

DEPARTMENT OF THE SENATE	
PAPER NO.	2689
DATE PRESENTED	17 NOV 1965
<i>J.R. Odgers</i>	
Chk of the Senate	

1964-65

THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

R E P O R T

relating to the proposed

EXTENSION OF 02/20 RUNWAY AND ASSOCIATED TAXIWAY WORKS

at

PERTH AIRPORT, WESTERN AUSTRALIA

## C O N T E N T S

	<u>Paragraph</u>
General	1
Existing Pavements at Perth Airport	2
The Present Reference	8
Present Airline Traffic at Perth Airport	
Internal Traffic	10
International Flights	11
Runway Requirements for International Traffic	15
Perth - Mauritius Sector	16
Perth - Singapore Sector	19
Runway Requirements	20
Other Pavement Requirements	
Pavement Width	25
Taxiway Development	27
The Perimeter Road	29
The Proposed Works	
Extension of North/South Runway	31
Stopway Pavement	34
Widening Shoulders on the Existing North/South Runway	35
Taxiway Works	36
Perimeter Road	38
Drainage	39
Construction Programme	41
Estimates of Cost	42
Recommendations and Conclusions	45

## PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

### EXTENSION OF 02/20 RUNWAY AND ASSOCIATED TAXIWAY WORKS AT PERTH AIRPORT

#### R E P O R T

By resolution on 15th September, 1965, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report, proposals to extend the 02/20 runway to 10,500 feet and associated taxiway works at Perth Airport.

The Committee have the honour to report as follows:-

#### GENERAL

1. The Committee received submissions and drawings from the Departments of Civil Aviation and Works and took evidence in Canberra from representatives of these departments and of Qantas Empire Airways Limited. A written statement by the Australian Federation of Air Pilots was also received. We visited Perth and inspected the existing airfield pavements and facilities and the areas where the proposed works are to be carried out.

#### EXISTING PAVEMENTS AT PERTH AIRPORT

2. The runway system at Perth airport comprises:-

- (a) the east/west runway, 6000 ft. long;
- (b) the north-east/south-west runway, 7150 ft. long; and
- (c) the north/south (or 02/20) runway, 7700 ft. long.

3. The east/west runway was initially constructed during World War II as a sealed pavement with 8" of gravel on a sand sub-grade and a thin bitumen surface. Except for a small section which serves as part of the taxiway between the terminal and the northern end of the 02/20 runway and which was strengthened several years ago for use by large jet aircraft, it is suitable for only relatively light aircraft of the DC.3 and Fokker Friendship types.

4. The north-east/south-west runway was also constructed during the war as a sealed runway and it was resheeted and resealed about 1950. A 300 ft. length of 12" concrete pavement was added at the south-western end in 1959. During 1963 the runway was proof rolled to compact the underlying sand and reshaped with gravel before cement stabilising the top 6" of the pavement. The whole runway was then surfaced with 1½" of bituminous concrete. The runway has instrument landing facilities to assist aircraft landing into the south-west. This is the landing direction most commonly used in conditions of bad weather.

5. The north/south or 02/20 runway was constructed between 1948 and 1950 to an initial length of 4800 ft. and a width of 150 ft. That pavement comprised 10" of gravel surfaced with a ½" thick bituminous seal coat. After the submission to the Committee in 1960, the runway was extended at the southern end to 7500 ft. with a 200 ft. over-run of full runway strength. The extension was constructed with a pavement of 10" of fine crushed rock surfaced with 1" of bituminous concrete. Early in 1963 the original 4800 ft. section of gravel runway was treated in a similar manner to the north-east/south-west runway and surfaced with about 1½" of bituminous concrete. This is the main take-off runway for large jet aircraft operating at Perth.

6. Both the existing north/south and north-east/south-west runways can be used by aircraft of the Boeing 707 type with all-up weights up to 335,000 lbs.

7. The taxiway system was first developed during the war with the construction of 50 ft. wide taxiways having a sealed gravel pavement of about 9". Following the 1960 submission to the Committee, the taxiway from the apron connecting with the northern end of the north/south runway and of the north-east/south-west runway were widened to 75 ft. and strengthened and they are now of comparable strength with the two main runways.

THE PRESENT REFERENCE

8. The works in this reference include:-
- (a) extension of the north-south runway by 2600 ft. at the southern end to 10,300 ft.;
  - (b) provision of a 200 ft. stopway pavement at the southern end of the proposed runway extension;
  - (c) widening the shoulders along both sides of the existing north/south runway from 8 ft. to 25 ft.;
  - (d) strengthening and widening to 75 ft. the taxiway interconnecting the north/south and north-east/south-west runways in the south-west sector;
  - (e) construction of an additional 75 ft. wide taxiway from the main terminal apron to the north-east/south-west runway in the south-west sector; and
  - (f) provision of a temporary perimeter road around the southern end of the proposed runway extension.

9. The runway and taxiway pavements are to be designed for use by civil jet aircraft with all-up weights up to 335,000 lbs.

PRESENT AIRLINE TRAFFIC AT PERTH AIRPORT

10. Internal Traffic The domestic traffic at Perth airport involves the operation of aircraft up to the size and weight of the Boeing 727 and the existing runways can handle these at full payload on direct flights to Sydney and Melbourne.

11. International Flights Qantas Empire Airways at present operates a weekly return service with Electra aircraft from Sydney to Johannesburg through Melbourne, Perth, Cocos Island and Mauritius. It also operates a twice weekly return service from Sydney through Perth and Singapore to London, at present using Boeing 707 - 138B aircraft.

12. South African Airways operates a weekly return service between Perth and Johannesburg using Douglas DC,7B and Lockheed Constellation aircraft.

13. The only other commercial international service through Perth is that operated by Air India on a once weekly return basis from Bombay to Nadi through Madras, Singapore, Perth and Sydney using a Boeing 707 - 420.

14. Although the international flights involve, at this stage, a total of only 16 aircraft movements per week, the traffic is growing at a rate well in excess of ten per cent per annum. The following figures show the growth in international passenger traffic through Perth since 1960.

<u>Year</u>	<u>Passengers</u>
1960	7,415
1961	7,993
1962	10,015
1963	13,462
1964	16,106
1965	18,000/20,000 (estimate)

RUNWAY REQUIREMENTS FOR INTERNATIONAL TRAFFIC

15. The stage lengths of international flights from Perth are -
- |                            |                     |
|----------------------------|---------------------|
| Perth - Sydney             | 2,067 statute miles |
| Perth - Melbourne          | 1,771 " "           |
| Perth - Cocos Island       | 1,840 " "           |
| Perth - Mauritius          | 3,654 " "           |
| Perth - Djakarta           | 2,047 " "           |
| Perth - Singapore (direct) | 2,491 " "           |

16. Perth - Mauritius Sector The present services to South Africa are flown by the turbo-prop Electra of Qantas and the piston-engined Douglas DC.7B and Lockheed Constellation of South African Airways. Both operators wish to use jet aircraft on this route but the aerodrome at Cocos Island is not suitable for them and until recently the aerodrome at Mauritius could not handle them. The latter has now been developed with a runway strength and length for

large jet aircraft and this makes possible direct flights from Perth to Mauritius and return. The by-passing of Cocos Island would mean the avoidance of a stop which is required mainly for refuelling, as well as a reduction in the route mileage between Perth and Johannesburg of 853 miles.

17. Cocos Island will continue to be an important stopping place for flights north-westwards from Perth including the charter flights between Great Britain and the Department of Supply installations in South Australia at present operated with Britannia aircraft.

18. Qantas Empire Airways propose to commence jet operations on the South African service with the Boeing 707 - 138B aircraft, changing later to the larger Boeing 707 - 338C. South African Airways plan to use Boeing 707 - 320 and Boeing 707 - 344 aircraft, both of which are a little smaller than the 707 - 338C.

19. Perth - Singapore Sector The other important stage is from Perth to Singapore. Qantas now operate Boeing 707 - 138B and plan to use Boeing 707 - 338C aircraft on this route. Air India use Boeing 707 - 420 aircraft. Although the distance from Perth to Singapore direct is 2491 miles, consideration has been given to the situation that would arise if air space north of Australia became unavailable to operators wishing to serve Singapore from Australia. The estimated distance from Perth to Singapore using a circuitous route is 4220 miles.

20. Runway Requirements Even though the Perth to Mauritius sector is 3654 miles, compared with 4220 miles to Singapore on the by-pass route, it is the more critical of the two. This is due to the severity of the in-flight head winds usually experienced on the westward flight to Mauritius and because it is necessary to carry large fuel reserves owing to the lack of an alternative aerodrome to Mauritius.

21. We were told that if the operational length of the main runway at Perth was increased to 10,500 ft. the larger type Boeing

jets could fly with full payload from Perth to Singapore on the by-pass route and to Mauritius with an almost full payload in the most adverse conditions of in-flight head winds and temperature. A runway of this length would meet the needs of those operators at present using Perth and those who might expect to use it in the future.

22. The proposed length of the runway is 10,300 ft. with a 200 ft. length of stopway or undershoot area at the southern end. This would be of the same strength as the main pavement so that it would become part of the runway if the runway was again extended.

23. The existing north/south runway is strong enough to take the large civil jet aircraft now in use at their maximum all-up weights and the new pavement will be designed to the same strength.

24. The Committee recommend that the 02/20 runway at Perth Airport be extended to 10,500 ft.

#### OTHER PAVEMENT REQUIREMENTS

25. Pavement Width It is proposed to construct the extension of the 02/20 runway to the same width as the existing runway, viz. 150 ft., and the shoulders on each side 25 ft. wide to fully conform to the standards and recommendations of the International Civil Aviation Organisation for runways used by large jet aircraft.

26. The shoulders to the existing pavement are only 8 ft. wide and as such meet only the minimum requirements of the Organisation. As the airport is now being used increasingly by jet traffic, it is proposed to widen the shoulders of the existing runway to 25 ft. so that the recommended requirements will be met.

27. Taxiway Development As the size of aircraft has increased, it has been necessary from time to time to strengthen and widen some of the taxiways originally constructed at Perth Airport. The present reference includes the strengthening and widening of a taxiway leading from the north/south runway towards the apron and the construction of a new taxiway 1280 ft. long so that heavy jet aircraft



will have direct access from the north/south runway across the north-east/south-west runway to the southern side of the apron. When this work is completed, both taxiways will be 75 ft. wide and of a strength suitable for the expected jet aircraft. Construction to these standards is normal for an airport of this type and the aircraft operating thereon.

28. Consideration has also been given to the development of parallel taxiways at the airport, particularly adjacent to the southern part of the north/south runway. It has been concluded, because of the existing pattern of aircraft movement on the ground, and the relatively spasmodic use made of the runway system, that the construction of parallel runways is not warranted at this stage. However, the pavement layout has been planned so that parallel taxiways can be added when the increase in traffic makes this necessary. At present the efficiency of the airport is not impaired because of the deferment of this work.

29. The Perimeter Road The extension of the north/south runway will cut the existing sealed perimeter road which skirts the airport movement area and gives surface access to navigational aids and the instrument landing system. The only instrument landing system at Perth Airport serves the north-east/south-west runway but the Committee were told that it was planned to eventually install a system to serve the north/south runway. Because at this stage the sites for the localiser, the glide path equipment and the associated prepared ground areas for the future system have not been chosen, the perimeter road around the southern end of the north/south runway cannot yet be constructed on its new and permanent alignment. A temporary unsealed gravel road only is therefore proposed at this stage.

30. The Committee recommends the widening of the shoulders on the existing 02/20 runway, the proposed taxiway works and the construction of the gravel perimeter road.

THE PROPOSED WORKS

31. Extension of North/South Runway The runway extension is to be constructed across generally low lying ground to a sand ridge which forms a natural levee bank between the airfield pavements and the Five Mile Swamp. The extension will be constructed on a uniform grade from the end of the existing runway to a level at the southern end which will avoid bridging the natural levee. It will involve about 80,000 cubic yards of cut to fill earth works.

32. The 150 ft. wide runway extension will consist of 10" of fine crushed rock surfaced with 1" of bituminous concrete. The 25 ft. wide shoulders will be constructed of 6" of bitumen sealed gravel. The runway strip will be prepared to a 600 ft. width and grassed.

33. As parallel taxiways are not proposed at this stage, aircraft will at times need to taxi south along the runway and turn on the southern end of the proposed extension. To permit this the runway pavement will be widened to 200 ft. over the end 200 ft. section.

34. Stopway Pavement The 200 ft. stopway pavement which is proposed immediately beyond the widened runway end will be of the same construction as the runway extension and have 25 ft. wide sealed gravel shoulders.

35. Widening Shoulders on the Existing North/South Runway The shoulders of the existing runway are to be widened to 25 ft. with a 6" sealed gravel pavement similar to that proposed for the shoulders on the runway extension.

36. Taxiway Works The proposed new taxiway linking the existing terminal apron with the north-east/south-west runway will be approximately 1280 ft. long and 75 ft. wide. It will have 8 ft. sealed gravel shoulders on either side. The pavement and shoulders will be of the same construction and thickness as the runway extension.

37. The taxiway to be strengthened and widened is now only 50 ft. wide and its 8" sealed gravel pavement is not strong enough for the proposed aircraft operations. The proposal is to replace the gravel with 10" of fine crushed rock to be surfaced with 1" of bituminous concrete. The widening will take place at the same time and be of the same construction.

38. Perimeter Road The extension of the perimeter road will be an unsealed gravel pavement 12 ft. wide.

39. Drainage The existing aerodrome drainage system will be adequate to discharge stormwater from the proposed runway and taxi-way works. Run-off from the east will be collected by the eastern perimeter drains and from the west by the western perimeter drain.

40. The Metropolitan Water Supply, Sewerage and Drainage Board proposes to drain the Kalamunda Creek area and the Five Mile Swamp and it appears that the most satisfactory method of achieving this will be to use the western perimeter drain through the airport. The Five Mile Swamp is to be used as a compensating drain for the Kalamunda Creek area and it will be drained by piping the water through the southern end of the airport area into a new open drain connecting with the western perimeter drain. The enlargement of the western perimeter drain will be necessary to carry the extra flow of water to the airport boundary. The Commonwealth can expect some benefit from these works but the actual extent of the Commonwealth contribution towards the cost has not yet been determined. The Committee noted that pending a decision on the Commonwealth contribution, the estimates of cost for the current reference include £20,000 for drainage improvements to be carried out in conjunction with the Board.

#### CONSTRUCTION PROGRAMME

41. The runway extension works are planned for completion in 1000 ft. stage lengths with the first stage to be completed four months after construction commences and the remaining stages eight and 11 months respectively after commencement. The other works will be carried out concurrently with the runway extension. All works are expected to be completed within 12 months of work starting.

ESTIMATES OF COST

42. The estimated cost of the work in this reference is £440,000 as follows:

Runway Extension:		
Earthworks, drainage, grassing	£100,000	
Runway pavement - 2600 ft. length with 25 ft. shoulders	£183,000	
Stopway pavement	£12,000	
Perimeter road connection	<u>£5,000</u>	£300,000
Widening of shoulders on existing 02/20 Runway		£25,000
New taxiway from terminal apron to the north-east/south-west runway		£65,000
Widening and strengthening of Taxiway E		<u>£50,000</u>
	TOTAL	<u>£440,000</u>

43. The Committee received additional written information comparing the estimated cost of the proposed runway extensions in this reference with the actual cost of similar pavements at present being built at Tullamarine Airport in Melbourne. For both pavements the cost is about £100 per foot. In each case the pavement comprises about 10" of fine crushed rock sealed with a coat of bituminous concrete. At Perth this is founded substantially on naturally occurring sand or in some minor areas on sand filling cut from immediately adjacent areas within the airport. However, at Tullamarine the pavement is based on about four feet of selected non-expansive material for which excoavation took place.


44. Although in the Tullamarine work the size of the project and highly competitive tendering resulted in most favourable costs, the Committee were concerned that the estimated cost of extending the Perth runway is comparable considering the nature of the construction involved. The Committee therefore recommend that the estimated cost of the runway extension be re-examined in the light of relative costs at Tullamarine.

11.

RECOMMENDATIONS AND CONCLUSIONS

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

	<u>Paragraph</u>
1. THE COMMITTEE RECOMMEND THAT THE 02/20 RUNWAY AT PERUH AIRPORT BE EXTENDED TO 10,500 FT.	24
2. THE WIDENING OF THE SHOULDERS OF THE EXISTING 02/20 RUNWAY, THE TAXIWAY WORKS, AND THE CONSTRUCTION OF THE GRAVEL PERIMETER ROAD PROPOSED ARE RECOMMENDED.	30
3. THE ESTIMATES OF COST FOR THE PRESENT REFERENCE INCLUDE £20,000 FOR DRAINAGE IMPROVEMENTS TO BE CARRIED OUT IN CONJUNCTION WITH THE METROPOLITAN WATER SUPPLY, SEWERAGE AND DRAINAGE BOARD.	40
4. THE ESTIMATED COST OF THE PROPOSED WORK IS £440,000.	42
5. THE ESTIMATED COST OF THE RUNWAY EXTENSIONS SHOULD BE RE-EXAMINED IN THE LIGHT OF RELATIVE COSTS AT TULLAMARINE.	44

  
W. J. Brimblecombe  
Chairman

Parliamentary Standing Committee  
on Public Works,  
Parliament House,  
Canberra, A.C.T.

11th November, 1965.