

INQUIRY INTO RAIL INFRASTRUCTURE PROJECT COSTING IN NSW

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Date received: 13/10/2011

Attachment 1, included
Attachment 2, included
Attachment 3 – assorted diagrams (see Secretariat)

ADVANCED TRANSPORTATION SYSTEMS

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12th October 2011

The Chair-Standing Committee 3
(Rail Infrastructure Costs)
The Hon. Natasha Maclaren-Jones
C/ – Legislative Council NSW Parliament
Macquarie St. Sydney

Dear Madam,

RE ACCOMPANYING SUBMISSION BY UNDERSIGNED ON RAIL MATTERS FOR PRESENTATION TO COMMITTEE 3

Enclosed with this covering letter, is a "SUMMARY OF KEY MATTERS RAISED IN THE REPORT" this being effectively and introductory summary of it for Council Members. Additionally, by personal delivery, the following are provided:-

1. An abridged "edition" of the Report "A COMPREHENSIVE PLAN FOR THE EXPANSION OF THE SYDNEY METRO SYSTEM"
2. Maps and Drawings (numbered) relevant to the above. The first two (and the largest) are
 - General Map of Sydney Metro System reaching as far west as Parramatta / Liverpool
 - Map of "FUNNEL", Nth. Sydney – CBD – Central showing projected additional trackage. These constitute the core of the proposals to solve the seemingly impossible problem of securing double the traffic throughput without the extravagant proposals put forth by Civil Engineers which involve an additional harbour crossing.

As a railway Civil Engineer of 32 years standing with 7 years in the Planning Division of the (then) Public Transport Commission and State Rail Authority 1974 – 1981, I have been able to study and observe at length the matters relevant to my report.

Increasingly, over the intervening years, I have been noting biases and exclusions by rail civil engineers which enormously increase costs and often superior options completely.

I have in my possession numerous maps and diagrams of the "City Electric Railway" and suburban routes, mostly procured prior to 2002 access to maps of the former became unobtainable: these have been essential in the development of the proposals.

I trust that my submission will prove valuable, notwithstanding that it is qualitative with little numbers on costs, which latter are almost impossible to deliver given my limited resources and access to information considered confidential.

GEOFFREY P. SANDFORD M.P.W.I/RTSA

SUMMARY OF KEY MATTERS RAISED IN THE REPORT (ATTACHMENT 2)

All the following improvements are urgently required in a quest to increase the geographic coverage capacity and user-friendliness of the Sydney Metro Rail System –

1. Expansion with new Routes
2. Expansion of Capacity-particularly in the “Funnel”
(CHATSWOOD – NTH SYDNEY – TOWN HALL – CENTRAL – REDFERN)
3. Vastly improved fluidity by elimination of 15-20 “FLAT JUNCTIONS”
4. The need to look to 3rd Rail and aesthetic light overhead structures to –
 - (a) Enable new links to be built (cheaper than underground)
 - (b) Render existing trackage more aesthetic through elimination of ugly Catenary
5. Various related changes & developments to expand accessibility and service levels on existing trackage
6. Solving the problem of freight movement on the Sydney System: The Clyde intermodal Proposal
7. Vacating several sites / use of air-rights to deliver revenue to fund the projects

Consequent on (partial) completion of 1, 2 & 3 above, the ability to place the M4 East (Westbound) Carriageways on rail land Macdonaldtown to Strathfield) enabling single eastbound carriageway to be placed under and beside Parramatta Road. (see Map 3)

The specified study areas (a) to (e) inclusive being addressed by the Committee highlight the intractability of the various engineers on the staff of ARTC, RAILCORP, TIDC and others in their relentless refusal to do the best with the means and opportunities available, entailing if necessary solutions that are offered by “outsiders”.

A primary cause of the unacceptable costs of projects is quite simple: OVERSPECIFICATION.

This can take many forms –

- Excessive factors of safety leading to excessive use of materials
- “Bathub” viaducts instead of open structure, ostensibly because of fire risk
- Excessive tunnel profiles with overstrength linings (the Road Tunnels on the M-2 at Epping have no lining: something rail engineers refuse to entertain)
- Simple air-powered elevating platforms for the handicapped instead of fancy elevators
- Absurdly overstrength staunchions for electricification catenary – sufficient to tear open cars and kill passengers (as at Waterfall).

A general refusal to allow steep gradients and tight curvature as is frequently done in USA and Europe, and these are required in Sydney (see Transcity – Northern Beaches proposal)

This came to light in the alignment of the Chatswood to Epping Rail Link where refusal to allow 3-4% gradient Lane Cove River to Chatswood caused an unnecessary 1.5 kilometre of CIRCUIITY (3.3% grade is employed northbound out of Wynyard whilst 4% grades can be readily handled by modern EMU trains with their high adhesion power cars).

Failure to make use of steep gradients greatly increases cost of grade separation, and in many cases, make the construction at the favoured location impossible.

The engineers and operators act in concert in declaring that any new extensions shall be double tracked. Duplication is often unnecessary, as single track with loops at stations can permit 5 minute headways. Grade separation at JUNCTIONS is more important: had this been done at Sutherland, the expensive duplication of the Cronulla line would have been unnecessary!

The reference to “Medlight” railways (see contents page) brings to light the fact that very light Monorail Style Structures can carry (so called) heavy-rail trains with ease, and combined with 3rd rail power supply offers aesthetically acceptable elevated railways: cheaper than tunnels.
(see Excuses, Obstructions & Concealments by Engineers for elaboration on above)

AN EASY SOLUTION TO THE M4 (EAST) DILEMMA

A solution to the vexatious problem of extending the M4 to the western periphery of the CBD is becoming extremely urgent. The option of putting both EB & WB carriageways in tunnels and / or beside Parramatta Rd is so expensive as to be prohibitive. The ventilation problems would also be enormous.

A far cheaper and far more environmentally acceptable solution would be to locate westbound carriageway on the northern margin of the railway corridor from Macdonaldtown to Strathfield. If this were achieved, it becomes a far easier and cheaper matter to place the eastbound tunnel nominally under Parramatta Rd but with openings in shallow cuts at four locations between Concord and Broadway.

The matter of placing the westbound carriageway on rail property-occupying the space currently occupied by the fast (Interurban) tracks-poses several potential hurdles, all of which must be overcome prior to implementation.

- Some relief of traffic density by rerouting must be achieved: this requires an additional route serving the Southwest and the operation of most Central Coast Commuter & Newcastle services via the North Shore. Also greater routing of trains from Castle Hill / Kellyville line via Chatswood (predicated on completion of line)
- At least five tracks must remain Macdonaldtown to Strathfield. This is readily achieved by the construction of an additional track on the southern perimeter with track functions all moving "one across to the south". More detail on this follows below.
- To enable fluidity and high throughput on the reduced five track section, certain locations require grade separation (flyovers underpasses).

Principal among these are an overpass at Flemington to allow down trains to move unhindered on to Olympic Park. Even more important is the underpass off the up Liverpool via Regents Park line passing under Lidcombe station with its own platform and connection to up tracks and Olympic Park Branch.

- At several locations some Civil Engineering works are involved, especially at Newtown Lewisham, Ashfield and Croydon.

It is vital to note at this point that the single fast track will have three loops at Stanmore, Petersham and Burwood. This will allow 4-5 minutes headways in each direction – more than is currently handled. "Flighting" of trains in groups will allow still higher capacity.

Further, in relation to general fluidity in the central zone of the Sydney system which affects, and is affected by, operations on the Redfern – Strathfield - Flemington Junc" – Lidcombe route, the projected grade separations for Sefton Pk Junction, delivering a completely nil-conflict "interchange"*

Achieving the above will allow more frequent and more flexibility diverse routing of freight trains especially on the core of the system encompassing Enfield, Nth Strathfield Junc., Flemington Junc., Chullora, Lidcombe and Clyde / Silverwater.

A thus far unremarked advantage will then be in place, - reduced circuitry and consequent reduced travel time and cost of operation will be achieved. Train services heading to Liverpool ex CBD via the new route will save about 3.5km and 3-5 minutes. Whilst Train services to the northwest via the to-be-completed Castle Hill / Kellyville line will use the direct route via Chatswood Central Coast Commuter and Newcastle line services will save 12 km and 10 minute over the Strathfield route, The latter two, of course absolutely require the (functional) quadruplication and this is comprehensively treated elsewhere.

* An analogy is here drawn between this four-way rail junction and the typical treatment of analogous nil-conflict freeway "junctions" call interchanges.

EXCUSES, OBSTRUCTIONS & CONCEALMENTS BY ENGINEERS

In the quest to achieve affordable, efficient user-friendly infrastructure and operations it is found that engineers, who traditionally prided themselves on their ability to do more with less, are increasingly delivering costly inferior options to such an extent that they are holding the community to ransom and jeopardizing the fulfilment of urgently needed expansion and remodelling. It is generally true that in the USA, with approximately the same stringent requirements, engineers achieve unit cost levels well below those being achieved in Australia.

Simple Overspecification: Example – on the Airport Link, Cross sections of the tunnels show enormous lining thickness to 0.5m, roughly treble that which is called for where ground is stable and overburden shields against future building loads.

In the case of viaducts and bridging, traditional “open structure” steelwork has been declared unsatisfactory on the grounds of fire risk and vibration / noise. The former is nonsense* and constitutes an excuse to specify heavy, expensive, visually intrusive “bathtub” bridging which cause greater height differentials or reduced clearance.

New materials allow light weight “open structure” style with minimal internal height (see Medlight Railways) and, combined in future with 3rd rail, will further reduce costs.

The Open Structure approach no longer has a noise / vibration problem: recent developments in damping (such as the “Cologne Eggs” used on the Harbour Bridge and on the ESR under the Theatre Royal) have dramatically improved this already, and there are prospects of further gains.

Overspecification reaches into the matter of gradients, this matter being covered elsewhere, but it needs to be emphasised that unrealistic requirements for low gradient can have the effect whereby engineers declare certain options “not feasible” and consequently they become obstructive.

Overspecification is also clearly manifested in electrification masts. The current 10 “universal” sections are expensive, ugly and dangerous as witnessed by their ability to carve open a Tangara carriage resulting in loss of life. Box sections of 5” (127mm) similar to those used for lighting supports on freeways, would be adequate. The writer has information that a requirement that deflection at top of mast should not exceed 3mm in 7-8 metre height (!) is quite absurd.

Engineers are –by the evidence – welcoming instead of warning against – meddling and unreasonable requirements increasing showing up as OSHA Regulations. Two interrelated examples are –

- Spacing of tracks on multiple track sections. Traditionally, tracks are spaced at 3.65m – adjusted upwards for curves – and this has applied for multiple tracks beyond just a pair. OSHA regulations seek to impose – for new construction – 4.2m minimum between any pair of tracks and 5metres for alternate spacings on multiple tracks.[Ⓞ]

These regulations arose – quite reasonably – out of consideration for track workers who frequently are required to operate on and around work trains and track maintenance vehicles whilst trains move at slow speed on adjacent tracks.

The requirement here is for the equipment design engineers to innovate designs such that all personnel can be accommodated on the work train or TMV, or have access to closely space track level “refuges” built into both sides of all vehicles exceeding 2.4m width – analogous to the frequent refuges traditionally built into the sides of both single and double track tunnels.

OSHA are also meddling in the matter of platform widths with unrealistic requirements of 10metre width for island platforms and 5 metre width for facing platforms.

Lighting: Extravagant Lighting in the Chatswood – Epping tunnels – as demanded by OSHA regulations – is unnecessary and proved unpleasant for both drivers and passengers alike.

Prohibition on Double Track Tunnels: The writer has heard from “informed sources” that civil engineers are favouring separate single track tunnels on the grounds of safety in the event of derailment! This is the height of absurdity!!

* The writer, having considerable background knowledge is unaware of a single instance of steel bridges catching fire and even becoming weakened by it.

[Ⓞ] The recently constructed four track bridge over the Parramatta River at Meadowbank is under threat with respect to quadruplication because of “inadequate” clearance between the pairs of tracks. This kind of “design by meddlers” beggars belief!