with much of the current freeway (and particularly tollway) design in Sydney is the physical capacity of the thoroughfares to accommodate current and future peak traffic flows in an economically viable manner.

The “either/or” approach to a decision for an M7/M2 to F3 Link providing relief to PHR OR the rest of northern Sydney’s road network needs to be replaced with one that encompasses and accommodates PHR AND the PH AND RR AND the M2 AND the F3 AND, if required, even unforeseen relevant future road needs, one of which is suggested later in this document.

The SKM and MWT reports suggest and I agree that while the option of improving public transport is idealistically the most desirable, it simply is not realistic, given the variability and geographical spread of trips made by Sydney’s travelling public and its freight and goods services. Any improvements to the public transport system in Sydney’s Northern Corridor need to be augmented by a road-based system that provides an improvement that is of an order of magnitude.

## THE SOLUTION

The idea that I shall present here offers a long-term, practical and hopefully viable traffic solution to the above problems for both the PHR and the PH/RR. Its application, in fact, is particularly relevant for any freeway which is axially oriented to a large population centre such as Sydney’s CBD - or between centres such as the CBD, Parramatta and the Central Coast, where commuter traffic results in periods of peak flow in one direction at a time that is significantly greater than at off-peak times.

Its main concept involves the addition of a third, parallel carriageway (or a third tunnel) to the dual carriageways (or tunnels) of a conventional system. When employed with the tidal flow controls and configurations for which I am currently seeking patent protection, this allows for:

- doubling the capacity for traffic in the direction of peak flow, with normal traffic capacity being maintained in the reverse direction,

- a “reserve” carriageway (or tunnel) to be available in the event of a blockage of either of the other two as a result of incident/emergency or repair/ maintenance, with the resultant capacity in both directions being that of normal off-peak conditions.

As a result, for an underground system, the equivalent utility of two four-lane tunnels can be achieved, with greater flexibility of use and less geographical and space constraints, at a comparable cost to that of building two three-lane tunnels, and less than the cost of two four-lane tunnels or four two-lane tunnels.

The design, construction and ongoing management of a three carriageway system,

particularly its tidal flow controls and its interchanges with other roads and freeways, could at first appear daunting, because of the number of possible permutations of traffic flow, especially when attempting to accommodate reversals of tidal flow, or closure of any one of the three carriageways.

However, I can offer a surprisingly simple solution to this problem. The basis of this solution involves “filter systems” that employ carefully designed lane and ramp configurations combined with sets of movable or floating medians strips, or similar tidal flow controls, to control traffic flow at the divergences and convergences between dual and triple carriageway systems and on the on-ramps of equally carefully designed interchanges within the triple carriageway systems. This allows this complex concept to work surprisingly simply and economically.

In short, my proposal is for the main freeway M2/F3 Link to be a triple carriageway tunnel system, which would split at its southern end into two underground “feeder ramps”, one oriented south-southeast and the other west. These “feeder ramps” would link the triple carriageway system, at motorway-to-motorway standard, with the M2.

Although it would obviously warrant further investigation if such a system were to be considered, it is my current opinion that the western “feeder ramp” should generally follow the Yellow Option corridor, in line with the conclusions of Transurban, while the south-south-eastern “feeder ramp” would be more aligned along the Red option corridor.

My concepts for the designs of the interchanges of these ramps with the M2 allow for some flexibility in the ultimate location of these interchanges. They would also serve to minimise the impact on surrounding property and parkland.

The “feeder ramps” would need to be of sufficient capacity to accommodate peak flow traffic to and from the west to provide relief for PHR, and the southeast to provide relief for PH and RR. The capacity of the triple carriageway system, in turn, would need to be sufficient to accommodate flow from both “feeder ramps”, thus providing the entire Link with the ability to achieve its objectives.

Apart from its ability to accommodate peak flow traffic, the system also has a very distinct advantage in that it allows one tunnel to be closed for off-peak maintenance – for example, at weekends or night, while still allowing traffic flow in both directions via the other two tunnels. This would minimise inconvenience to motorists using the Link during this time, as well as the motorists, pedestrians and residents using surrounding local roads, who would otherwise have to bear the extra resulting traffic. At the same time it would maximise returns for toll operators, since traffic would not be diverted off the toll-returning thoroughfare.

Further, in the event of an accident or incident/emergency blocking one of the tunnels, traffic could still flow in both directions via the other two.

The following table illustrates the vehicle carrying capacity of triple carriageway, two or three lane systems by revealing the maximum service flows per hour for their

various lane configurations, using the criteria suggested in footnote (2) of Table 16-2, page 16-3, of the SKM Report.

| | | < Maximum service flow > | | | | |
|---|---|---|---|---|---|---|
| Configuration | No. of lanes | Level A | Level B | Level C | Level D | Level E |
| Unit (SKM 16-2) | 1 | 560 | 880 | 1280 | 1705 | 2000 |
| | | | | | | |
| 1 c/way x 2 lanes | 2 | 1120 | 1760 | 2560 | 3410 | 4000 |
| 2 c/ways x 2 lanes | 4 | 2240 | 3520 | 5120 | 6820 | 8000 |
| | | | | | | |
| 1 c/way x 3 lanes | 3 | 1680 | 2640 | 3840 | 5115 | 6000 |
| 2 c/ways x 3 lanes | 6 | 3360 | 5280 | 7680 | 10230 | 12000 |

To further clarify the implications of these figures, let us now consider the above for a theoretical M2/F3 Link in a triple carriageway configuration on a typical weekday, where scheduled maintenance was required on one of the carriageways at night from 9pm to 6am.

It would be reasonable to presume that two carriageways would be available for southbound traffic and one for northbound traffic from 6am to, say, midday or 1pm. Assuming for this exercise that tidal flow was reversed at 1pm, then one carriageway would be available for southbound traffic and two for northbound traffic from 1pm to 9pm. From 9pm to 6am, one carriageway would be available in each direction.

For a 3 tunnel x 2 lane configuration this allows a 2 hour peak (7-9am or 5-7pm) capacity, in the direction of peak flow, at service Level A of 4,480 vehicles, Level B of 7,040 vehicles, Level C of 10,240 vehicles, Level D of 13,640 vehicles and Level E of 16,000 vehicles. Over the same period, in the reverse direction, it offers a capacity at service Level A of 2,240 vehicles, Level B of 3,520 vehicles, Level C of 5,120 vehicles, Level D of 6,820 vehicles and Level E of 8,000 vehicles.

A 3 tunnel x 3 lane configuration allows a 2 hour peak (7-9am or 5-7pm) capacity, in the direction of peak flow, at service Level A of 6,720 vehicles, Level B of 10,560 vehicles, Level C of 15,360 vehicles, Level D of 20,460 vehicles and Level E of 24,000 vehicles. Over the same period, in the reverse direction, it offers a capacity at service Level A of 3,360 vehicles, Level B of 5,280 vehicles, Level C of 7,680 vehicles, Level D of 10,230 vehicles and Level E of 12,000 vehicles.

Hourly off-peak capacity between 6am and 7am and between 9am and 1pm would remain as depicted in the “2 c/way” rows of the above table, southbound, and as depicted in the “1 c/way” rows of the above table, northbound. At 1pm, as tidal flow was reversed, capacity in each direction would reverse.

Between 9pm and 6am, the maximum hourly service flow in each direction would be as depicted in the “1 c/way” rows of the above table. At the same time, the scheduled maintenance could be performed on the closed carriageway (tunnel) with virtually no interaction between traffic and maintenance staff, thereby negating the obvious associated safety risks and/or speed restrictions or the necessity for re-routing traffic in one direction by another route off the freeway. The freeway would remain open

and fully functional in both directions, with all of the obvious benefits that have been mentioned previously.

## OTHER POINTS

(1) There are suggestions in the Reports that the Yellow Option's preference could be compromised because of the current position of the toll plaza on the M2 at Macquarie Park. It is further observed, on p. 44 of the MWT Report, that the Yellow Option would be far more attractive from a revenue perspective if tolling on the Link and the M2 were to be charged at a per kilometre basis. This certainly appears to be fairest to both motorists and toll operators.

In my concept, a practical way of resolving this would be to move (if necessary) the M2 Toll Plaza to a position between its east and west interchanges with the Link. Assuming that the M2 is a cashless tollway by the time the Link is opened, it could readily be partitioned into revenue collection sectors, similar to the M7.

The first toll sector eastbound from the M2's eastern interchange with the Link would extend to the interchange with Lane Cove Road, and westbound from its western interchange with the Link to Pennant Hills Road, (presuming PHR is the first interchange west of the Link's western interchange with the M2). Other toll collection monitors further along the M2 would collect further revenue from vehicles travelling beyond PHR or LCR.

If the Link were tolled, the collection points could be positioned on each of the "feeder ramps", as opposed to along its main section. This would allow collection scanners to readily assess the direction on the M2 from, or to, which the vehicle is travelling. It could then easily and accurately assess the toll and allot monies collected proportionally to the Link and the M2, by separating the kilometres travelled along the M2 from PHR or RR from a known kilometres travelled amount for the Link to Wahroonga.

Even if the Link were not tolled, positioning toll collection points on these ramps would eliminate the chance of double tolling for vehicles using it or the M2, (MWT p.39).

(2) Further to point (1), I would envision, without the benefit of detailed study at this point, that the M2 would need to be widened to four lanes westbound between its western interchange with the Link and PHR, and three lanes beyond that. Similarly it may need to be widened to four lanes eastbound between its eastern interchange with the Link and LCR, and three lanes beyond that.

(3) The triple carriageway concept, of course, could also be extended to provide a long-term solution to the F3's future capacity problems. The SKM and MWT reports conclude that post-2026 F3 traffic would require solutions such as an eight lane F3 of two four-lane carriageways, or an entirely separate and new road, possibly following a route through the C Corridor.

MWT's Preface, p.vii suggests the possibility that this may even be necessary as early as 2021. The proposals detailed on p.61 of the MWT report should be considered in light of the alternative option of implementing a third carriageway of two or three lanes on the F3, at least as far as the Hawkesbury River, and possibly as far as Kariong.

While the recent bushfires have shown that it would be desirable to have an alternative Hawkesbury crossing to the current F3/Pacific Highway bridges, the comparative directness of the F3's route to the Central Coast and beyond means that it will remain as the preferred road for motorists, as long as it is not closed due to incident/accident.

If it was economically viable and practical for the walls that often divide the F3's two current carriageways to be removed, the area between the two current carriageways could be replaced with an extra carriageway. Separation of the three carriageways could be achieved using New Jersey medians, or similar, which are far safer and more accommodating of an errant vehicle than the sandstone walls.

The frequent closing of the F3 in one direction due to minor accidents, particularly during weekends and holidays, and the lack of an alternative route, is another argument for the utility of the reserve carriageway that is made available by a triple carriageway system. Pursuant to this, it could also be prudent to incorporate, every few kilometres or even more frequently, connecting lanes in both directions between the outer and middle carriageways, obviously with appropriate tidal controls.

(4) The Sydney Orbital has recently been completed with the opening of the Lane Cove Tunnel. The mooted extension of the M4 East from Strathfield to join the CBD's Western Distributor network and therefore the Cross City tunnel will provide a motorway standard, east-west "axle" that connects the eastern and western "arcs" of the Sydney Orbital.

A logical addition to this picture then becomes a north south "axle" of similar or better standard, connecting the northern and southern "arcs" of the Orbital. This would provide an alternative, freeway standard, north south oriented corridor to the M7 and the F1/Eastern Distributor/Southern Cross Drive/General Holmes Drive/M5, and possibly even a future F6 extension. It would also provide relief for most, if not all, of the overburdened Metroad No. 3 south of Gordon.

Although this is well outside the scope of this review and current planning for the Sydney road network, I would like to briefly expound on this here, for reasons that will soon become clear.

The M2/F3 Link will fill in the Missing Link of Auslink's desired motorway standard National Highway in and around Sydney. If my concept were to come to fruition, then a similar "Missing Link" would concurrently be filled for the Pacific Highway/Ryde Road between the F3 and the M2. As just mentioned, an extension of this link south from the M2 would provide much needed relief as well as an alternative to the crowded and dangerous Metroad No. 3.

The RTA's AADT and accident figures along Metroad No. 3 bear this last statement out. Appendices B to D, in the attachment of that name, detail the RTA's AADT figures for the roads that I consider most relevant to this review. Appendix B illustrates these figures along Metroad No. 3 generally from north to south from its interchange with the Pacific Highway at Gordon to its junction with the Princes highway at Blakehurst, as well along Mona Vale Road.

The figures strongly suggest the need for a future extension of the M2/F3 Link south, generally following the course of Metroad No. 3, possibly in stages, to link the M2 with the M4, the M4 with the M5, and even eventually the M5 with the F6 south of the Georges River. Anyone who travels along, resides or works near, or who has to cross Metroad No. 3 would not need to review these figures to agree with this argument.

Although this is not likely to be possible in the short term for various and obvious reasons, its possibility should not be ruled out forever. An M2/F3 Link designed and constructed along the lines of this proposal would leave this possibility open for future governments, private organisations and individuals to ponder.

Accordingly, my detailed concepts of the M2/F3 Link include the planning and design capability of accommodating this long-term possibility – hence my mentioning it here. It is my personal opinion that it would be short sighted for anyone to permanently exclude it.

(5) The triple carriageway freeway/motorway concept would be particularly suitable to the link that I have just described, as well as a future M4 East Extension, F6 Extension or any other major grade-separated road development that is axially oriented towards or between Sydney's main population centres, and/or subject to major surges in peak hour traffic flow in one direction at a time.

## CONCLUSION

As mentioned at the start of this document, I am the sole originator and author of my system and I am seeking intellectual property protection for its patentable attributes. If the Chair has any interest in further examining this proposal, I would be prepared to present detailed descriptions, including diagrammatical representations of my targeted and specific designs for the Link, particularly the interchanges and tidal flow controls, at a meeting with yourself and any other interested and/or relevant parties to discuss the worthiness of their further consideration, investigation, and/or possible implementation.

In conclusion, I understand that this rather lateral suggestion would be an ambitious and initially expensive option. But hopefully, in the long term, it could prove to be a comprehensive and cost-effective alternative to meet northern Sydney's, the Central Coast's, the RTA's and Auslink's National Highway traffic objectives for the M2/F3 Link.