Supplementary Submission No 19a

INQUIRY INTO RAIL INFRASTRUCTURE PROJECT COSTING IN NSW

Organisation: Advanced Transportation Systems

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Position: Principal

Date received: 27/10/2011

Attachment 1 – assorted maps (see Secretariat)

ADVANCED TRANSPORTATION SYSTEMS

GEOFFREY P SANDFORD. PRINCIPAL

26 Oct 2011

THE CHAIRPERSON: STANDING COMMITTEE No. 3
(Att Ms Natasha Maclaren-Jones)
c/. LEGISLATIVE COUNCIL
Macquarie St.
Sydney

Dear Madam,

Re: SUPPLEMENTARY SUBMISSION TO METRO RAIL EXPANSION REPORT

As a supplement to the material delivered via Stuart Smith to Ms. Duffy on Thursday, 13th Oct, the following self-explanatory material is enclosed:-

1. Text: THE PROJECTED TRACK ALIGNMENTS IN THE CBD to be read as part of Chapter V: THE MAJOR PROJECTS DESCRIBED
2. Map: A large scale map of Town Hall – Central section of the CBD showing new tunnels
3. Profile Chart: Approximate gradient profile of above section
4. Map: City Railway Proposal of 1925 with author's caption

This material is primarily offered to reinforce the claim that the solution offered is practical and without excessive cost. The writer is aware of adverse judgements emanating from the RAILCORP planners that such a scheme is virtually impossible. Not so! The use of steeper grades and (descending) sloping platforms takes care of that.

Secondarily, the textual material is to vindicate that four <u>through</u> (i.e. Nth Sydney – Central) tracks were envisaged nearly a century ago and that, post 1925, a larger eight platform Town Hall was planned for. The current proposal is, in effect, what Bradfield would have personally proposed post 1925.

I trust these supplements will prove useful.

Yours Sincerely,

GEOFFREY P. SANDFORD
(Memb. P.W.I. & R.T.S.A.)

Note: Reproduction of Sydway Directory Map in CBD by written permission of SYDWAY directories as noted on the copies.

Also
2 Additional text pages – revised
1 Additional Revised Drawing with the three above – Town Hall Station Elevation

THE PROJECTED TRACK ALIGNMENTS IN THE CBD
[OR..... TREADING IN THE FOOTSTEPS OF D^{R} J.J.C. BRADFIELD)

In the following, we look at how easily the urgently needed pair of additional tracks connecting North Shore/ North Sydney with Central / Redfern* and beyond "fit" with the existing infrastructure, thanks to the farsighted provisions for such made nearly a century ago. Specifically, we examine the legacy of D^{r}. Bradfield, who did even more work on "City Electric Railways" than he did on the celebrated harbour bridge.

In his landmark, but little known "City Electric Railways" of 1915, Bradfield explored several options for routes in the CBD. The newly completed Central station with its provision for the eight track suburban platforms adjoining Chalmers St. represented the city's "Southern gateway" whilst a projected harbour crossing along with a new North Sydney station represented the "Northern Sydney gateway". To connect these, Bradfield envisaged rail connection through the CBD with four tracks as a starting basis. This commitment to four tracks – incorporated in early harbour crossing plans was evident even before the type of bridge to be constructed had been decided upon. Indeed, it would have been a disappointment to Bradfield, that, upon its opening in March 1932, the eastern tracks on the bridge were to be used by trams immediately. Were Bradfield to know that less than 30 years later, these tracks would be removed and the eastern half of upper level Wynyard Station would become a car park, he would have been appalled!

Looking at his later work "City Electric Railways" of 1925, and particularly Appendix "J" we see that his proposals emphasised FOUR TRACKS clear through the CBD. The proposal in Appendix "J" shows a pair of those tracks passing through upper level Wynyard and Town Hall to present Nos 16 & 18 platforms at Central precisely as eventually constructed. Additionally, the plan shows what are clearly the other pair of these through tracks which after passing through upper level Wynyard (East) proceed under the CBD via Pitt Street to eventually pass east of Museum Station and into a projected new underground station at Chalmers St., this being labelled "Southern Suburbs" (Railway)

This station as constructed, however, was on a different alignment being parallel to Chalmers St. indicating that the route east of Museum had been abandoned, while the additional lower level platforms indicated that this was to be the Southern "approach" to the ESR, the earlier proposed Western Suburbs route under George St./ Broadway having been abandoned.

Thus by circa 1928, Bradfield's and his colleagues' intentions were clearly that –

- Lower level Chalmers St., now designated "Eastern Suburbs" would be connected to the unused lower level platforms at Town Hall, from which the ESR would proceed via St. James. South from Central, the route was via the "Illawarra Relief" at Redfern⊙ to a confluence with the Illawarra at Erskineville, sextuplication being provided for as far as Sydenham.
- The second "through route" would connect unused upper level Wynyard with upper level Chalmers St. presumably via Town Hall.

Thus the question can be posed: Did they envisage a larger eight platform Town Hall Station? The answer is a resounding yes! The set back of the building alignment of about 20ft (6m) on the eastern side and the additional set back of the Future Electricity Supply building allow ample space for an additional track and platform, whilst the already generous space on the western side allows for a counterpart track and platform. Of course, both of these would be outside the "box", the cuboidal structure of columns and beams 94 ft. (28 m) wide containing the present six track/ platform facility.

Such additional tracks require tunnels intruding beyond the building alignment on both sides of George St. to the south and on the eastern side to the north (Alas, over the past 20 years, new buildings have been constructed in the adjacent blocks, though fortunately, the high rise component of these buildings are set back. (The set back of the Hilton Hotel built in 1972, appears to represent compliance with future need, while the Price Waterhouse building of 1990 appears to be partially compliant with these needs.)

The use of this space on either side of the box thus forms a vital part of the current proposal described elsewhere in this Chapter (see Drawing: "Town Hall Station: Cross Section of Expanded 8 track station").

Additionally, a map and profile covering Central to Town Hall is included and it should be noted that at the north end of the (Southern Suburbs) platform, a stub track leading to a turnout merging with the south bound track is provided enabling an electric locomotive to be stabled there permanently to rescue trains if they stall on the 4.7% grade. Also note that a Southbound "exit" track to a new underground platform 19a for Interurban trains is provided, this eventually leading to a ramp up into Sydney yard, trains being enabled to proceed to Redfern via the Fast Tracks.

So in summary, it is clearly apparent that we should be grateful for Bradfield's near century old far-sightedness. Indeed, as the author has developed these proposals, there is an eerie sense that one is completing an engineering jigsaw puzzle! A 21st century Sydney needs to be thankful as the solution to an emerging crisis is "laid out" under their feet in the CBD.

* Excepting of course, the bridge itself where close headways of less than 60sec on the existing pair of tracks Milsons Points to Argyle Portals will permit frequency equivalent to four tracks capacity

⊙ The tunnels to connect Chalmers St. With Southern Suburbs Redfern were never completed.

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 (!) was specified. This is quite absurd.

Engineers are –by the evidence – welcoming instead of warning against – meddling and unreasonable requirements increasing showing up as OHSA 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. OHSA 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.

OHSA 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 OHSA 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!

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 the 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 may be required: this requires an additional route serving the Southwest and the operation of most Central Coast Commuter & Newcastle services via the North Shore. Also increased 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 Croydon. 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 circuity 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) CBD 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.