Port Pirie Airport

Scoping Study For 50 Seat Aircraft Operations

January 2012

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Port Pirie Regional Council

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Executive Summary

The following study examines the possible introduction of 50 seat aircraft into Port Pirie Aerodrome for fly-in fly out operations to service the mining industry.

Currently 50 seat Fokker F50 aircraft operate to in South Australia to Olympic Dam and Prominent Hill. Other aircraft used in mining fly-in fly-out operations include the Saab 340 (34 seats) to Jacinth Ambrosia, Beech1900 and Metro 23, (both 18 seats) to Prominent Hill and Challenger. All these above aircraft can operate into gravelled runways.

To access remote mine sites, a runway length of between 1500m and 1800m is needed. The length is derived largely by the fuel load required to reach the destination and also the ambient temperature, pressure and wind speed during takeoff. At this stage the destination is unknown so an accurate length cannot be determined.

The study found the low cost option was to upgrade the 17/35 gravelled runway to F50 standard for daytime use. This 1069m runway is slightly better aligned for wind compared to the 08/26 sealed runway. A slight downside is that aircraft will be taking off and landing over areas north of runway17/35 containing a small number of dwellings and may have future residential growth. However the potential low number of aircraft movements; possibly no more than 2 landings and departures a day, is unlikely to cause a disruption to residences and would fall well below the accepted noise level criteria adopted in the Australian Standard AS 2021 *Acoustics - Aircraft noise intrusion - Building Siting and Construction*.

In contrast operations off an extended 08/26 sealed runway is over land set aside for general farming, although there are a number of significant cost implications in the development of this facility. As the runway is lit for night use and has published procedures for non-precision instrument (GPS) approaches, any extension from an existing length of 1043m requires complete replacement and upgrading of the existing runway lighting and re-drafting of the published instrument approach. The runway would need to be widened from 18m to 30m (the widening could be gravelled only) and the extension would also need to be sealed at least for the central 18m.

In terms of other infrastructure, new security regulations from July 2012 apply to aerodromes with Regular Public Transport or open charter passenger services. Aerodromes serviced by aircraft above 20,000 kg (the F50 is 20,820kg) will require full passenger and baggage screening. For closed charter such as fly-in fly-out, where seats are not available to the public, the Office of Transport Security has been silent so far on policy or particular requirements. Previously it appeared that full security screening was likely to apply to closed charter aircraft above 20,000kg and possibly be required from July 2014 onwards. That inference is no longer in place. The rules applicable to closed charter are currently not defined. If security provisions do not apply, use of the existing passenger terminal would suffice for fly-in fly-out closed charter operations for the time being. If full security regulations come into force as per open charter, a new secured departure lounge, passenger and baggage screening areas and associated equipment etc is needed at a likely to cost in excess of $2.5M. Staffing of such facilities also carries additional and significant operating costs.

Due to unknown future regulations, the low cost option of developing the 17/35 runway with no associated terminal development, would appear to be the best strategy, at least in the short term, once the need for 50 seat aircraft operations is established.

Contents

1. Introduction

The following study examines the development required at Port Pirie Airport to support fly in fly out operations by 50 seat aircraft to serve the South Australian mining industry.

50 seat aircraft currently used in South Australia for this purpose include the Fokker F50 turbo prop aircraft which have a maximum all up weight of 20,820 kg. These aircraft are capable of operations off gravelled runways and are currently serving mine sites at Prominent Hill and Olympic Dam.

Other aircraft of this size include the Bombardier Q 100/200 (37 seats) and Q300 (50 seat) series aircraft (previously known as Dash 8). Depending on the operator, some operate from gravel runways. There are none of these aircraft currently in use in South Australia. The Q400 (70 seats) is not included in this study.

Smaller turbo prop aircraft serving the mines include the Saab 340 (34 seats) Beech 1900 (19 seats) and Metro 3 / Metro 23 (19 seats).

For this study the F50 is used as the critical aircraft so that facilities catering for the F50 will also be suitable for all other aircraft listed above.

2. Runway Alignment

Wind rose data supplied from *Bureau of Meteorology* is included at Appendix A.
The data recorded is over a 5 year period collated for the 9AM and 3PM for each month of the year.

The data shows the strongest winds are predominantly from the south during summer mornings, tending to south-westerly in the afternoons. These winds continue through March and April.

For the remainder of the year there are few occasions of winds above 30 km/h occurring during the mornings. Winds increase during the afternoons with stronger northerly's occurring from June through October and again the wind strength increases during the afternoons.

Stronger south to south westerly's occur from September onwards.

Overall the data does not indicate the occurrence of regular high winds that are likely to disadvantage commercial aircraft.

The allowable cross wind component for the F50 aircraft is in the order of 30-35 knots (55-65 km/h). The BoM data indicates such wind strengths would be rare. The optimum runway alignment for light aircraft with low cross wind tolerance would be north south to north northeast south southwest. For the F50 the runway orientation at Port Pirie is less critical to a point where development of either of the existing 17/35 or 08/26 runways would be a suitable option. Extension of the 03/21 runway is not considered option due to lack of existing infrastructure and the absence of any benefit in terms of wind direction.

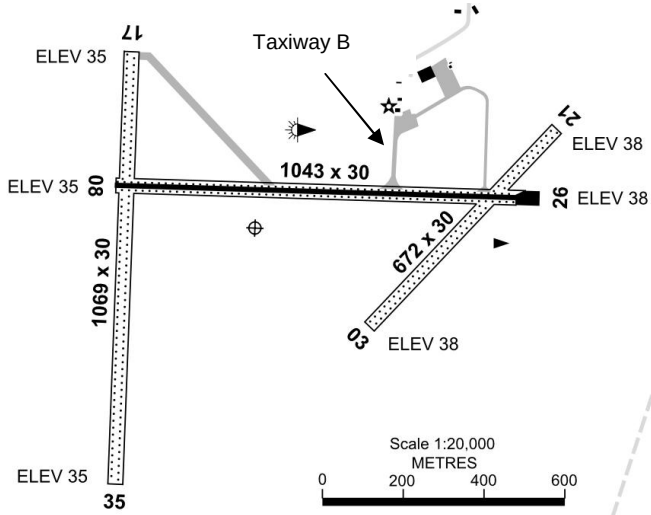


Diagram showing the existing 3 runway layout at Port Pirie.

3. Runway Length

The runway length required depends on a range of variables including aircraft type and model, flying stage route length and subsequent fuel load including holding requirement, passenger and freight payload, atmospheric temperature and pressure, wind speed and direction, and obstacle clearance[1].

[1]*Regular Public Transport / air transport aircraft are required under Civil Aviation Order CAO 20.7.1.b to maintain 35ft terrain clearance throughout the various phases of climb with one engine inoperative.;*

Without a critical or target destination from Port Pirie, it is not possible to fix a runway length requirement. Prominent Hill is an example of a mining aerodrome using an F50 with a runway length 1800m and operating direct flights to Adelaide over a distance of 1200km as the crow flies. With provision of additional clearway* it is likely a length of 1800m would reach most destinations within SA. Some payload limitation may occur on longer hauls once air temperatures rise above 34 degrees Celsius.

**Clearway - a defined area at the end of the take-off run available on the ground or water suitable area over which an aeroplane may make a portion of its initial climb to a specified height.*

The Port Pirie Development Plan March 2011 identified future planning of areas under the flight paths of the exiting runways. Land beyond the east, west of 08/26 and south of the 17/35 runway are made up of general farming and should remain clear of any developments likely to be affected by aircraft operations. Issues may arise if the form of farming changes to include forestry or other activities where tall vegetation or structures are involved close to the airport boundary. An increase in the approach and take off grades to an extended runway is likely to limit the ability of the runway to support larger aircraft.

Housing has been developed 1000m north of the 17/35 runway approximately 130m east of the extended runway centreline. Port Pirie Zone MAP PtPi/12 shows Rural Living[2] 595m from the runway end 190m east of the extended runway centreline.

The plan also shows RuDu (Rural Deferred Urban)[3] 1540m north of the runway and extends either side of the extended runway centreline.

[2]*Rural living*
This zone should accommodate no more than one dwelling per allotment, together with low intensity rural activities that are ancillary to the residential use of land and do not impair the pleasant semi-rural/residential character of the zone or locality.

[3]*Deferred urban*
This zone is ideally located to accommodate future residential growth. However, until the land is required for residential purposes, it should continue to be used for farming purposes.

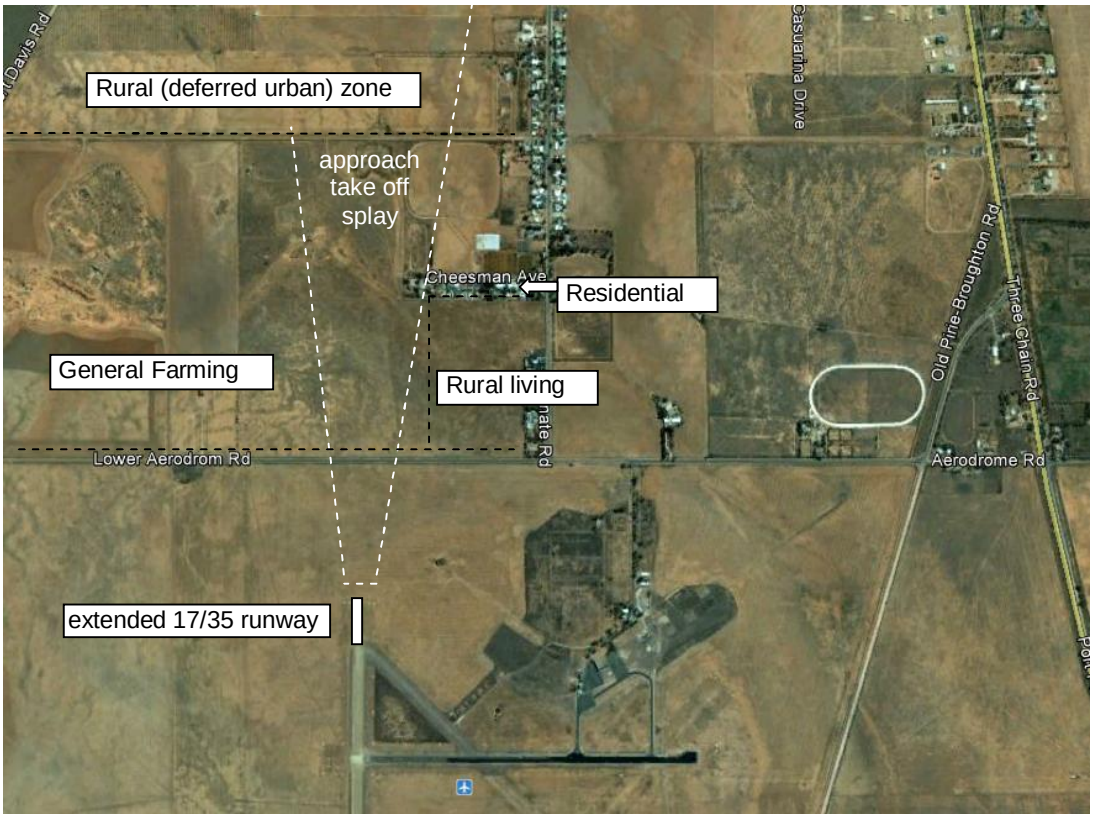
The existing east-west 08/26 sealed runway is 1043m in length. Additional land is available for extending the runway in both directions. Allowing for 60m of clearway and an additional 60m for obstacle clearance over perimeter fencing, the runway can be extended approximately 410m to the west and 250m to the east, giving a total length of around 1700m.

There are no terrain issues off either end of the 08/26 runway. Hills to the east are beyond the extent of the approach and take off clearance surfaces as prescribed for F50 and larger aircraft. Instrument approach procedures published by Airservices Australia for landing to the west commence 15 nautical miles (27.8km) east of the runway and provide terrain clearance over the ranges for a standard 3 degree approach slope. Shifting the runway 250m to the east will require adjustment to the published procedure but will not adversely affect the ability of aircraft to land or take off from the runway. Take off to the west is clear.

The existing north south 17/35 gravel runway is 1069m long. There is 540m of land available to the perimeter fence at the northern end and 390m to the south. Extensions to the north are complicated by the presence of houses approximately 1000m from the runway end on the eastern side of the approach take off area. In addition there is potential for deferred development of housing some 1500m north of the present runway end as shown in the Port Pirie Development Plan March 2011 MAP PtPi/12. For the purpose of this exercise it is assumed the 17/35 runway could be extended 360m to north for take-off in that direction and 270m to the south giving a potential length for takeoff of 1700m in either direction. Note the 270m extension to the south allows for 60m of clearway from the runway to the runway strip end and an additional 60m from the strip to then perimeter fence (270+60+60 = 390m).

The landing threshold for landing from the north need only be extended 160m to the north to give a landing length of 1500m which is satisfactory for the design aircraft. Take off length is more critical. The reason for this configuration is that keeping the landing threshold further from residences decreases the noise levels. In contrast extending the runway end to the north makes no difference to noise levels during takeoff which are measured from the start of the takeoff run. Refer tables in Section 11 of this Report

The Port Pirie Development Plan March 2011 shows general farming in all directions along the extended centrelines of the 08/26 and 17/35 runways. Refer MAP PtPi/3, 12, 13, 14, and 23.



Plan showing a possible 150m runway extension of the 17/35 to the north and the location of existing and possible future housing.

Housing within close proximity to aircraft flight allows potential for possible noise complaints. Noise aspects are covered in Part 8 of this report.

4. Runway Strength

Both the 08/26 and 17/35 runway are unrated. Gravel runways are also subject to variation in strength with change in moisture condition and are liable to lose strength when overly wet, particularly if the structure or sub-grade has a high clay component.

Geotechnical data is needed to determine whether either runway is suitable for sustained F50 operations. The data is also needed for the design of any new extension and analysis of the taxiway and apron pavements.

Geotechnical testing needed to validate F50 capability would include:

- Establishment of pavement structure layer thickness above the sub-grade.
- Particle size distribution of the base, sub-base and sub-grade materials.
- Atterberg properties - Liquid Limit, Plastic Limit, Plasticity Index of the base, sub-base and sub-grade materials.
- Determination of in-situ moisture content and material density.
- Evaluation of base, sub-base and subgrade material Californian Bearing Ratio (CBR).
- Testing would also be needed for apron and taxiway(s).

The pavement design profile will depend on sub-grade design condition. A previous report by Andrew Forte had geotechnical samples taken at 2 locations on the 08/26 runway. The samples were tested in Mid North Materials Laboratory on 20th December 1999. Laboratory tests gave subgrade 2 Californian Bearing Ratio (CBR) results for the brown silty clay subgrade of 4 and 8 for a 4 - day soaked test. A pavement thickness of varying from 500mm for the CBR 4 subgrade reducing to 312mm for the CBR 8 subgrade would be needed to support regular F50 operations. Further testing of the 08/26 pavement is needed to confirm suitability under F50 loads.

With reasonable drainage the low subgrade value may be avoided thus reducing the depth of pavement needed. Additional testing over a wider area to gain a proper appreciation of the likely in service subgrade condition is needed.

The decision to seal the runway is largely an economic consideration. A sealed surface will provide all-weather performance and will not require ongoing maintenance needed to maintain the surface in a relatively firm and tightly bound condition as is the case with a gravel pavement. However the F50 can operate of an unsealed pavement albeit with some operational penalty due to reduced breaking performance. In the case of the 08/26 runway it would be logical to include sealing any pavement extension as part of the new works.

5. Runway and Runway Strip Width

F50 aircraft Reference Code 3C as applied by CASA and detailed their Manual of Standards Part 139 – Aerodromes. The Reference Code relates the characteristics of aerodrome facilities to specifications that are suitable for use by aeroplanes of that particular reference code.

Code 3C aircraft require 30m wide runways. The 08/26 runway is 30m wide comprising an 18m sealed central portion with the outer areas gravel. The 17/35 runway is gravelled to a width of 30m.

F50 aircraft can operate off gravel runways although with some operational penalty based on reduced braking performance compared to a sealed surface. In the case of the 08/26 runway, this would be treated as unpaved for performance calculations, unless the sealed with was increased to 30m in width.

CASA requires 90m wide runway strip for Code 3C non-instrument runways and 150m for non-precision instrument approach (NPA) runways (i.e. GPS NPA is already in place for runway 08/26). Where it is not practicable to provide the full 150m width of runway strip, a minimum 90m wide graded only strip may be provided where the runway is used by up to and including Code 3 aeroplanes, subject to adjustment to the minimum decent altitude allowed under instrument conditions.

CASA have previously accepted 150m runway strip comprising 90m graded with 30m flyovers cleared either side for Code 3 aircraft. Flyovers need only to be clear of above ground obstructions and would be readily obtainable for both the 08/26 and the 17/35 runways.

The takeoff areas are to be clear to a width of 180m with splays of 12.5% either side for night operations. This could readily be achieved at Port Pirie off all ends of both the 08/26 and 17/35 runways.

6. Taxiways and Apron

The minimum allowable taxiway width for F50 aircraft is 15m, with a surrounding taxiway strip graded to 25m and cleared of objects to 52m in total width. Aircraft must maintain 3m wheel to edge of pavement clearance during taxying manoeuvres. This clearance should also be maintained during parking manoeuvres on the apron.

Currently Taxiway B from runway 08/26 to the central apron is approximately 9m wide over the bituminous seal. Widening is therefore needed. For operation off the 17/35 it is assumed the most economic arrangement would be taxi via the west end of runway 08/26 and then via Taxiway B to the apron. (*Refer diagram on Page 5 of this Report*).

The central apron is quadrilateral in shape with the approximate dimensions of 55m x 33m. The available area can accommodate a single F50 aircraft. During periods of F50 parking, the main apron would be closed to other aircraft. The sealed taxiway to the grassed parking area would also be closed, as the F50 would block access across the apron. Aircraft requiring access to the grassed parking area would need to taxi via the eastern sealed taxiway and apron.

Testing of Taxiway B and the sealed apron pavements is needed to confirm suitability under F50 loads.

7. Airport Lighting

The existing airport lighting would have complied with the regulations in place at the time of installation. The current longitudinal light spacing on runway 08/26 is 90m which remains satisfactory for non-instrument runways. Now equipped with a non-precision instrument approach, the required spacing is 60m. The new standard only needs to be introduced where the runway is upgraded, such as with a runway extension, or there is a change in use of the facility from one aircraft code to a higher code. Both runways are currently listed in the Airservices Australia Enroute Supplement (Australia) Runway Distance Supplement (RDS) as Code 2; the F 50 is Code 3.

Extending the 08/26 runway would involve replacement and upgrading of the existing runway edge lights, even in the case where F50 operations are limited to daytime use only.

Similarly the 08/26 runway end / threshold lights do not comply with the new standards which require additional lights and higher candela output.

Alternatively if 17/35 runway was to be upgraded and runway 08/26 was used as a taxiway only, the existing 08/26 lighting could be retained.

Widening of Taxiway B would involve replacement and upgrading the lighting layout to match the increase in pavement width and to conform to the new CASA standards which require a reduced longitudinal spacing between lights.

Apron floodlighting would also need upgrading to meet compliance for uniformity of coverage of the area of pavement used by the larger aircraft. The existing apron floodlighting could remain in the case where F50 operations are conducted during daylight hours only.

The existing 08/26 runway has a single illuminated wind indicator centrally located on the north side of the runway and a secondary sock at the eastern end south of the runway. Current standards for a NPA runway require a wind indicator at each end of the runway

MOS 9.6.1.2 states *"If a WDI is provided in the vicinity of a runway threshold to provide surface wind information for pilots engaged in instrument straight-in approach and landing operations, and such operations are to be conducted at night, then the wind direction indicator is to be lit."*

The standard location is for a wind indicator is 100m upwind from each threshold on the left hand side as viewed by a pilot on approach. For daytime use an unlit wind indicator position 100m from each threshold would suffice. This would apply to both the 08/26 and 17/35 runways.

8. Fuel

The airport currently has aviation gasoline (AVGAS) fuel located adjacent to the eastern apron. The storage comprising an above ground storage tank and bowser in addition to drum fuel, caters for small piston engined aircraft.

Jet fuel used by F50 aircraft is currently not available. If Port Pirie was to become a hub for future fly in fly out operations, aviation jet fuel would be needed.

There are 3 common methods of fuel storage / delivery. A summary of the types of installations found at airports is given below:

Fuel Facility Type	Advantages	Disadvantages
Remote storage tanks feeding to underground hydrants	Can deliver high flow rates and large volumes as required by large jets. Refuelling causes minimal disruption to other apron activities	Costly infrastructure normally associated with large jet airport and fixed parking positions (aerobridges). Changes in parking configuration requires costly rearrangement of hydrants
Storage tanks with refuelling tanker delivery to aircraft.	Fully flexible arrangement. Larger tankers are suitable for large jets. Smaller tankers appropriate for smaller aircraft such as F50	Results in additional traffic on apron and possible congestion. High operating costs of vehicles and drivers etc.
Tank storage adjacent to landside airside barrier with bowser and hose reel delivery	Least capital and operating costs compared to alternatives listed above	Hose length limited to 30m so only one aircraft can be accommodated from a single bowser unless an island arrangement was installed. Low pressure fitting not suitable for larger aircraft. Suitable for F50 size aircraft and below

A possible location for new aviation jet fuel storage facility would be adjacent to the eastern apron which would also allow access by general aviation jet and turbine aircraft including helicopters. As this location is remote from the likely F50 parking position, delivery of fuel via mobile tanker vehicle would be necessary.

Alternatively a tank and hose reel could be installed next to the western apron. Possible options are (a) on the western side or (b) on the southeast side of the apron.

9. Navigational Aids

Provision of an instrument approach allows an aircraft to descend to a lower minimum altitude during periods of reduced visibility before making visual contact with the airport.

Non-Precision Approaches (NPA)'s include non-directional beacon (NDB) and GPS RNAV approaches. All Regular Public Transport (RPT) aerodromes have these. Some registered aerodromes such as Wudinna and Renmark also have NPAs.

Port Pirie currently has published GPS RNAV non-precision approaches for both ends of runway 08/26. For the introduction of F50 services it is not mandatory to have instrument procedures in place. However they are considered desirable as they increase the ability of aircraft to land in periods of poor weather. Higher levels of instrument approach procedures such as VOR, radar and precision approach instrument landing system (ILS) are normally found only at capital city and large regional airports serving jet aircraft.

There is no requirement to upgrade the current GPS procedures for runway 08/26 for F50 aircraft unless the runway ends are moved as part of an extension. This will require adjustment to the published procedure and re-flight testing. In the case of runway 17/35 which does not have an instrument approach, there is no requirement to install a new procedure, although for regular use, a GPS approach would be seen as desirable by the aircraft operator

10. Passenger Terminal

From July 2012, new aviation security regulations require open charter and regular passenger services by aircraft above 20,000kg to be screened.

For this category of airport, screening of passengers involves using a hand wand or walk through metal detector and random and continuous explosive trace detection procedures. Screening of carry-on bags will be undertaken by visual inspection and random and continuous explosive trace detection procedures.

Screening of checked bags will be undertaken by 100% explosive trace detection testing.
Checked bags screened in this manner will be required to be screened by checked bag x-ray at the first available point before transhipment.

For fly in fly out operations to mining sites involving a closed charter, the Office of Transport Security (OTS) regulations have not been finalised. Previously July 2014 was being mentioned, but never

ratified as a possible compliance date for closed charter. This places Port Pirie in a dilemma; if the current rules continue to apply, there is no requirement for provision of security measures. If the Commonwealth at some future date applies the same rules as applicable for open charter, then considerable infrastructure, equipment and manpower resources will be needed to meet compliance.

Currently, only sufficient area for passenger waiting and toilet facilities is needed. Passenger check in and baggage weighing as appropriate for closed charter operations could be accommodated within the existing club rooms next to the apron.

If security measures are needed, this would require a separate building for security checking of passenger and baggage and secured departure lounge facilities. Allowing space for passengers, circulation and security, an area of approximately 160m^2 needed to accommodate a single 50 seat aircraft. .

11. Aircraft Noise

The Australian Noise Exposure Forecast (ANEF) is the standard applied to planning for noise around airports as describe in AS 2021 Acoustics—*Aircraft noise intrusion—Building Siting and Construction*.. For smaller aerodromes with low aircraft numbers and the absence of large jets, the ANEF does work particularly well as the derived noise contours will barely extend past the aerodrome perimeter

For smaller airports studies undertaken by Commonwealth have used a base of 10 or more noise events above 70 dB(A) per day as a likely trigger for noise complaints. 70 dB(A) is equivalent to an internal noise level 60 dB(A), the accepted indoor design standard for normal domestic dwellings with attenuation of approximately 10 dB(A) by the fabric of a house with open windows. Noise levels above 60 dB(A) are likely to interfere with conversation or listening to the television.

Charts included in AS 2021 show noise levels above 70 dB(A) for F50 aircraft would occur in the residential; rural living and rural deferred urban zones north of runway 17/35 if this was the runway selected for future 50 seat aircraft use. However the expected low number of movements by these aircraft (probably occurring only in daylight hours), is unlikely to be cause for concern or lead to undue levels of noise complaints.

It is also worth noting that during exercises involving operations of C130 Hercules military aircraft off runway 17/35 which included night flights; there were no noise complaints received.

Future use of the 08/26 runway should not lead to any noise complaints due to an absence of housing under aircraft flight paths.

The following tables provide data sourced from AS 2021. The tables for takeoff and arrivals (landings) show in highlight the expected maximum noise level likely at the closest residence 1000m north of the extended centreline for runway 17/35. Refer Item 3 of this report for details of housing location.

NOISE LEVELS FOR SAAB 340, DASH 8 FOKKER 50 TAKEOFFS

centre line distance	Noise Levels dB(A) Side line distance, m								
	0	100	200	300	400	500	600	700	800
0	**	**	**	**	**	65	62	60	58
250	**	**	**	**	**	65	63	60	58
500	**	**	**	**	**	65	62	60	58
750	**	**	**	**	**	65	62	60	58
1000	**	**	**	**	**	68	65	63	61
1250	**	**	**	**	**	71	68	65	63
1500	91	88	83	79	75	72	70	67	65
1750	88	87	83	79	76	73	71	68	66
2000	86	85	82	79	76	73	71	69	67
2250	85	84	81	79	76	74	72	70	68
2500	83	83	81	78	76	74	72	70	68
2750	82	81	80	78	76	74	72	70	68
3000	80	80	79	77	75	73	71	69	68

Allowing for a 1500m runway, the noise on takeoff at 2500m from the start of take off run will be 83 dB(A) on the extended runway centreline and between 82 and 81 dB(A) at the location of the nearest residence when taking off to the north on runway 17/35.

NOISE LEVELS FOR SAAB 340, DASH 8 FOKKER 50 ARRIVALS

centre line distance	Noise Levels dB(A) Side line distance, m								
	0	50	100	150	200	250	300	350	400
0	**	**	**	**	**	**	**	**	**
250	**	**	**	**	**	**	**	**	**
500	90	86	81	77	73	70	67	65	63
750	88	85	81	77	74	71	68	66	64
1000	86	84	80	77	74	71	69	66	64
1250	84	83	80	77	74	71	69	67	65
1500	83	82	79	76	74	71	69	67	65
1750	82	81	79	76	74	71	69	67	65
2000	81	80	78	76	73	71	69	67	66

On landing an aircraft 1000m from the runway end on centreline will generate a short noise event peaking at 86 dB(A). At 250m either side of centreline the noise level drops below 70dB(A) regardless of the offset.

12. Options

Low Cost Option

1. Pavements and associated works

a) Extend runway 17/35 each end to provide a runway length for takeoff of 1700m (and a landing length when approaching from the north of 1500m). Minimal change to existing gravel pavement other than addition of gravel, water, grade and compact. Runway extension to be gravel. All pavements to be maintained tightly bound free of excess loose material through ongoing maintenance as required.
b) Extend runway strip to match and install new runway cones and runway strip gable markers.
c) Widen the Taxiway B to 15m replace and taxiway edge lights. Widened section to be sealed.
d) Install an additional unlit wind indicator at the southern end of runway 17/35.
e) Install new line marking on the sealed central apron.
f) Monitor performance of sealed pavements, reconstruct wheel track areas only if evidence of pavement distress occurs

2. Buildings and other infrastructure

g) Subject to commonwealth acceptance, nil works, operate from existing passenger terminal facilities next to the central apron.
h) Airline operator to provide fuel storage facility.

High Cost Option

3. Pavements and associated works

a) Extend runway 08/26 each end to a total length of 1700m.
b) Widen existing pavement to a width of 30m.
c) Increase strength of existing as determined from geotechnical testing.
d) Seal the full 1700m x 30m pavement plus widened turning nodes each end.
e) Widen the Taxiway B to 15m replace runway edge lights. Widened section to be sealed.
f) Replace all runway lighting with new cables transformers and light fittings to the new CASA standard (mandatory if 08/26 extended).
g) Install 2 new illuminated wind indicators at each end of the runway (mandatory if 08/26 extended).
h) Install additional apron flood lighting.
i) Reconfigure the instrument approaches to both ends of runway 08/26 (mandatory if 08/26 extended).

4. Buildings and other infrastructure

j) If security measures are demanded by the Commonwealth, provide accommodation for passenger and baggage screening and a secured passenger departure lounge. Also subject to Commonwealth approval, the building may be a transportable facility.
k) Airline operator to provide fuel storage facility.

13. Order of Cost Estimates

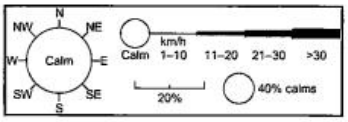
	17/35 GRAVEL RUNWAY UPGRADE. MINIMUM COST OPTION	Order of Costs
1	**AIRCRAFT PAVEMENTS**	
1.1	Resheet to 30m, extend to 1700m gravel	
1.2	Widen taxiway B	
		$ 501,400
2	**AIRPORT LIGHTING**	
2.1	no change	
3	**TERMINAL**	
3.2	Nil works required under current security regulations	
	(may be subject to change)	
4	**FUEL FACILITIES**	
7.1	New Jet fuel facilities (operator to supply)	
	Consultancy / Contingency 15%	$ 75,210
	TOTAL	**$ 576,610**
	08/26 UPGRADE and FULL SECURITY OPTION	
1	**AIRCRAFT PAVEMENTS**	
1.1	Widen 08/26 to 30m, extend to 1700m,	
1.2	Spray seal to widened section and runway extensions	
	Widen taxiway B	
		$ 1,714,800
2	**AIRPORT LIGHTING**	
2.1	New runway lighting for 08/26 (edge and threshold lights)	
	New taxiway lights	
2.3	Additional Flood lights for new apron	
	New Illuminated Wind Indicators	
		$285,000
3	**PUBLISHED APPROACHES**	
3.1	Redesign both ends to cater for runway extensions	$75,000
4	**TERMINAL**	
4.1	New secured lounge plus screening area incl circulation	
	security equipment (X-ray, trace detector, metal detector etc	$2,561,000
5	**FUEL FACILITIES**	
7.1	New Jet fuel facilities (operator to supply)	
	Consultancy / Contingency 15%	$ 695,370
	TOTAL	**$ 5,331,170**

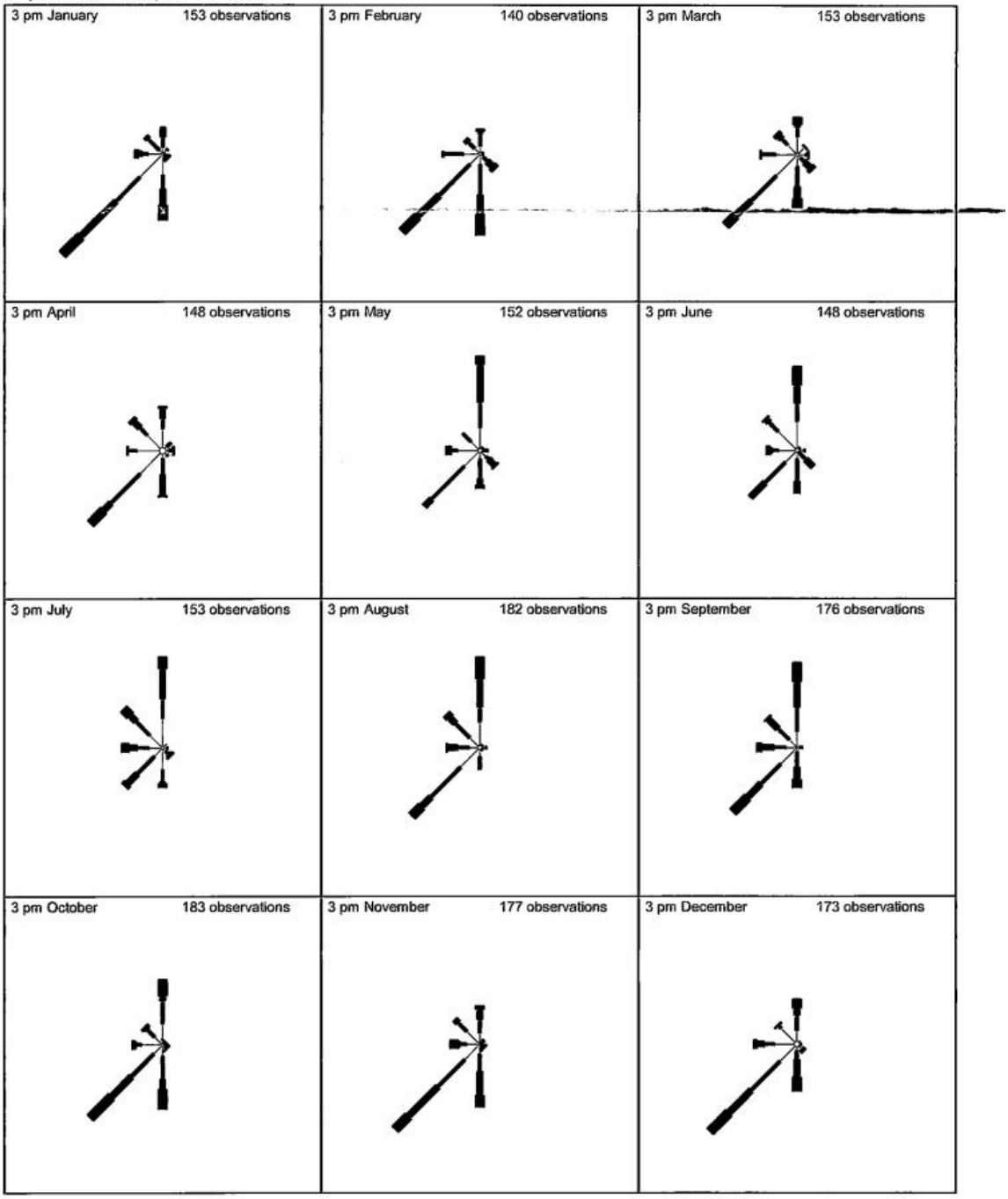
14. Appendix A BoM Wind Rose Data

Wind Roses using available data between 2006 and 2011 for Port Pirie Aerodrome

Site Number 021118 • Locality: Port Pirie • Opened Jan 1943 • Still Open
Latitude 33°14'03"S • Longitude 138°00'04"E • Elevation 10m

Only the hours 9 am, 3 pm are included.

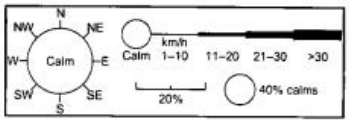


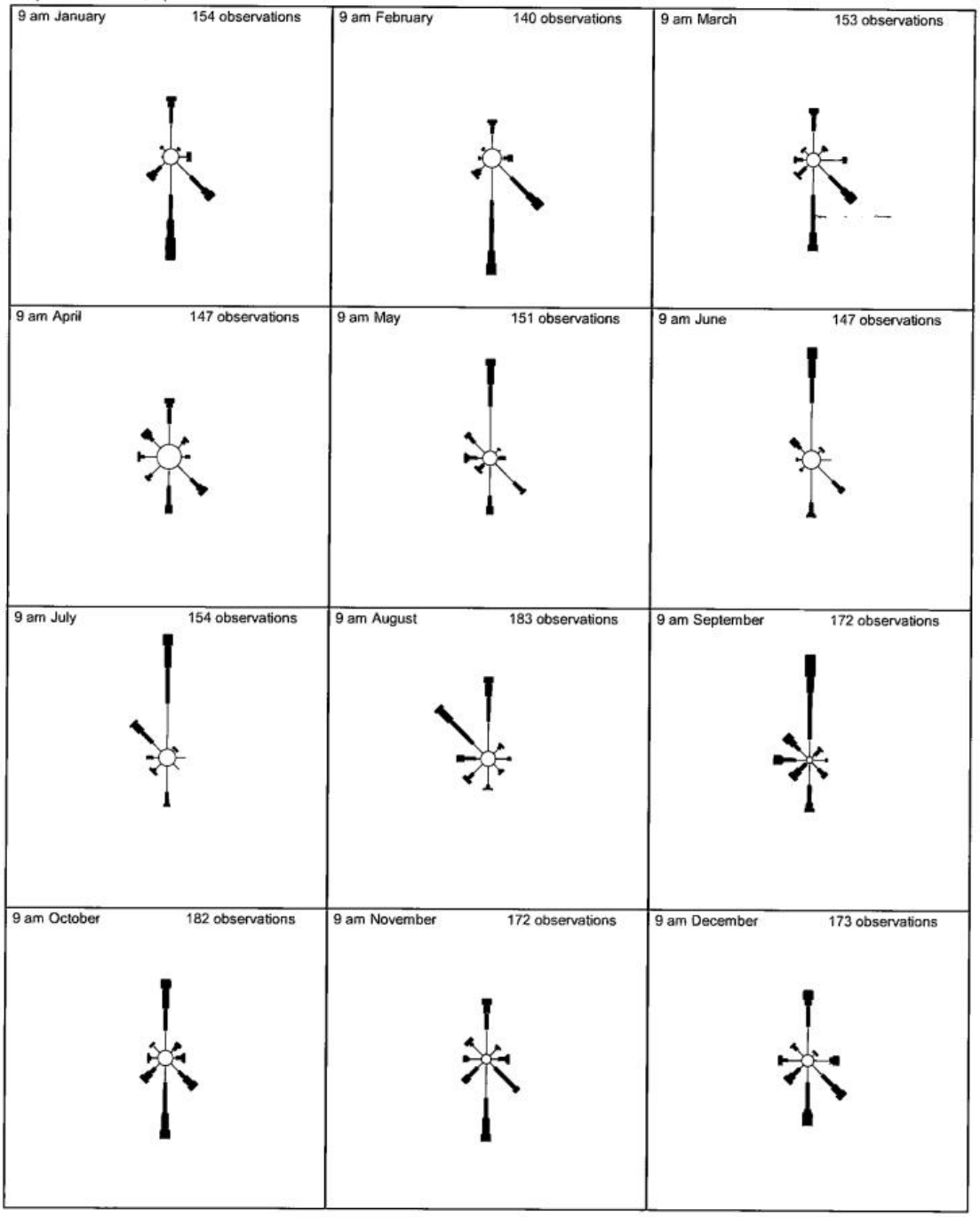


Wind Roses using available data between 2006 and 2011 for Port Pirie Aerodrome

Site Number 021118 • Locality: Port Pirie • Opened Jan 1943 • Still Open
Latitude 33°14'03"S • Longitude 138°00'04"E • Elevation 10m

Only the hours 9 am, 3 pm are included.





15. Appendix B Project Brief

Determine an appropriate runway heading from broad wind data from the Bureau of Meteorology.

Look at lengths typically provided for F50 aircraft and examine the best locations for future extensions taking into account existing pavements, terrain, obstructions, Council planning.

Outline typical pavement profiles needed to support F50 aircraft and suggest testing needed for existing pavements where strength data is unknown.

Provide commentary on existing compliance / non compliance with current standards.

Describe how best to link the preferred runway to the apron. Outline minimum parking area requirements. Provide comment on existing compliance / non compliance with current standards.

Provide comment on existing compliance /non compliance with current standards.

Outline the requirement for fuel storage and suggest possible storage locations and delivery methods.

Comment on the existing GPS approach and suitability for intended F50 usage.

Provide an outline of the various minimum components and security requirements for passenger and baggage processing as per Department of Infrastructure and Transport AVSEC requirements.

Provide a brief commentary on expected noise levels and possible impact (if any) on the surrounding area.

Provide estimate of costs for works