Parliamentary Standing Committee on Public Works

REPORT

relating to the proposal for

STAGE 1 CONSTRUCTION OF NEW WORKS AND UPGRADING OF EXISTING FACILITIES FOR THE NEW TACTICAL FIGHTER PROJECT

at

Fishermens Bend, Melbourne

(Eleventh Report of 1982)

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA
1982

FOR SENATOR FOREMAN

In accordance with the provisions of the Public Works Committee Act 1969, I present the Reports relating to the following proposed works:

STAGE 1 CONSTRUCTION OF NEW WORKS AND UPGRADING OF EXISTING FACILITIES FOR THE NEW TACTICAL FIGHTER PROJECT AT FISHERMENS BEND, MELBOURNE; AND

DEVELOPMENT OF THE MILITARY AREA AT WOODSIDE, SOUTH AUSTRALIA FOR THE 16TH AIR DEFENCE REGIMENT.

26 October 1982.

1982

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PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

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PARLIAMENTARY STANDING COMMITTTEE ON PUBLIC WORKS

STAGE I CONSTRUCTION OF NEW WORKS AND UPGRADING OF EXISTING FACILITIES FOR THE NEW TACTICAL FIGHTER PROJECT AT FISHERMENS BEND, MELBOURNE

REPORT

By resolution on 27 May 1982 the Senate referred to the Parliamentary Standing Committee on Public Works for investigation and report, the proposal for the Stage I Construction of New Works and Upgrading of the Existing Facilities for the New Tactical Fighter Project at Fishermens Bend, Melbourne.

The Committee has the honour to report as follows:

THE REFERENCE

1. The proposal referred to the Committee is for the construction of certain new facilities at the Commonwealth Aircraft Corporation (CAC) and the Government Aircraft Factories (GAF) at Fishermens Bend, Victoria to facilitate Australian industry participation in the New Tactical Fighter (NTF) Project. The work in this reference includes:

- construction of a new jet engine test cell at CAC,
- construction of a co-production staff office building at CAC, and
- improvements to the canopy shop at GAF.

The estimated total cost of the work is $5.4 million at May 1982 prices.

THE COMMITTEE'S INVESTIGATION

2. The Committee received written submissions and drawings from the Department of Defence Support and the Department of Transport and Construction, and a Sectional Committee took evidence from their representatives, and representatives of the Department of Defence and the Department of Administrative Services, at a public hearing in Melbourne on 11 August 1982. Mr M.J. Smith, Managing Director of Vipac and Partners, also made a submission and gave evidence to the Committee. On 23 September 1982, the Committee took further evidence from representatives of the Departments of Defence Support, Transport and Construction, Defence, and Administrative Services, when the hearing was reconvened in Canberra.

3. Prior to the public hearing on 11 August 1982, the Sectional Committee inspected an engine test cell facility of Trans Australian Airlines at Melbourne Airport, and certain facilities at the Government Aircraft Factories and the Commonwealth Aircraft Corporation at Fishermens Bend, including the sites for the proposed new work and upgrading.

BACKGROUND

4. The F/A-18 Purchase On 20 October 1981 the Minister for Defence announced the selection of the F/A-18 aircraft, manufactured by McDonnell Douglas Corporation of the United States of America, as the new tactical fighter for the RAAF. The F/A-18 had been developed from the outset as a multi-role aircraft with all weather air-to-air and air-to-surface missiles, and all weather navigation and weapons targeting systems. It will replace the ageing Mirage as Australia's front line fighter aircraft.

5. The Government has ordered 75 F/A-18 aircraft. The first two will be fully manufactured and assembled in the United States, and the third aircraft will be almost completely manufactured in the USA, then shipped to Australia and reassembled at the Government Aircraft Factories at Avalon. The remaining 72 aircraft will be finally assembled and tested in Australia.

6. The total cost of the project, as announced by the Minister for Defence, is $2,430 million at August 1981 prices. This included the cost of new buildings and overhaul facilities at RAAF bases to cater for the aircraft, and the cost of establishing important support capabilities in Australian industry. The overall cost therefore includes the cost of the works in this reference.

7. The RAAF should receive the first F/A-18 by the end of 1984, operational training is expected to commence in the latter half of 1985, and a production rate of three aircraft every two months achieved by the middle of 1986. All deliveries should be completed by 1990.

8. Role of the Department of Defence Support. The Department of Defence Support has the responsibility of ensuring that the industrial base of the Australian defence aerospace industry meets Australia's defence requirements. To achieve this, the Department generally has to maintain an upgrading of facilities within the industry. It formulates proposals and implements programs for improving the structure and efficiency of the industry, and assists with the development and acquisition of new techniques and equipment.

9. To maintain an appropriate defence capability, Australian industry needs skilled labour, certain technological capabilities, and an appropriate task to perform. Companies can seek their own orders, or work can be sponsored directly by government through its

various policies on local production and Offset work for export. Government sponsored work, which is usually arranged through the Department of Defence Support, not only ensures a constant level of employment in the industry, but ensures that the technologies and skills within Australia are relevant to the needs of the RAAF in this case, and of the other Services in general.

10. There are no financial arrangements for government support of the Australian aerospace industry, but the facilities to be provided, which are the subject of this reference, can be looked upon as a government initiative to assist the Australian aircraft industry.

11. Contractural Arrangements for the NTF Project
The contractural arrangements for the purchase of the F/A-18 fighter, and for Australian Industry Participation (AIP) in the NTF project are complex.

12. The Australian F/A-18 purchase will be implemented as a United States foreign military sale acquisition under the terms and conditions specified in four sets of documents:

- Memorandum of Arrangements between the United States and Australian Governments,
- letters of offer and acceptance defining the specific items to be procured,
- a Deed between McDonnell Douglas Corporation and the Commonwealth of Australia for Australian industry participation, and
- a Deed between the General Electric Company Aircraft Engine Group and the Commonwealth of Australia for Australian industry participation.

13. Under these arrangements orders are placed by Australia on the American Foreign Military Sales System which in turn generates contracts on McDonnell Douglas and General Electric. These prime contractors then place sub-contracts on American and Australian industry. The arrangements impose an obligation on the United States companies to achieve a stipulated level of AIP.

14. *Memorandum of Arrangements:* The Memorandum of Arrangements, which was presented to the Parliament by the Minister of Defence on 18 November 1981, is the basic umbrella document between the United States and Australian Governments and covers the arrangements for the acquisition and co-production of the new tactical fighter. It was negotiated before the final selection of aircraft was made. The preamble to the document describes the Government's intention to create in Australia an industry capable of supporting the F/A-18 in service with the RAAF. The document then sets out the obligations of both the United States and Australia with regard to the overall NTF project.

15. The principal obligations specified in the document, with respect to the AIP program, are that Australia has to pay for all tooling to be used in Australian industry for the manufacture of components that Australia makes for its own aircraft, and has to provide the plant, machinery and facilities required to undertake the program.

16. The Department of Defence Support states that the arrangements commit the Commonwealth to provide certain facilities for Australian industry sub-contractors to achieve an agreed level of Australian industry involvement in the program. The decision to provide these facilities at Government expense is based on this interpretation of the document. However an equally valid interpretation may be that the facilities must be provided at Australian rather than American expense, and whether the cost is met by Government or industry is a matter for the Australian Government to decide.

17. Australian Industry Participation *Reasons for AIP:* The Australian Government has entered into arrangements for Australian Industry Participation for strategic rather than economic reasons. Although there will be some economic benefits, such as the maintenance of employment in the Australian aerospace industry, the additional cost of the NTF program because of the AIP arrangements will be in the order of 15 percent or a little less.

18. *Tasks to be Performed:* The NTF AIP program comprises designated work on Australian aircraft and Offset work for export back to the United States. The range of tasks which make up the designated work program are based on the technological and strategic value of the work and the cost. These designated tasks include final assembly and test of the F/A-18A (Australian version) aircraft, its engines, radar and other major components, and the manufacture of a wide range of components.

19. *Revenue:* The Department of Defence Support advises that the designated and Offset work programs should generate orders on Australian industry worth about $560 million at August 1981 prices. That includes the potential export of air frame, engine, equipment and avionics components valued at about $370 million.

20. One condition of the Offset Program is that the Australian price, in aggregate, must be competitive with current United States prices. This will be achieved by the economies of scale in manufacturing components, not only for the 73 Australian aircraft, but for up to a further 1,366 United States aircraft. In most cases the Offset work will follow on from those parts that will be manufactured for the Australian aircraft, and the American as well as the Australian aircraft will eventually have from 10 to 20 percent Australian content.

21. *Introduction of New Technologies:* The AIP arrangements of the NTF project will introduce a representative sample of new technologies into Australia. It does not attempt to introduce every new technology, which would be too costly.

22. Examples of new technologies include the manufacture of carbon composite structures and new bonding techniques for metal and non-metallic materials, assembly and test of advanced servo-hydraulic systems, precision machinery and grinding of complex components, use of advanced non-destructive inspection techniques, high pressure fluid forming of complex shapes and high strength aluminium alloys, assembly tests and integration of advanced avionic equipments, manufacture of avionic componentry, multi-layer circuit boards, hybrid microcircuits, and computerised engine test data collection and analysis.

23. The stage will not be reached where an entire F/A-18 could be fully manufactured in Australia, but in terms of value, about 10 to 20 percent local content of Australia's own aircraft will be achieved.

24. *Commonwealth Aircraft Corporation:* CAC is a privately owned company with facilities at Fishermens Bend, Victoria. The facilities exist primarily for Defence purposes, but the Company also engages in commercial operations under appropriate financial arrangements with the Government. The primary specialised role of the Company in the defence field is the manufacture, repair and overhaul of jet engines, including associated sheet metal activities, together with capability for engine modification and spares production.

25. In accordance with this role, and objectives of AIP, CAC has been selected as the sub-contractor to General Electric (GE) for the assembly and testing, and partial manufacture of 161 F404 engines, including spare engines, which will power the RAAF F/A-18A aircraft. In addition, CAC will undertake a substantial Offset Program, extending beyond the year 1990, for the

supply of selected components to GE. CAC will also provide maintenance support for the subsequent operation of these engines with the RAAF.

26. *Government Aircraft Factories:* The GAF is established under the Supply and Development Act 1939-1975 and operates under Department of Defence Support administration at facilities located at Fishermens Bend and Avalon, Victoria. The specialised role of GAF in the Defence field is the design, development and production of aircraft and guided missiles, together with capability for modification, spares production, and airframe repair and overhaul. Design, development and component production functions are located at Fishermens Bend. Final assembly and test flying functions are located at Avalon Airfield.

27. GAF has been selected as sub-contractor for final assembly and flight test of both single seat and two seat versions of the aircraft for the RAAF, from components to be supplied from both Australian and US sources. In addition, GAF will undertake the assembly and fitting-out of imported sub-assemblies, as well as the manufacture of components both for the Australian assembly program, and for supply to the prime manufacturer. One of the components to be manufactured by GAF for the F/A-18 is the canopy.

28. Government Support of Australian Industry The Government, through the Department of Defence Support and the Department of Transport and Construction will provide assistance to participating industry contractors at an estimated cost of $65 million at current prices. Of this amount, $14 million will be for capital new works to be carried out by the Department of Transport and Construction. These works are:

- five projects currently under construction (two of which have been completed), at a total estimated cost of $2.45 million. The individual

value of these projects is less than the $2.0 million mandatory limit for reference of work to the Committee. However, the Department of Defence Support discussed these projects with the Chairman and Vice-Chairman prior to the commencement of work;

- the three projects, with a total estimated cost of $5.4 million, that are the subject of this report; and

- fifteen further projects with a total estimated cost of $6.25 million. Only one of these projects exceeds the Committee's mandatory $2.0 million limit.

29. There are other new works in various stages of implementation and planning which are not a direct charge to the NTF project but will have application on NTF work. These works include the Composite Material and Bonded Metal Component Manufacturing and Repair Workshop under construction at the GAF Fishermens Bend facility. This project, with an estimated cost of $16 million at July 1980 prices, was exempt from scrutiny by the Public Works Committee by reason of the urgent nature of the work. Other works are the Aircraft-Fuel Test Facility, currently under construction, and associated Concrete Hardstanding at GAF Avalon.

THE NEED

30. Jet Engine Test Cell As previously mentioned CAC has been selected as the sub-contractor to General Electric for the assembly and testing and partial manufacture of 161 F404 engines, including spare engines, which will power the RAAF F/A-18A aircraft.

31. CAC will, in addition, undertake a substantial Offset Program extending beyond the year 1990 for the supply of selected engine components to General Electric. CAC will also provide maintenance support for the subsequent operation of these engines with the RAAF.

32. Test cells are required to run, monitor and to assess the performance of newly assembled jet engines. They are also used to assess, before and after maintenance, the performance of engines in service and to identify any problems that may arise.

33. *Existing Facilities:* There are currently three jet engine test cells at CAC. The existing test cell facilities consist of one CAC owned cell and two government owned test cells under the control of the Department of Defence Support. The CAC cell and one of the government owned cells are fitted out for testing both Avon and Atar engines. The other small government owned cell is fitted out for testing Viper engines. The existing facilities do not have a capability for testing the F404 engine (16,000 lb thrust).

34. The existing CAC test cell is 43 years old and is unsuitable for modification to accept the F404 engine. The existing government owned cell, fitted out for testing Viper engines, is 34 years old and is too small for conversion to accommodate the F404 engine.

35. The possibility of converting the larger 30 year old government owned test cell was considered. After investigation, this option was discarded because of the high technical risk, particularly in the areas of aerodynamics and structural integrity.

36. *Proposed use of the New Facility:* The proposed new cell will be used to test five new F404 engines per month, and each test will take eight hours to carry out. However, the cell will be utilised more fully as it will be more economical to use the new cell rather than the present cells to test existing engines handled by CAC. The new cell will, to an extent, therefore replace existing cells. The new cell will also be capable of testing TF30 engines used to power the F-111 aircraft.

37. *Commonwealth Obligation to Provide New Facilities:* The Department of Defence Support states that the Commonwealth is committed to provide the new jet engines test cell facility under the terms of a Deed between the Commonwealth and GE, executed on 1 December 1981. The Committee does not believe that the Memorandum of Arrangements necessarily places an obligation on the Commonwealth itself to pay for this facility. However, it recognises that the Government has made a decision to assist Australian industry through the provision of new capital facilities, including the proposed new jet engine test cell.

38. Co-Production Staff Office The co-production of the F404 engine by CAC as a sub-contractor to GE requires a 12 man GE resident team and support staff in place at CAC from 1982 to administer and assist in the F404 Engine Assembly and Test Program and Components Parts Manufacturing Program.

39. *Obligation to Provide Accommodation:* The contractural arrangements provide for the team to be in place for the life of the program (approximately eight years) and that Australia will pay the full cost of the team, including salaries and accommodation, at a total estimated cost of between $4 million and $5 million.

40. *Existing Accommodation:* A survey of existing company and government owned buildings at CAC has established that no suitable accommodation for the co-production staff office exists. It is therefore necessary for new office accommodation to be provided.

41. Improvements to Canopy Shop The Department of Defence Support states that under a Deed between McDonnell Douglas and the Commonwealth executed on 1 December 1981, the Commonwealth is committed to provide certain facilities at GAF in aide of the co-production role, including the provision of improvements to the canopy shop.

42. *Demand for Canopies:* Aircraft canopies of the type fitted to F/A-18 aircraft require periodic replacement due to the effects of pressure stressing and loss of optical capacity. Canopies are therefore classified as high

usage spares. Canopies will be manufactured for both Australian aircraft production and spares, and Mirage operational experience suggests that at least 500 spare canopies will be required over the life of the aircraft.

43. *Existing Facilities*: The existing canopy workshop is an enclosed area of 640 square metres, located within the northern end of Building 1 at Fishermens Bend. The area was modified to its present configuration in 1954 for the production of canopies for the Canberra aircraft. Currently, canopies are being produced for Mirage, Macchi and Nomad aircraft.

44. The existing workshop is deficient in four principal aspects:

- there is insufficient space to maintain the production rate of spare canopies currently required by the RAAF, and this would be exacerbated by the commencement of F/A-18 canopy manufacture,
- working conditions are unsatisfactory due to high temperatures caused by ovens in the area, and the presence of fumes from trimming operations. These problems have been addressed but it has not been possible to obtain a complete improvement in the existing area. Industrial representations are frequently made during the summer months,
- because of the need to extract heat and fumes, the area within the canopy workshop is at negative pressure with respect to the outside, and it cannot be kept dust free, and
- the exisiting area is too small to accommodate the special plant needed for forming and handling the F/A-18 canopy.

45. Committee's Conclusions A new jet engine test cell, capable of testing the F404 jet engine, is required at the Commonwealth Aircraft Corporation, Fishermens Bend.

46. A new building is required to provide office and conference accommodation for the resident GE co-production team.

47. Improvements to the canopy shop at the Government Aircraft Factories, Fishermens Bend, are required to facilitate the manufacture of F/A-18 canopies.

THE PROPOSED WORKS

48. Jet Engine Test Cell A new jet engine test facility to appropriate "state of the art" standards is proposed for testing F404 engines at CAC, Fishermens Bend. It will be an efficient cell with a long, low maintenance, life.

49. The essential elements of the proposed new test cell facility are an engine running cell with acoustic treatment and suitable aerodynamic characteristics, an engine preparation room, engine test control room, control equipment and instrumentation (including computer controlled equipment for the automatic collection and recording of engine performance data), fuel storage and handling equipment, and plant and instrument rooms.

50. Research and development (R&D) investigation on jet engines, particularly jet engines operated by the RAAF, is undertaken from time to time by the Aeronautical Research Laboratories (ARL), which are located adjacent to CAC at Port Melbourne. The use by ARL of the new test cell for R&D engine investigations, particularly investigations in support of the F404 engine, was considered in the development of the proposal and will be provided for

in the technical specification of the cell. In particular, the specification will include provision for a room to house special ARL test equipment and instrumentation, and for an additional engine preparation room for ARL. These facilities will be funded independently of this proposal but constructed concurrently.

51. *Provision for Future Engines:* As demonstrated by the existing facilities, jet engine test cells can remain in service for a great many years, and will eventually be used to test engines vastly different from those for which they were originally designed. The new cell will therefore be built to accommodate all after-burning military aircraft engines in service, or known to be under development.

52. The Department of Transport and Construction states that the aerodynamic characteristics of the test cell will cater for an engine that will deliver 40,000 lb thrust. However, as the noise levels of these future higher powered engines are not known, acoustic treatment will only be provided to cater for the 16,000 lb F404 engine. Additional sound suppression measures can be added at a later date when the noise levels of the higher powered engines are known.

53. *Proposed Design and Construction Contractural Arrangements:* Test cell design is a highly specialised field, and the necessary expertise does not lie with the Department of Transport and Construction. The design of the test cell had therefore not been fully resolved when this proposal was submitted to the Committee. The Department of Transport and Construction states that a contract will be let for the detailed design of the new test cell, but consideration of the project by the PWC is necessary before any contract for detailed design can be let.

54. The Department of Transport and Construction proposed four distinct steps in the design and construction of the test cell:

1. The Department intends to place a contract with a single selected contractor, an American firm, for the supply of specialised equipment and instrumentation.

2. When that contract is placed, a concurrent consultant-type commission will be placed on that same firm, to supply detailed design criterea, including the acoustic and aeronautic design, on which the very detailed design and tender documentation of the cell is based. This single selected contractor will also oversee, together with the Department of Transport and Construction, the actual detailed design and tender documentation stage, and will provide a technical supervisory role during the construction phase.

3. When the design criteria is provided, a firm of engineers will be commissioned to provide the detailed structural design and documentation. This is a routine civil engineering task, and it is expected that the successful tenderer will be an Australian firm.

4. The construction phase, which is not a particularly complex task, is also likely to be undertaken by an Australian firm.

55. The Department of Transport and Construction indicates that the detailed design and construction will be put to open tender, but as the supply of specialised equipment and intrumentation and the preparation of design criteria are of a specialised nature, a single overseas contractor will be chosen on a non-competitive basis.

56. The Committee accepts that a single selected supplier of specialised equipment should be chosen, as there are no Australian and very few overseas firms capable of providing the equipment required. However, the Department of Transport and Construction has not demonstrated that this selected supplier is the only firm, or even the best firm to choose, to provide the design criteria and the acoustic and aeronautic design. In fact, evidence was presented to the Committee to the effect that certain Australian individuals are not only capable of participating in these highly specialised aspects of the design, but are among the world leaders in the field, having designed similar test cells for use in other countries, including the USA.

57. The Committee therefore believes that the contract for the design criteria and the acoustic and aeronautic design should not be automatically given to the supplier of specialist equipment. Suitably qualified Australians should be given the opportunity to tender for the work.

58. The Committee believes that this is important as the rationale for AIP is to introduce new technologies, and to maintain existing high level technologies in Australia. Also, if further test cells are required at certain RAAF bases to support the F/A-18A in service, proven Australian expertise would then be available to design them.

59. *Design Details:* The Committee was unable to assess this project on the basis of detailed sketch plan as the development of the proposal has not yet reached this stage. The design submitted to the Committee for consideration is of a typical jet engine test cell, rather than the exact design of the cell that is to be built.

60. Details of the proposed jet engine test cell are at Appendix A.

61. Co-Production Staff Office To provide office and conference accommodation for the GE resident team and their secretarial support, it is proposed to construct a demountable building, of approximately 300 square metres in area, within the perimeter of the CAC establishment at Fishermens Bend.

62. The building will be factory pre-built or prefabricated type, with insulated steel-framed walls and roof. The design will include office accommodation, a kitchen, and toilet facilities. There are no plans for the utilisation of the building after 1990. The modular construction of the building will enable it to be relocated to another site if subsequently found to be necessary. Construction details are at Appendix A.

63. The Department of Defence Support states that the proposed building will meet in full the Commonwealth's obligation to provide a co-production staff office at CAC.

64. Improvements to Canopy Shop The four principal steps for canopy transparency manufacture are forming, polishing, trimming and bonding. The proposal is to create four separate enclosed areas, one for each function, so that specified requirements in respect of cleanliness and environmental conditions can be achieved in each area. The existing canopy workshop will be converted into two of these enclosed areas, and space will be available for the further two areas after transfer of other functions to a new building currently under construction. The additional enclosed areas will increase floor space of the canopy workshop from 640 square metres to 1,590 square metres. A further 186 square metres of adjacent open workshop space will be available for assembly of canopy bubbles into metal frames, to complete the canopy assembly.

65. Works to be carried out within the enclosed areas are improvements to lighting, temperature control and ventilation, and dust and fume extraction. Floor surfaces will be repaired or reconstructed to provide a uniform dust free surface for wheeled trolleys and jigs.

66. Details of the proposed work are at Appendix A.

67. Committee's Conclusions The contract for the design criteria of the jet engine test cell, including the acoustic and aeronautic design, should not automatically be given to the supplier of specialised equipment. Suitably qualified Australians should be given the opportunity to tender for the work.

68. The Committee is unable to endorse the design of the test cell at this stage as the design has not yet been fully resolved.

69. The design of the proposed co-production office building is satisfactory.

70. The proposal for upgrading the canopy shop is satisfactory.

SITES

71. Jet Engine Test Cell The jet engine test cell will be located within the perimeter of the Commonwealth Aircraft Corporation establishment. It will be situated toward the eastern boundary of the premises a substantial distance from the nearest occupied buildings.

72. *Foundation Problems:* The site presents some foundation problems due to the high water table which is common in the Fishermens Bend area. However, this will be overcome and $300,000 has been set aside for piling which will provide a solid base on which to construct the test cell.

73. *Land Leasing Arrangements:* The land on which the proposed test cell is to be constructed is currently leased by CAC from the State of Victoria. CAC is prepared to surrender the lease and the State of Victoria will grant a 75 year lease to the Commonwealth. The land rent will be $17,200 per annum to be reappraised after the first five years. The State Government was not prepared to sell the site to the Commonwealth.

74. *Constraints Due to Noise:* The siting of the proposed jet engine test cell, and the impact of engine noise on nearby working and residential environments are interrelated. Numerous sites were considered and some were discarded because of the high cost penalty involved in achieving acceptable noise levels in nearby buildings.

75. Noise emanating from the test cell must be kept below specified levels in the nearest working environment and also at the nearest residential areas. The proposed site was selected as it would have the minimum impact on these areas.

76. The test cell will be sited within a sound envelope. Measures will be taken to keep noise levels below 70 dB(A), beyond a radius of 90 metres from the test cell, which is the distance to the nearest factory buildings. These noise levels comply with the Victorian Health Commission's "Health (Hearing Conservation) Regulations 1978", which govern acceptable noise levels in the workplace.

77. If noise levels outside the sound envelope are kept within these limits, the noise levels at the nearest residential buildings (1.25 km distant from the test cell) will be 40 dB(A). This compares with a background noise in the area of 45 dB(A), even in the quiet of the night.

The Victorian Environment Protection Authority is satisfied with assurances that the noise impact on residential areas will not exceed this level. Following consultations between the Department of Defence Support and the Victorian Ministry for Conservation, it was determined that an Environmental Impact Statement would not be required for this proposal.

78. During the investigation the Committee was concerned that the target noise levels would be exceeded, as media reports and the Department of Defence Support's evidence itself, suggested that there may be noise problems with the F/A-18 aircraft. However, when the hearing was reconvened the Committee was advised that new information to hand confirmed that noise levels will not exceed those originally stated by General Electric and used as parameters in the design of the test cell.

79. Nevertheless, the Committee believes that an Environmental Impact Statement should have been required for this project because of the potential for a serious noise problem. Furthermore, assurances given to the Environment Protection Authority and the Victorian Ministry for Conservation must have been somewhat questionable, as at that time the noise levels of the F404 engine were only estimates and there appeared to be little confidence in them.

80. Co-Production Staff Office The building will be sited within the perimeter of the plant operated by CAC on land held by the Commonwealth on long term lease from the State of Victoria. This lease will expire on 30 June 1988 but the State has formally advised that a further lease for a period up to 75 years will be available at that time.

81. The site is situated near the eastern boundary of the CAC establishment and some distance from the factory areas. However, this should not present any problems.

82. Improvements to Canopy Shop The improved canopy shop will be located within the northern end of Building 1 at the Government Aircraft Factories at Fishermens Bend. The existing canopy shop is located in this area and the space occupied by the canopy shop, and additional adjacent space, will be used in the development of this facility.

83. Committee's Conclusions The site selected for the jet engine test cell is suitable provided that the noise levels emanating from the test cell will be kept below 70 dB(A) beyond a radius of 90 metres from the cell.

84. The site selected for the co-production staff office is suitable.

85. The site for improvements to the canopy shop is suitable.

ESTIMATE OF COST

86. Stage I Total The "near limit of cost" estimate for the project was $5.4 million when referred to the Committee. In addition, special testing equipment and instrumentation will be installed in the test cell at an additional estimated cost of $2.8 million.

87. Jet Engine Test Cell The "near limit of cost" estimate for the test cell itself is $4.6 million. The usual "limit of cost" estimate could not be provided as, by definition, this estimate is based on detailed sketch plans. In this instance, detailed sketch plans will only be available after contracts have been let. Nevertheless, the Department of Transport and Construction assured the Committee that the "near limit of cost" estimate of $4.6 million is a firm figure.

88. Notwithstanding this, the Committee notes that the cost is likely to increase significantly should the noise levels of the F404 engine be greater than expected. This is because more elaborate and expensive silencing treatment will have to be incorporated. If there are further cost increases above and beyond those due to increases in the CPI, then this project should be referred back to the Public Works Committee for further scrutiny.

89. Co-Production Staff Office The limit of cost estimate at May 1982 prices for the co-production staff office is $200,000. This estimate is based on factory pre-built or prefabricated type construction.

90. Improvements to Canopy Shop When referred to the Committee the limit of cost estimate for improvements to the canopy shop was $600,000 at May 1982 prices. This comprises the following elements:

	$
Building works	160,000
Mechanical works	400,000
Electrical services	40,000
Total	600,000

REVENUE

91. CAC will sub-lease the jet engine test cell from the Commonwealth. It will pay a market rental for the sub-lease of the land, plus a rental for the space provided within the building which would have regard to similar rentals payable per square metre for industrial complex in the Fishermens Bend area. It will not have true regard to the Commonwealth's capital cost of providing the facility.

92. Both the co-production staff office at the Commonwealth Aircraft Corporation and the canopy shop at

the Government Aircraft Factories will be used for Commonwealth purposes and are not of a revenue producing character.

PROGRAM

93. The Stage I items are proposed for inclusion in the 1982/83 New Works list. It is intended that the new engine test cell design and construction phases will be overlapped where possible to ensure completion of the project in the shortest practicable timescale.

94. The timing of the test cell is on a critical path. The F404 delivery program calls for the first engine ex-CAC in August/September 1984. In order to meet this program, the cell should be designed, built and calibrated by the end of May 1984.

95. Work on the co-production staff office and improvements to the canopy shop will commence as soon as possible. The Department of Transport and Construction plan to have these works completed by March 1983 and November 1983 respectively.

96. Committee's Conclusions. The Committee recommends construction of the work in this reference.

RECOMMENDATIONS AND CONCLUSIONS

97. The summary of recommendations and conclusions of the Committee and the paragraph in the report to which each refers is set out below.

		Paragraph
1.	A NEW JET ENGINE TEST CELL, CAPABLE OF TESTING THE F404 JET ENGINE, IS REQUIRED AT THE COMMONWEALTH AIRCRAFT CORPORATION, FISHERMENS BEND.	45

		Paragraph
2.	A NEW BUILDING IS REQUIRED TO PROVIDE OFFICE AND CONFERENCE ACCOMMODATION AT THE COMMONWEALTH AIRCRAFT CORPORATION ESTABLISHMENT FOR THE RESIDENT GE CO-PRODUCTION TEAM.	46
3.	IMPROVEMENTS TO THE CANOPY SHOP AT THE GOVERNMENT AIRCRAFT FACTORIES, FISHERMENS BEND, ARE REQUIRED TO FACILITATE THE MANUFACTURE OF F/A-18 CANOPIES.	47
4.	THE CONTRACT FOR THE DESIGN CRITERIA OF THE JET ENGINE TEST CELL, INCLUDING THE ACOUSTIC AND AERONAUTIC DESIGN, SHOULD NOT AUTOMATICALLY BE GIVEN TO THE SUPPLIER OF SPECIALISED EQUIPMENT. SUITABLY QUALIFIED AUSTRALIANS SHOULD BE GIVEN THE OPPORTUNITY TO TENDER FOR THE WORK.	67
5.	THE COMMITTEE IS UNABLE TO ENDORSE THE DESIGN OF THE TEST CELL AT THIS STAGE AS THE DESIGN HAS NOT YET BEEN FULLY RESOLVED.	68
6.	THE DESIGN OF THE PROPOSED CO-PRODUCTION OFFICE BUILDING IS SATISFACTORY.	69
7.	THE PROPOSAL FOR UPGRADING THE CANOPY SHOP IS SATISFACTORY.	70
8.	THE SITE SELECTED FOR THE JET ENGINE TEST CELL IS SUITABLE PROVIDED THAT THE NOISE LEVELS EMANATING FROM THE TEST CELL WILL BE KEPT BELOW 70 dB(A), BEYOND A RADIUS OF 90 METRES FROM THE CELL.	83
9.	THE SITE SELECTED FOR THE CO-PRODUCTION STAFF OFFICE IS SUITABLE.	84
10.	THE SITE FOR IMPROVEMENTS TO THE CANOPY SHOP IS SUITABLE.	85

		Paragraph
11.	THE NEAR LIMIT OF COST ESTIMATE FOR THE OVERALL PROJECT WAS $5.4 MILLION AT MAY 1982 PRICES WHEN REFERRED TO THE COMMITTEE.	86
12.	THE NEAR LIMIT OF COST ESTIMATE FOR THE JET ENGINE TEST CELL IS $4,6 MILLION AT MAY 1982 PRICES.	87
13.	THE LIMIT OF COST ESTIMATE FOR THE CO-PRODUCTION STAFF OFFICE IS $200,000 AT MAY 1982 PRICES.	89
14.	THE LIMIT OF COST ESTIMATE FOR IMPROVEMENTS TO THE CANOPY SHOP IS $600,000 AT MAY 1982 PRICES.	90
15.	THE COMMITTEE RECOMMENDS THE CONSTRUCTION OF THE WORK IN THIS REFERENCE.	96

(M.R. Bungey)
Chairman

Parliamentary Standing Committee on Public Works,
Parliament House,
CANBERRA, ACT

21 October 1982.

4. The engine testing area will consist of a reinforced concrete structure with vertical primary and secondary air inlets, horizontal test area, and a horizontal detuner with vertical exhaust.

5. The air inlets and the exhaust will be acoustically treated to absorb sound energy from the engine compressor and the exhaust. In addition to providing sound attentuation, the inlet acoustic treatment will contribute toward maintaining smooth inward airflow.

6. The walls of the test cell, in the area in which the engine is to be mounted, will be fitted with acoustic panels to ensure that reflected sound energy from the engine, especially at maximum power with afterburner operating, will not damage the engine itself.

7. Mounted immediately behind the engine will be an augmenter tube which will feed the jet efflux into the exhaust system where it will be mixed with cooling air from the secondary air inlet. This will reduce the temperature of the exhaust and absorb some of the energy from the engine.

8. The plenum chamber, at the rear of the horizontal exhaust section, will change the direction of the exhaust gases into the vertical stack.

9. A service building will be constructed adjacent to the test cell with a small separation between their respective walls. Each building will stand on its own foundations to minimise the transmission of vibration to the service building.

10. The service building will include the following:

- a control room to house the test control console. The engine under test will be viewed through a window from the control room, which will be safe even under catastrophic engine failure conditions. Closed circuit television will provide the operator with a view of areas not visible through the window. The control

room will be isolated from noise and vibrations;

- an engine preparation room which will have capacity for three engines and associated support equipment, plus storage space for engine adaptors to allow the testing of three different engine types. Ready access to the test cell will be provided;
- a facilities room;
- an equipment room;
- the Aeronautical Research Laboratories' instrumentation room; and
- a fuel metering room.

11. Suitable "hard points" will be embedded in the walls of the test cell proper, to allow the future installation of pipes or other fittings without the need to penetrate concrete surfaces.

12. Underground fuel storage tanks with a capacity of 250,000 litres will be provided. They will conform with all relevant statutory regulations.

13. The testing area will be reinforced concrete to attenuate noise and to withstand forces imposed by engines under test. The design will provide for catastrophic failure conditions.

14. Internal concrete surfaces of the test cell proper, not covered by sound absorbent material, will be coated with a suitable oil and fuel resistant epoxy paint to prevent the release of concrete dust and particles under engine test conditions.

15. Non-skid treatment will be applied to the test cell floor.

16. The structural details of the testing area and service building, and materials to be used, will be determined during the final design phase.

17. *Co-Production Staff Office:* This office will be of a factory pre-built or prefabricated type with insulated steel-framed walls and roof. It will be clad externally with pre-finished steel panels and internally with plasterboard to the walls and acoustic panels to the ceiling.

18. *Improvements to Canopy Shop:* The existing canopy shop will be renovated and expanded. Features to be demolished include masonry walls, concrete floors and cold water services. The building works include new plasterboard-lined partitions and ceilings, a new floor to the acrylic bonding area, new steel grid plant platforms and new cold water supply and drainage.

19. Special Equipment and Instrumentation *Jet Engine Test Cell:* The major items of special equipment and instrumentation to be installed in the test cell and funded separately from the work in this reference, are:

- a thrust stand system, that will comprise
  - the support structure,
  - the thrust stand which will measure engine thrust, and
  - an engine adaptor which will expedite engine installation and removal;
- an elevator work platform that will be lowered during engine testing so as not to interfere with air flow;
- a test console which will house the engine controls and instrumentation displays of engine performance;
- a computer based automatic data acquisition system;
- a fuel control system;
- an air start system which will provide compressed air for engine starting; and
- an intercommunication system.

20. Engineering Services *Jet Engine Test Cell:* Packaged air conditioning will be installed in the control room and office. All areas, including the test area, will be provided with heating. All areas of the service building will be ventilated.

21. Compressed air will be supplied to the testing area, preparation room and workshop area.

22. A six tonne gantry crane will be installed in the engine preparation room to handle the engines.

23. *Co-Production Staff Office:* Packaged air conditioning will be provided in the office area. Normal exhausting will be provided in kitchen and toilet areas.

24. *Improvements to Canopy Shop:* The processes utilised in this facility require close tolerances in both room temperature and humidity. Therefore, air conditioning will be provided to all areas. The cooling system will consist of a central chiller plant with chilled water being reticulated to air handling plants serving the various zones. Heating will be provided by a steam-to-hot water calorifier with heating hot water being reticulated to the air handling plants. Steam will be supplied from the existing factory boiler.

25. Special fume exhaust booths and fume cupboards will be provided to exhaust fumes emitted in the manufacturing process.

26. Compressed air will be supplied to all work areas.

27. A new vacuum pump and vacuum reticulation will be provided to the acrylic trimming area.

28. *General:* Normal hot and cold water services will be supplied to all facilities. Where appropriate, electric boiling water units will serve kitchen areas.

29. Electricity *Jet Engine Test Cell:* Electric power will be provided to the test cell from the existing Test Cell No. 2 on the CAC site.

30. Special lighting suited to severe vibration will be fitted in the testing area. In accordance with the requirements of the relevant SAA codes, explosion proof wiring and fittings will be used in the testing area within one metre of the cell floor and in the fuel metering room. Elsewhere lighting appropriate to usage will be installed.

31. Emergency lighting will be provided to ensure safe exit of personnel in the event of a power failure.

32. General purpose power outlets will be installed in the testing area as required, and throughout the service building.

33. *Co-Production Staff Office:* Normal light and power services will be provided. Power supply will be from existing CAC reticulation.

34. *Improvements to Canopy Shop:* Additional light fittings will be installed to provide the illumination levels required in the workshops. New general purpose outlets and power supplies to mechanical plant are to be provided.

35. *General:* External security lighting will be provided to both the test cell and co-production staff office.

36. Hydraulics Water supply for both the test cell and co-production staff office will be by extension of the existing CAC reticulation. Water supply for the canopy shop will be from the existing GAF reticulation.

37. Stormwater drainage from the three facilities will be connected into the existing factory drainage systems.

38. Sewage from the three facilities will be discharged into the existing factory reticulation. Trade wastes will be treated to meet MMBW standards for discharge.

39. Roads and Car Parking Vehicular access to the test cell will be through the existing Commonwealth Aircraft Corporation establishment. Hardstanding car parking will be constructed of bitumen surfaced crushed rock pavement. Access will be provided between the test cell and factory for the transfer of the jet engines.

40. Vehicular access and parking for the co-production staff office will be provided by existing pavements.

41. Fire Protection *Jet Engine Test Cell:* The existing CAC fire service reticulation is adequate to provide the required water pressures and flows, and will be extended to the test cell.

42. An automatic sprinkler system will be installed throughout all areas except the fuel storage, conditioning and metering areas, the control room, and the test cell proper.

43. An automatic carbon dioxide system will be installed in the fuel metering room.

44. A water-fog system which can be concentrated on the engine under test will be installed. This will be operated manually from the control console.

45. An automatic Halon system will be installed in the control room.

46. All fire suppression systems will be connected to the existing alarm system installed at CAC, which is in turn connected to the Melbourne Metropolitan Fire Brigade system.

47. The nearest fire station is the Port Melbourne station, located approximately 3.5 km from the site.

48. Portable fire extinguishers and hose reels will be provided.

49. *Co-Production Staff Office:* The existing CAC fire service reticulation will also be extended to the co-production staff office. The office will also be protected by thermal alarms, and portable fire extinguishers and hose reels will be provided.

50. *Improvements to Canopy Shop:* The existing sprinkler service will be altered to suit the new layout. Portable fire extinguishers and hose reels will be provided.

51. Landscaping *Jet Engine Test Cell and Co-Production Staff Office:* Landscaping design will use native plants and will blend with existing adjacent areas. Due regard will be given to the proximity of the sites to Todd Road.

52. Environmental Considerations *Jet Engine Test Cell:* The area surrounding the proposed test cell is predominantly zoned "general industry" and much of the land to the south of the site is currently undeveloped. The nearest residential zones are approximately 1.25 km from the cell.

53. The requirements of the Environment Protection (Impact of Proposals) Act 1974 have been met and no Environmental Impact Statement is required.

54. The following internal acoustic requirements will apply under all operating conditions –

control room	- 75 dB(A) maximum
preparation room	- 75 dB(A) maximum

These levels comply with the Victorian Health Commission's "Health (Hearing Conservation) Regulations, 1978".

55. Acoustic performance will comply with maximum allowable external noise levels as determined using procedures contained in the State Environment Proection Policy - "Control of Noise from Commercial, Industrial or Trade Premises within the Melbourne Metropolitan Area".

56. Consultations are continuing with the Environment Protection Authority of Victoria to ensure compliance with their requirements.

57. The requirements of the Environment Protection Authority of Victoria with respect to exhaust emissions, stack height and exhaust gas velocity will be satisfied.

58. All liquid waste discharges will comply with MMBW and local government regulations.

59. *Improvements to Canopy Shop:* The following maximum allowable noise levels in the canopy shop will be met:

acrylic polishing area	-	75dB(A)
acrylic forming area	-	75dB(A)
acrylic trimming area	-	80dB(A)
acrylic bonding area	-	80dB(A)

These levels comply with the Victorian Health Commission's "Health (Hearing Conservation) Regulations, 1978".

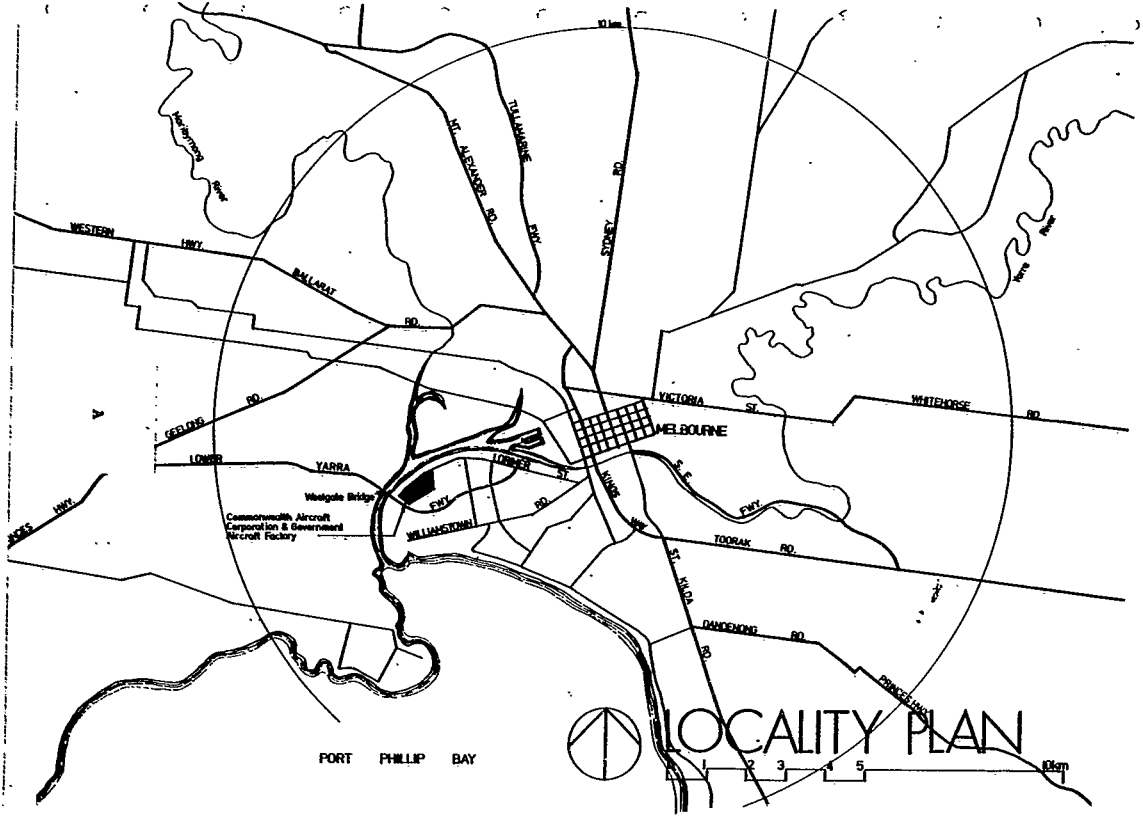
60. No special air treatment of fumes is required prior to emission.

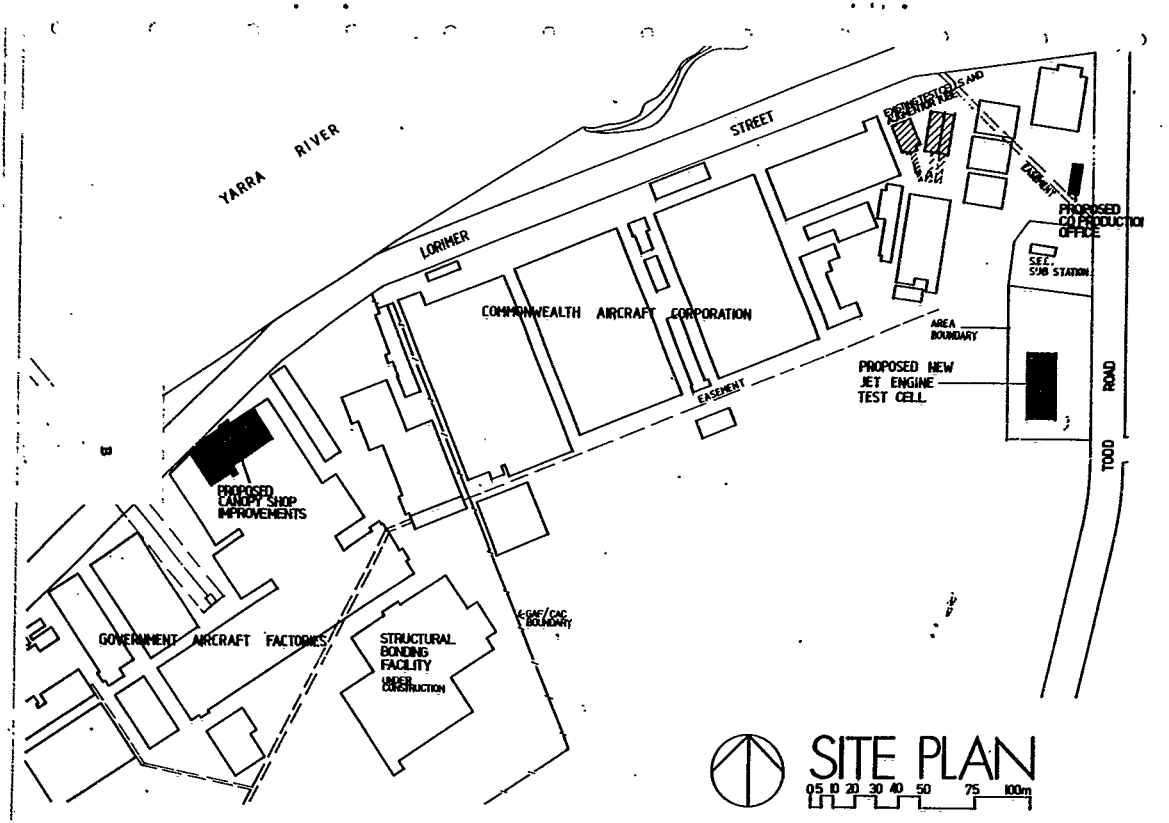
61. Liquid waste will be treated by the existing plant to meet MMBW and local government discharge requirements.

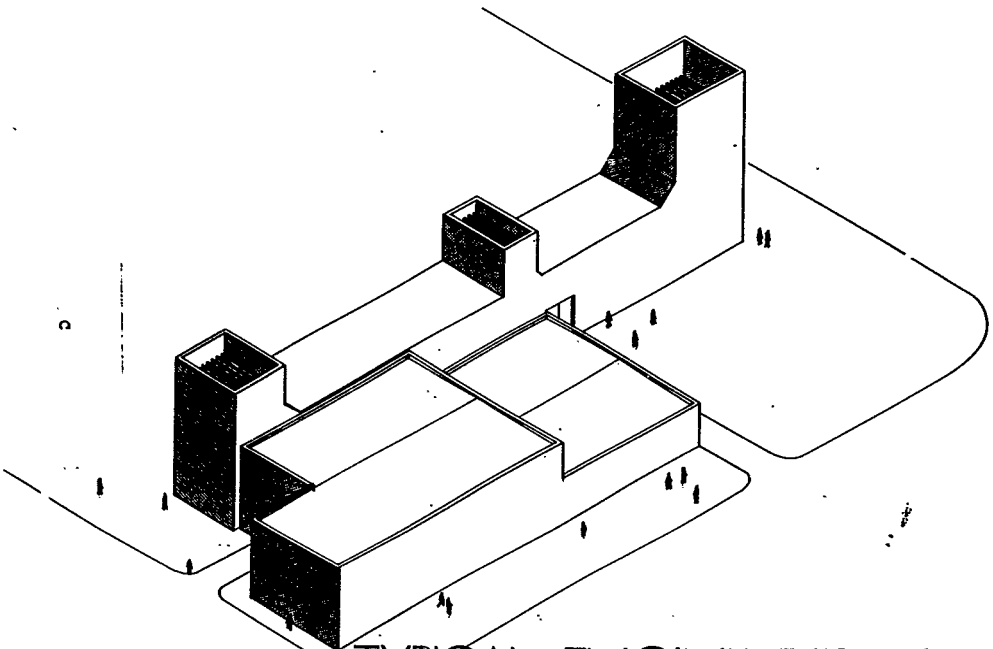
62. Regulations Buildings and services will conform where appropriate with relevant standards, codes, regulations and by-laws.

63. Liaison With Authorities *Jet Engine Test Cell:* In developing the technical brief, consultations have been held with the Environment Protection Authority of Victoria and the Port Melbourne City Council. In the final design phase further consultations will be held with these authorities together with the Melbourne and Metropolitan Board of Works and the State Electricity Commission of Victoria.

64. *Improvements to Canopy Shop:* The normal clearance for trade wastes will be arranged with the MMBW during construction.

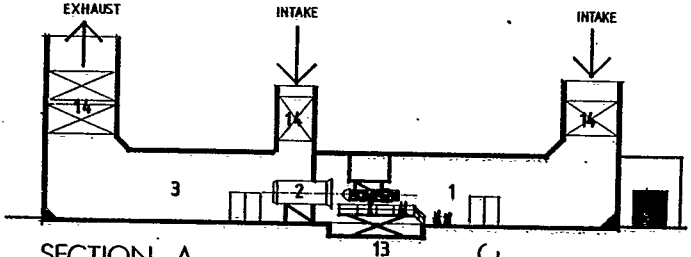

10 km
Maribyrnong River
WESTERN HWY
BALLARAT RD
GEELONG RD
LOWER YARRA
Westgate Bridge
Commonwealth Aircraft Corporation & Government Aircraft Factory
WILLIAMSTOWN
FWY
MT ALEXANDER RD
TULLAMARINE FWY
SYDNEY RD
MELBOURNE
VICTORIA ST
WHITEHORSE RD
Yarra River
LORIMER ST
KINGS WAY
S.E. FWY
TOORAK RD
ST KILDA RD
DANDENONG RD
PRINCES HWY
PORT PHILLIP BAY
LOCALITY PLAN
1 2 3 4 5 10km


YARRA RIVER
LORIMER STREET
COMMONWEALTH AIRCRAFT CORPORATION
EXISTING TEST CELL AND EXHAUST STACK
EXHAUST
PROPOSED CO PRODUCTION OFFICE
S.E.C. SUB STATION
AREA BOUNDARY
PROPOSED NEW JET ENGINE TEST CELL
EASEMENT
TODD ROAD
PROPOSED CANOPY SHOP IMPROVEMENTS
GOVERNMENT AIRCRAFT FACTORIES
STRUCTURAL BONDING FACILITY
UNDER CONSTRUCTION
G-GAF/CAC BOUNDARY
SITE PLAN
0 5 10 20 30 40 50 75 100m

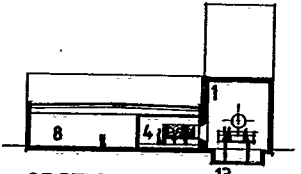


TYPICAL ENGINE TEST CELL

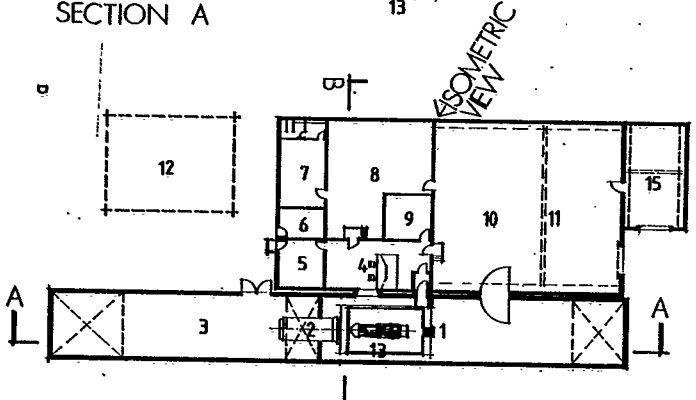
ISOMETRIC VIEW



SECTION A



SECTION B



PLAN

1 Test cell
2 Augmentor tube
3 Exhaust duct
4 Control room
5 A.R.L. Instrumentation room
6 Fuel metering
7 Staff amenities
8 Equipment room
9 Office
10 Engine preparation
11 Overhead crane
12 Underground fuel storage
13 Hydraulic work platform
14 Sound attenuators
15 A.R.L. Engine preparation

TYPICAL ENGINE TEST CELL

0 5 10 20 40m