VFT Pre-Feasibility Study Report

"... a level of vision above the ordinary"

Front cover quotation from Mr John Langmore, MP, Chairman of the National Infrastructure Subcommittee of the House of Representatives Standing Committee on Expenditure.
Hansard, p.1919 1-4-87

Design VLAD MOSMONDOR
Typeset by HOT TYPE, QUEANBEYAN
Printed by MICRODATA PTY LTD, CANBERRA

VFT
Pre-Feasibility
Study Report

A PROPOSAL TO PROVIDE A VERY FAST TRAIN SERVICE LINKING SYDNEY, AND MELBOURNE VIA CANBERRA IN 3 HOURS

Prepared by the VFT Study Team under the management
of CSIRO for the VFT joint venture partners
Elders IXL, Kumagai Gumi, TNT

Canberra, June 1987

PREFACE

This document analyses the technical feasibility and, the financial and economic viability of constructing and operating a new high speed, standard gauge double-tracked electrified railway to link Sydney, Canberra and Melbourne. The railway would have an operating speed of 350 km/h offering a transit time of 3 hours between Sydney and Melbourne for the fastest express trains.

The railway, to be known as the VFT, would operate the fastest trains in the world in regular service. It would bring closer together the business, political and tourist centres of south eastern Australia and would influence the social and economic fabric of the region. It would be one of the largest and most significant projects ever undertaken in Australia. It would stimulate technological development, create export markets, and generate directly and indirectly opportunities for the employment of 25,000 people during the five year construction phase.

This report has been prepared for the information of the Joint Venturers (Elders IXL Limited, Kumagai (NSW) Pty Limited and TNT Australia Pty Limited). It reports the results of the pre-feasibility study carried out by the VFT Project Team and a team of consultants with the active collaboration of the Joint Venture Partners and the cooperation of a number of government departments and agencies.

All money values given in the report are in June 1986 Australian dollar values unless otherwise indicated.

A glossary of terms used in the report follows this preface.

The report is based largely on the work of the consultants (a list of their reports is attached). However, the conclusions reached are those of the VFT project team consisting of:

Dr J P Wild (Chairman)
Dr A J Nicolson (Project Manager)
Dr J F Brotchie
Mr D Budd
Mr J V Dunn
Mrs A M McKenna (Secretary)
Miss S M Moore (Liaison Manager)
Dr R R Noakes

VFT Committee of Management

The Joint Venture Partners were represented on the VFT Committee of Management by the following individuals who made an important contribution to the pre-feasibility study:

Elders IXL	Mr F B Bongers Dr R F Dillon
Kumagai Gumi	Mr T T Mitani Mr M Arioka
TNT	Mr I F Shortell Mr R T Patteson

Acknowledgements

Acknowledgement is due to Dr Selwyn Tucker and Mrs Rhyll Reed of the CSIRO Division of Building Research for computer modelling and manuscript preparation respectively. Mr Jim Powell of TNT provided constructive criticism of the financial sections of the report, while Mrs Anne Harvey of Dale Budd & Associates Pty Ltd and Mr David A Brett of the CSIRO Centre for International Research Cooperation provided valuable assistance during the preparation of the report. Thanks are also due to Messrs John Barrington, Peter Butler, George Harley, Russell Hicks, Arthur Palmer and Ms Hilary Whitworth for assistance during the pre-feasibility study. Special thanks are due to Dr Geoff Taylor, formerly of the CSIRO Executive for support leading to the commercialisation of the project. Kwika Airfreight generously provided courier services to support the project team, greatly assisting with the rapid exchange of documentation.

LIST OF CONSULTANTS' REPORTS

Consultant	Title
BHP Engineering 169-185 Miller Street SYDNEY NSW 2000	Rail Track Costs (Table of Estimates)
Comeng 11 Berry Street GRANVILLE NSW 2142	VFT Rolling Stock
John Connell - Mott, Hay & Anderson 60 Albert Road SOUTH MELBOURNE VIC 3205	Very Fast Train Project Melbourne Entry
John Connell - Mott, Hay & Anderson 60 Albert Road SOUTH MELBOURNE VIC 3205	Very Fast Train Project Signalling and Communications
Elrail Consultants Pty Ltd 135 Wickham Terrace BRISBANE QLD 4000	Investigation of Power Supply (Electrification)
GHD-Transmark Australia 8th Floor 36 Clarence Street SYDNEY NSW 2000	VFT Sydney Access Corridor
GHD-Transmark Australia 8th Floor 36 Clarence Street SYDNEY NSW 2000	Passenger Market Study for the Very Fast Train
GHD-Transmark Australia 8th Floor 36 Clarence Street SYDNEY NSW 2000	Freight Market Study

Gibb Australia 24 Thesiger Court DEAKIN ACT 2600 and Japan Railway Technical Service Otemachi Building 5th Floor 6-1 Otemachi 1-chome Chiyoda-ku TOKYO 100 JAPAN	Passenger Market Study for VFT Project
Macdonald Wagner Pty Ltd Level 29, Northpoint Building 100 Miller Street NORTH SYDNEY NSW 2060 and SOFRERAIL 3, avenue Hoche 75008 Paris FRANCE	Very Fast Train Sydney - Canberra - Melbourne Pre-feasibility Study Report on Operting Costs
Snowy Mountains Engineering Corporation 220-226 Sharp Street COOMA NSW 2630 and Maunsell and Partners 38 Thesiger Court DEAKIN ACT 2600	Route Evaluation and Cost Estimate Liverpool to Dandenong

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CHAPTER 1

SUMMARY AND RECOMMENDATION

1.1 Recommendation

The pre-feasibility study has indicated financial viability and technical feasibility. Progression to the next stage of the project is recommended.

1.2 Passenger Demand

Passenger demand is estimated to exceed 5 M one-way Sydney - Melbourne trip equivalents (Syd-Mels) in 1995 (with projections ranging from 6.6 M to as high as 9.5 M). A base case of 5 M is adopted for financial analysis.

1.3 Revenue

Gross revenue from passenger operations is projected as $525 M with an additional $60 M from freight operations, giving a total base case revenue of $585 M in 1995.

1.4 Rate of Return

The nominal internal rate of return, pretax, on funds invested (for the case of full equity) is 18.8% (16.3% post- tax). The pay back period (allowing for tax) is less than eight years from start of operation. Higher rates of return could be realised if lower interest rates were achieved through government endorsement and minimal equity funding applied.

The following key factors will have a significant effect on the ultimate financial viability of the project:

(a) Market verification
(b) Capital cost savings
(c) The assumed period of operation and the impact of residual values
(d) The treatment of tax losses accumulated in the period prior to achieving a positive cash flow
(e) The way in which real estate value capture opportunities may be realised
(f) Finance packaging

Each of these factors particularly requires full and careful attention in the feasibility study and resolution before any decision to proceed.

1.5 Capital Cost

Capital cost is projected at almost $4 B, including land acquisition, earthworks, construction of stations, double track, overhead electrification, central control system and trainsets, as well as design and supervision, and a substantial contingency allowance.

1.6 Operating Costs

Operating costs are estimated at $155 M p.a., including energy (19%), maintenance (47%), operational staff and management (13%), insurance, advertising and agents' commissions (18%), and freight handling (3%).

1.7 Assumptions

The following assumptions have been made for the purposes of the financial analysis. Construction period is 5 years. The operating period used is 15 years. Real rate of growth in demand and revenue is 3%, inflation 7%, and interest rates 15% p.a. For the base case full (100%) equity funding is assumed. Residual value of project is estimated to be 8 times pretax, predepreciation profit in the 15th year of operation. (This is equivalent in rate of return to no residual value after 27 years of operating life.)

1.8 Where The Passengers Come From

Of the 5 M Syd-Mel trips p.a. in the base case it is estimated that 33% (1.7 M) are induced demand (new trips) and the remainder are diverted from car (32%-1.6 M), plane (26%-1.2 M), bus (6%-0.3 M) and train (4%-0.2 M). Nearly one third are for business purposes. These 5 M trips p.a. represent 55% of projected total trips in the corridor in 1995 without VFT or 47% of the total with VFT. They represent only 0.65 one way trips p.a. for each of the 7.8 M people projected to be living in the corridor in 1995 (7.1 M in 1984) compared with 1 trip p.a. by TGV for everyone in the Paris-Lyon-Marseilles corridor and 1.9 trips p.a. on Shinkansen for everyone in its corridor (Figure 1.1).

1.9 Train Sets & Service Frequency

The VFT base case requires 24 train sets each of six cars with each train seating about 400 passengers (or a mix of passengers and freight) providing hourly departures in each direction between 6 a.m. and 9 p.m. and more frequently during morning and evening peaks. On weekdays some 30 trains are scheduled each way.

1.10 Sensitivities

Key factors to which the project is sensitive have been identified in the paragraph 1.4 on rate of return. Sensitivity analyses for changes of ±20% in passenger demand or construction costs give variations in rate of return of about ±2.5%. Changes in operating costs of ±50% have similar impacts, whereas changes in fare levels or equity ratio have much less effect. Increasing travel time by 0.5 h (speed limit of 300 instead of 350 km/h) decreases rate of return by 1.3%. Increasing the construction period to 6 years decreases pretax rate of return by 0.6% whereas a decrease to 4 years increases rate of return by 0.7%. Concentration of expenditure towards the end of the construction period would produce a similar and even larger increment.

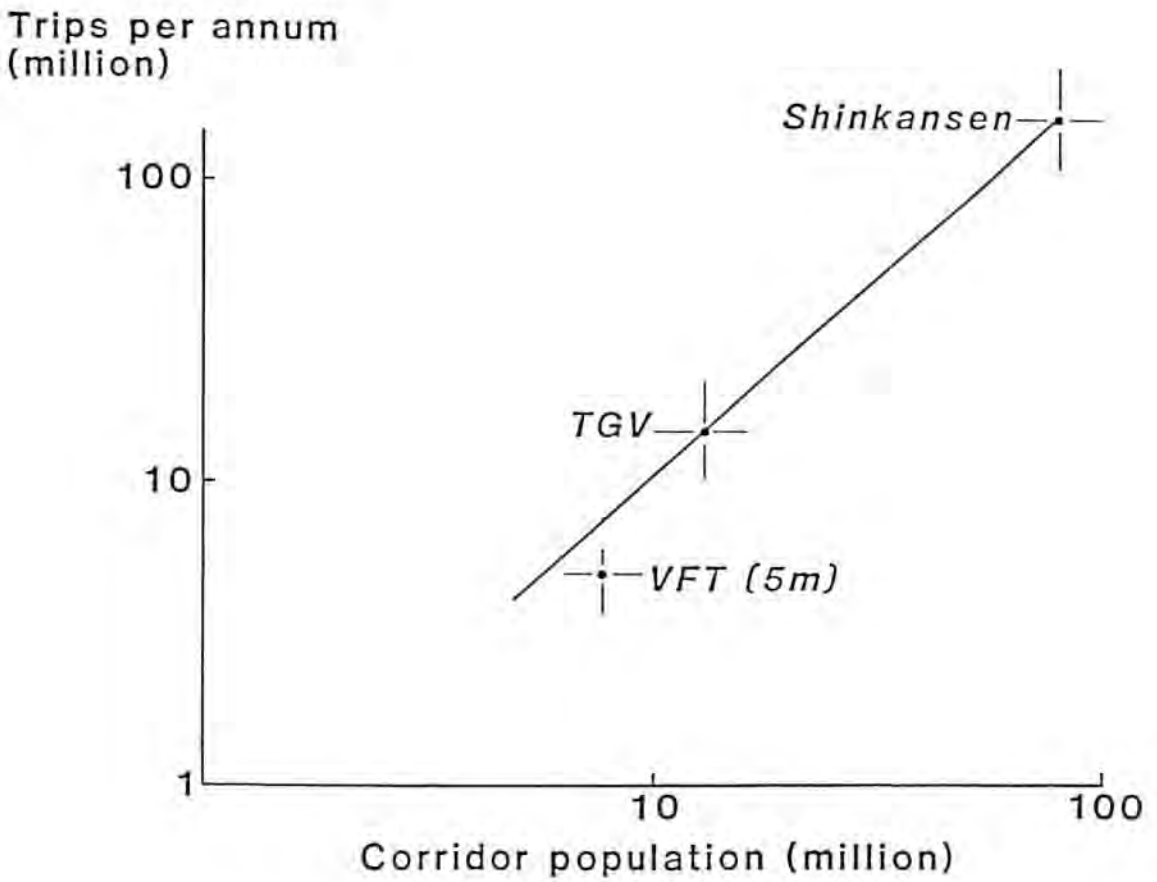

Figure 1.1. Passenger trips p.a. vs corridor population for TGV France, Shinkansen in Japan and as projected for VFT (Base Case).