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Aviation Rescue and Fire Fighting Services

Options for Charging

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1. Purpose

This “Options Paper” has been developed in order to identify a range of alternative charging methodologies; alternate revenue drivers; and alternate risk share arrangements that Airservices Australia (ASA) could apply for the provision of Aviation Rescue and Fire Fighting (ARFF) services.

The paper includes: an overview on how, when and where an ARFF service is provided and explores the regulatory regime in which it operates; a short summary of the pricing processes and events that has led Airservices Australia (ASA) to developing a new long term pricing and charging methodology; and a review of possible risk share arrangements.

The feedback, comment and submissions received from customers, stakeholders and the Australian Competition and Consumer Commission (ACCC) on this paper will assist ASA in developing a long term charging framework for its Draft Price Notification that is to be delivered by 30 September 2005.

Further, the mere fact that an option or approach is discussed in this paper should not be taken to mean that ASA is endorsing or prefers one option or approach over another.

2. Pricing History

ASA proposed new prices for all its service lines (enroute, terminal navigation and aviation rescue and fire fighting) for a five year period, which was considered by the Australian Competition and Consumer Commission (ACCC), in November 2004.

At that time the ACCC agreed to the overall sum of revenue that ASA was proposing to charge for services, but objected to the charging structure for ARFF.

The charging structure that had been in place until then was based on a location specific pricing model and applied to all aircraft greater than 2.5 tonnes.

The objections raised by the ACCC at the time were that:

- the prices charged to smaller operators did not appear to be related to the impact they had on Airservices’ costs;
- the introduction of new ARFF services using the existing basis for charging was likely to have a large negative effect on certain user groups such as training schools and medical aviation services; and
- there may be merit in Airservices and airports entering into individual risk sharing arrangements.

In addition to these concerns, the ACCC noted the potential for the negotiation of risk sharing arrangements to address the issue of activity forecasts at particular airports.

ASA was given approval by the ACCC to continue the temporary pricing arrangement for ARFF services until the price structure issues were satisfactorily resolved.

As such pricing for ARFF remained at the pre-existing levels, i.e. 2003-04 prices, and no charges were imposed at Maroochydore or Townsville, despite services being provided.

Given that ASA was significantly under recovering for ARFF services it subsequently sought a revision in pricing through a Temporary Price Notification that was endorsed by the ACCC in June 2005.

The interim pricing arrangements were introduced on 1 July 2005 (see Attachment A – Pricing Table). The interim pricing continues to be applied on a location specific and tonnes landed basis, but is applied differently at the following tonne thresholds:

- Aircraft below 5.7 tonnes Maximum Take-Off Weight (MTOW) are now excluded from charges;
- Aircraft between 5.7 tonnes MTOW and 15.1 tonnes MTOW remain on charges that were in place prior to 1 July 2005; and
- Aircraft above 15.1 tonnes MTOW pay the new charges proposed in December 2004.

The effect of these arrangements was to:

- Provide immediate relief from ARFF charges for light aircraft operations including non-passenger carrying operations such as aeromedical service providers and training schools;
- Maintain the current pricing arrangements (including no charge for Maroochydore and Townsville) for smaller passenger carrying aircraft; and
- Limit price increases that were agreed with industry during the previous consultation to the customer group containing larger Regular Passenger Travel (RPT) aircraft.

The amendments operate until 1 January 2006 when a new permanent charging basis for ARFF services, developed through the current consultation process (see Timetable – Attachment B) should become effective.

3. Delivering the Service

Aerodrome Rescue and Fire Fighting Services (as it was known then) was established in 1947 and has predominantly been provided by the Commonwealth Government (with the exception of three aerodromes - Norfolk Island 1992, Broome 1995 and Townsville, the latter being a joint user aerodrome with the fire services provided by the RAAF) through ASA and various prior entities, acting under an authorising Act of Parliament.

ASA presently provides ARFF and related supporting services at seventeen locations around Australia in accordance with the Airservices Act 1995 and Australian international obligations under the Chicago Convention.

The core functions and responsibilities for the ARFF service at an aerodrome are:

(a) to rescue persons and property from an aircraft that has crashed or caught fire during landing or take-off; and
(b) to control and extinguish, and to protect persons and property threatened by, fire on the aerodrome, whether or not in an aircraft.

Nothing prevents ARFF from performing fire control services or rescue services elsewhere on an aerodrome, but ARFF must give priority to its core functions and responsibilities identified above.

The International Civil Aviation Organisation (ICAO) standard (Annex 14) for international aerodromes states that ***'rescue and fire fighting equipment and services shall be provided at an aerodrome'***. Australia, as a signatory to the Chicago Convention, is obliged to comply with this requirement unless a difference is lodged under Article 38 of the Convention. Australia also applies the ICAO standards for rescue and fire fighting services to domestic aerodromes subject to specified criteria that is described in Civil Aviation Safety Regulations.

The Civil Aviation Safety Regulations 1998 (CASR), made under authority of the Civil Aviation Act, provide for general regulatory controls for the safety of air navigation. The applicable CASR for ARFF is 139 subpart H, which sets out the obligations, requirements and functions for the ARFF.

In terms of capacity and response ability the following are the core operational requirements at each associated level of category. The category of each aerodrome is summarised at Attachment C.

CATEGORY OF AERODROME	MINIMUM STAFF (per Shift)	FIRE VEHICLES (Minimum)	WATER (L - Minimum)	DISCHARGE RATE (L per minute)
9	10	3	24,300	9,000
8	8	3	18,200	7,200
7	7	2	12,100	5,300
6	5	2	7,900	4,000

ARFF services are currently established at an aerodrome when:
(a) there are international passenger air services; and
(b) if there are more than 350,000 passengers movements per annum.

The passenger throughput of 350,000 has been established to ensure that an ARFF service is provided to cover at least 95% of the travelling public.

Disestablishment of the service may be considered when the number of annual passengers on air transport falls below 300,000 and remains below this level for a twelve month period. The ARFF also needs to provide CASA with a safety case to justify disestablishment.

Once an ARFF is required to be provided at an aerodrome it is then necessary to determine the category of that service. The category of the service is matched to the category (size) of aircraft that are flying into that location based on the combined movements (take off or landing). Category is determined by reviewing the busiest consecutive three months of the previous twelve month period and identifying the largest aircraft over 700 movements. Where the number of movements of aircraft in the highest category normally using the airport is less than 700 in the busiest consecutive three months, then the airport category may be one less than the highest category.

At present ICAO Annex 14 volume 1 and CASR Manual of Standards (MOS) part 139H both allow for a remission of one category below the required standard for the largest aircraft category. ICAO has commenced a process to amend Annex 14 and remove the “remission factor”. As part of this amendment process, ICAO member states are provided the opportunity to comment on the proposal prior to a final decision being made. Should the proposal to remove the remission factor be accepted, the next scheduled amendment to the Annex 14 is November 2007.

In line with the anticipated change to ICAO Annex 14, CASA have notified ASA of their intention to amend the MOS to also remove the current remission of one category.

Aerodromes are permitted to operate at a lower category in periods where it is known that no highest category aircraft will be landing. Aerodromes are also required to ‘up category’ when, larger than usual aircraft are to land at that location, which causes resourcing issues.

For temporary changes in category, staff are brought in to work (on overtime rates), whereas in other circumstances, vehicles may be deployed from one location to another in order for a location to maintain its required level of service. Permanent increases in services require additional vehicles to be purchased and personnel to be recruited. This form of resource pooling makes it more difficult to accurately ascertain a location specific cost of providing a service and to recoup the required revenue on a location specific price basis.

Fire service protection is required for the duration of air transport operations, including delayed flights, all commercial passenger flights regardless of aircraft size must be covered.

Where coverage is for less than 24 hours, the ARFF must be fully operational for a minimum of 15 minutes before the first scheduled aircraft movement for the day, whether it is an arrival or departure. Crew must remain for 15 minutes following the last aircraft movement whether it is an arrival or departure.

The ARFF must be able to respond to an incident at either end of the runway in not more than three minutes from the initial call and be able to apply 50% of the maximum discharge for that category; the remaining capacity (i.e. vehicle/s) must arrive within 1 minute of the first vehicle.

Additionally, it must be able to respond to any part of the movement area within three minutes as well.

This has obvious impacts on truck type, size and performance and ultimately cost. Trucks, apart from the fire station, are the most expensive infrastructure and are purpose built to be able to deliver the required amounts of foam, water and firefighters to the scene of an incident within the response times identified above. They must comply to an international standard –

National Fire Protection and Association (NFPA 417) and Australian Design Rules (i.e. must be road registrable) and accordingly they must be able to:

- negotiate all terrain conditions;
- accelerate from 0-80 kilometres per hour in 24 seconds fully loaded (34 tonnes); and
- be able discharge the full foam/water contents within two minutes.

Airservices' ARFF currently has a fleet of 58 fire vehicles and is in the process of procuring more. These vehicles cost in the order of $1.2m each and are considered state of the art, with an anticipated $35m to be allocated to further update the fleet of vehicles, commencing in around 3 years time. The average age of the existing fleet is 15 years old and the new vehicles are expected to last 20 years.

At aerodromes where the threshold is within 1000m of a body of water a water rescue service is also provided to meet regulations. A water service requires launching facilities, boats and sufficient rescue platforms (rafts) to cater for 50% of passengers on board the largest aircraft operating into that airport.

ARFF responds to over 5000 incidents per annum, with such responses covering runway, hangar, terminal areas and aircraft, physical infrastructure and passengers.

Given the nature of the service there is a disproportionate number of responses to passengers be they to people on planes or within terminal areas – this is to be expected, greater aircraft responses would indicate failures in operational systems designed to prevent aircraft incidents occurring.

Attachment D provides a break down on incident responses for 2004-05, 8% of responses were to aircraft, 37% were to airline passengers and 55% were to airline physical infrastructure such as terminals and hangars (all of which meet our regulatory obligations). As identified earlier ARFF has a dual responsibility to both aircraft and buildings on the aerodrome.

In addition there are a larger number of incidents at larger airports which is driven by larger volumes of passenger and aircraft.

In the past there have been discussions about whether these responses particularly those that are provided to passengers within terminal locations should be paid for by the airport itself, or the airlines through current ARFF charging.

However, it should be recognised that these responses are, for the most part, provided to and for airline operations and to their customers (the travelling public) and that at the majority of locations these response are achieved at the marginal cost as little additional physical infrastructure is required; first aid equipment is needed for passengers on aircraft; and staffing does not need to be increased.

ARFF also maintains memorandum of understandings with each state/municipal brigade service which provides a mutual obligation on the parties to respond to major incidents/disasters.

More recently ARFF has been approached to provide a higher level of response at airports to those non-airline related areas where we currently don't have a regulatory responsibility to respond.

To the extent that this occurs ARFF will enter into separate arrangements for the provision of this service and cost and price accordingly.

It is important to note in this summary that the number of passenger movements is only the trigger for ARFF commencing the provision of service after this it is the category of aircraft, i.e. length and width, that determines the category and therefore the cost of provision of the service.

4. International Charging Methodologies

Airservices has undertaken a short review of the provision of ARFF services in the United States, Canada, the United Kingdom and New Zealand. In each of these countries, we have endeavoured to find out who provides the service and how the costs are recovered. Based on our review of each of these countries, it appears that the provision of ARFF in Australia may be unique in the respect that:

- Airservices has the responsibility to provide ARFF services direct to airlines rather than that responsibility falling to individual airports; and
- Costs are recovered directly from airlines (rather than the airport acting as an intermediary) as a specific charge.

In the United States ARFF is provided through various State Fire Municipalities, private airport owners and some contracts. The Federal Airport Authority funds a portion of training, research and development and vehicle costs. Some airports recover costs through an airfield landing fee that includes airfield costs whilst others are a combination of government funding and airfield charges.

In Canada, individual airports are required to establish and maintain the ARFF service, or to obtain it by contract. Airports usually include ARFF as a cost centre of the airside operation and can choose how to recover those costs. For instance, the airport may charge for ARFF as a component of its landing or parking fees.[1] At regional airports the airport owner funds only 15% of fire vehicle purchase, the remainder is funded by the Government.

In the United Kingdom the provision and pricing of ARFF services is the same as it is for Canada.

In New Zealand, airports provide and charge for the ARFF service. In the Commerce Commission's 2002 report which investigated whether Auckland, Wellington and Christchurch Airports should be subject to price control, the Commission explained that each of these airports recovers ARFF costs through a "*rescue fire component of aircraft landing charges*."[2]

At Auckland International Airport, for instance, landing charges are levied as either a fixed charge per aircraft[3] or a per tonne charge (which increases with the MTOW of the aircraft). In addition, international and domestic aircraft above 40 tonnes pay different per tonne charges. The ARFF component is not made explicit, however.[4]

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1 Information obtained from Transport Canada.

2 Commerce Commission, Final Report: Part IV Inquiry into Airfield Activities at Auckland, Wellington and Christchurch International Airports, 6 August 2002, pp 189-190, 240 and 285.

3 Fixed charges are levied on smaller aircraft.

4 Auckland International Airport Limited, *Identified Airport Activities Disclosure Financial Statements: Year Ended 30 June 2004*, pp 23-25.

The International Civil Aviation Organisation (ICAO) provides guidance on the charging of ARFF services in its *Policies on Charges for Airports and Air Navigation Services.* Where ARFF is provided by an airport, the policy states that the costs should be included under the category of "*approach, landing and take-off facilities and services*."[5] It also states that landing charges:[6]

> "*should be based on the weight formula, using the maximum certificated take-off weight … as the basis for assessment. However, allowance should be made for the use of a fixed charge per aircraft, or a combination of a fixed charge with a weight-related element, in certain circumstances, such as at congested airports during peak periods. The landing charge scale should be based on a constant rate per 1 000 kilograms or pounds in weight, but the rate may be varied at a certain level or levels of weight if considered necessary.*"

5. The Pricing Challenge

The key challenge facing ASA is to establish a charging methodology and associated pricing structure that enables the pool of ARFF costs to be recovered, whilst minimising any undesirable distortions to airport usage. The ACCC has similarly acknowledged ASA's: "*need to achieve cost recovery while minimising the attendant distortion to allocative efficiency.*"

The pursuit of efficient pricing is often at odds with people's concepts of 'fair' pricing. Efficient pricing, just like efficient taxation, is concerned only with minimising the distortion to end users of services. Efficient pricing can require users to help finance services in a manner that is not directly linked to the 'benefits' they derive from using those services.

There are compelling reasons for this apparently counterintuitive suggestion. If, for example, recovering the cost of ARFF services from those users most likely to benefit results in a dramatic reduction in their demand for little or no ARFF cost savings then an economic distortion is created – as the economic value of activity lost exceeds the value of ARFF cost savings achieved. In this circumstance it may be more efficient to spread cost recovery to all users, irrespective of benefit derived, if this involves a smaller reduction in airport usage.

In other words, when recovering costs that are "fixed" (i.e. invariant with usage) isolated equity considerations will often take a back seat to the overarching aim of enhancing efficiency, i.e. a desire to maximise aggregate welfare. The most economically defensible reason for preferring one pricing mechanism over another is if there is reason to believe one will distort airport usage less than the other.

The current CASA regulations (based on ICAO standards) and the stipulation that an ARFF service must be provided when passenger movements exceed 350,000 per annum means that a low volume of activity has a dramatic effect on the per tonne price.

5 *ICAO's Policies on Charges for Airports and Air Navigation Services (Seventh Edition – 2004),* Appendix 1.

6 op.cit, pp 9-10.

This is claimed to create inefficiently high prices at airports during initial growth stages, as seen on the North Queensland Coast, which can result in sub-optimal use of the airport for an extended period. This reflects the fact that the marginal cost of more aircraft landing will tend to be much lower than the average cost of all aircraft landings at such airports.

There is also an argument made by some of the airports that a high price per tonne has little effect on activity at unique/specialised locations, where the trip cost is only part of the overall cost of the visit. Whereas at other regional locations where there are other transport alternatives or alternate airports a price change may have a large impact, which is of concern to regional airports.

The threshold issue to consider in determining the optimal structure of ARFF charges, other than the basis of charging of tonnes, passengers or aircraft category, is whether ASA should continue to set unique prices for each airport (i.e. location-specific pricing) or whether there should be an element of common prices for similar services provided at different locations (i.e. category-based pricing).

6. Elasticity of Demand

The impact of changes in the price of ARFF services on demand to land aircraft will be a function of the sensitivity of demand to changes in a total airfare, which is measured by the *elasticity* (the percentage change in the quantity demanded divided by the percentage change in price). The less sensitive a passenger is to a change in price for a particular service, the lower their elasticity of demand.

Demand to land aircraft carrying more passengers will tend to be less price responsive to a per landing charge than aircraft carrying few passengers. Put simply; demand to land aircraft carrying 200 passengers will tend to have a smaller response to a $100 charge per landing than will demand to land aircraft carrying 20 passengers. This is because the $100 can be recovered by an average 50c per ticket surcharge in the former case but in the latter case recovery would require an average $5 per ticket surcharge.

However, the price responsiveness of demand to land both types of aircraft is likely to be the same for a per passenger landed charge - unless there is some difference in the price responsiveness of the customers being carried. A per tonne charge is, in effect, a proxy for a per passenger charge and, consequently, all aircraft are likely to have the same price responsiveness to a per tonne charge - again, unless there is some difference in the price responsiveness of customers being carried.

The Productivity Commission, in its report on the *Price Regulation of Airport Services,*[7] found that Sydney, Melbourne, Brisbane and Perth airports had relatively higher demand elasticities than Alice Springs, Coolangatta, Hobart and Launceston airports. The ACCC refers to this finding in its Preliminary View.[8]

7 Productivity Commission, *Price Regulation of Airport Services: Inquiry Report*, 23 January 2002.

8 Australian Competition and Consumer Commission, *Preliminary View: Airservices Australia Draft price notification*, November 2004, p. 77.

The Productivity Commission goes on to say:[9]

> *"…different segments in the market may vary in their price responsiveness. The overall demand elasticity for the airports' services will be a composite of these different market segments, appropriately weighted."*

Reliable estimates of the sensitivity of demand for passenger air travel to changes in fares are difficult to obtain and estimates vary widely. Elasticity studies for Australian airlines include the following:

- Battersby and Oczkowski (2001) found a range of elasticities for business and leisure passengers from –0.07 to –1.68;[10]
- Bureau of Transport and Regional Economics (1983) estimated the elasticity for leisure passengers to be –2.3;[11]
- Bureau of Transport and Regional Economics (1986) estimated the following elasticities for domestic routes: short-haul, -0.55; Medium-haul, -0.73; Long-haul, -0.82; 'Summer holiday', -1.45; 'Winter sunspots', -2.37;[12]
- May, Butcher & Mills (1986) which, using data from 1977 to 1984, estimated the following elasticities: short-haul, -0.48; Medium-haul, -0.82; Long-haul, -1.52; 'Summer holiday', -0.86; 'Winter resorts', -0.91; all routes, -0.70;[13] and
- Taplin (1997), who estimated the price elasticity for domestic vacation air trips to be -2.10.[14]

Consequently, it is difficult to accurately estimate the elasticity of demand for aircraft to land at a particular airport (which is dependent on the price sensitivity of that aircraft's passengers).

In the absence of reliable estimates, the most efficient form of pricing will involve a constant mark-up over avoidable/incremental costs to recover the unavoidable/non-incremental costs. This could be on a per passenger or per tonnes basis.

The ACCC notes that:[15]

> *"…given the broad correlation between tonnes landed and passenger numbers, allocating the common costs between locations on the basis of tonnes landed results in a greater proportion of distributed costs being covered by a relatively lower per passenger equivalent charge."*

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9 Productivity Commission (2002) op cit, p. 107.

10 Battersby, B and Oczkowski, E (2001) "An Econometric Analysis of the Demand for Domestic Air Travel in Australia" *International Journal of Transport Economics*, Vol 28, No 2, p193-204

11 In Nairn, RJ and Hooper, P (1992) *Tourism Related Movement Study Final Report, Sydney: Roads and Traffic Authority NSW*, table 1A05, p59

12 Bureau of Transport Economics (1986) *Demand for Australian Domestic Aviation Services by Market Segment*, table 4.2, p35

13 May, T.E, Butcher, E.W.A and Mills, G (1986) "Consumer Responsiveness to Changes in Air Fares" *Independent Review of Economic Regulation of Domestic Aviation*, Vol 2, Canberra: AGPS, Appendix L, table L.1, p360-361

14 Taplin, J (1997) "A Generalised Decomposition of Travel Related Demand Elasticities into Choice and Generation Components" *Journal of Transport Economics and Policy*, Vol 31, No 2, table 1, p186

15 Australian Competition and Consumer Commission (2004) op. cit, p. 78.

Efficiency suggests that if two aircraft landing (at the same or at different airports) both impose an identical incremental/avoidable cost on ASA then those two aircraft should pay an identical price - unless one has a higher elasticity of demand than the other. Only if one aircraft has a lower elasticity of demand (i.e. is less responsive to price) should ASA efficiently charge it a higher price.

It is conceivable that passengers landing at some airports have a lower elasticity of demand than others, as was suggested in the above quote from the Productivity Commission report. It is also conceivable that some types of passengers, e.g., passengers of 'low cost' airlines, have lower elasticity of demand than others. It is even possible that passengers have different elasticities depending on the time of day they land (e.g. business passengers flying home between 5 and 7pm on a weekday). If these elasticities differences were material it is likely that they would be reflected in the elasticity of demand by airlines to land those passengers at airports with ARFF services.

If ASA could accurately ascertain the values of these elasticities it could set a range of differentiated prices that depended on the factors outlined above (e.g. location, time of day, or 'type' of airline). However, ASA believes that the evidence on differential elasticities associated with passenger characteristics is not well established. Moreover, ASA is not well placed to interpret what information there is and any attempt to do so would inevitably result in a great deal of controversy, with all affected parties arguing strongly that they carried the most price sensitive passengers.

In this context, the most efficient pricing structure may well be one that charges all aircraft the same per tonne price unless there are material differences in incremental/avoidable costs to ASA as a result of that aircraft landing.

Consequently, in assessing the efficiency of the pricing proposals below we assume that a per tonne pricing basis adequately addresses different elasticities of demand *to land* that are driven by different numbers of passengers carried.

7. Assessing the Options

Airservices Australia has previously and in discussions with customers/stakeholders proposed the following criteria in assessing each alternate charging model:

- Prices should have a strong relationship to the cost of providing services;
- Prices should encourage economically efficient resource allocation;
- Impact of pricing on contestability may be a consideration for Government; and
- The charging basis should recognise the key drivers giving rise to the need for an ARFF service.

Each of these are explored more fully in the following discussion on the *practical application to ARFF; economic efficiency; zero incremental/avoidable costs; impact on contestability;* and *transparency, equity and simplicity.* Their application to the range of models is either discussed in this section or in the “The Charging Options” section below.

Practical Application to ARFF

There are two incremental/avoidable costs for ARFF and two drivers of those costs:

1. the costs incurred by ASA when annual passenger movements exceed 350,000 at an airport or the costs avoided by ASA when passenger movements fall below 300,000; and
2. the costs incurred by ASA when higher category aircraft land more than 700 times in any three month period per annum at an airport or the costs avoided by ASA when higher category aircraft cease landing at an airport.

In the current circumstances, incremental costs per unit of activity (e.g. tonnes/passengers/ category of aircraft landed) may be very different from the avoidable costs per unit of activity.

That is, the costs avoided as a result of a percentage (%) increase in 'activity' may be very different from the costs avoided as a result of a percentage (%) decrease in activity. There are at least three reasons for this:

1. the costs to ASA associated with additional activity are not fully reversible. For example, the costs associated with building/extending a fire station are largely 'sunk' such that the incremental costs of exceeding a threshold (in passenger movements or category) exceed the costs avoided as a result of falling below the relevant threshold;
2. the activity thresholds that cause ASA to incur costs are different to the thresholds that cause it to avoid costs. For example, ASA incurs costs when a 350,000 passenger threshold is exceeded but only avoids costs when passenger numbers fall below a 300,000 threshold; and
3. ASA's costs are lumpy - such that the incremental/avoidable cost of changes in activity is zero until a particular threshold is passed. For example, currently a small number of Category 9 aircraft land at Rockhampton airport - despite the fact that Rockhampton has only Category 6 ARFF services. The *avoidable costs* of those Category 9 landings is close to zero, however, the *incremental cost* associated with a material increase in Category 9 aircraft landing would be in the millions of dollars.

This immediately raises the question as to whether it is more efficient for ASA to price on the basis of avoidable versus incremental costs. ASA believes that the answer to this question is complex, however, as a general rule we consider that efficiency is likely to be best served if ASA prices on the basis of incremental costs when activity levels are expected to be growing and prices on the basis of avoidable costs when activity levels are expected to fall. That is, it does not appear sensible to price on the basis of costs avoided as a result of a fall in activity if it is known that, for other reasons, activity levels will be increasing or *vice versa*.

It is also true that, at airports where there is little or no likelihood of passenger numbers falling below 300,000 per annum, ASA's incremental/avoidable costs are almost purely driven by the category of ARFF services that they must provide, which is itself driven purely by the highest category of aircraft that lands more than 700 times, in any three month period of a year. That is, the only activity that has material incremental/avoidable cost is landings of aircraft that have a category at, or higher than, the category of ARFF services currently supplied at that airport.

For example, additional landings of category 6 aircraft at Sydney Airport impose little or no incremental ARFF costs on ASA. However, new landings of the A380 (expected next year) will cause ASA to incur incremental costs in upgrading Sydney Airport ARFF services from a category 9 to a category 10 airport.

The above analysis has the following implications:

- at all "well established"[16] airports with ARFF services, ASA's only material incremental/avoidable cost relates to landings of aircraft with the same or higher category as that of current ARFF services at that airport; and
- at 'marginal' airports, ASA's only material avoidable costs relates to reductions in passenger numbers that would cause ARFF services to cease to be provided.

Economic Efficiency

Economic efficiency requires Airservices Australia (ASA) to both:

1. signal to customers the cost that their activity imposes on ASA. The cost that their activity imposes on ASA will be equal to either:
   - **incremental costs** - the new costs that ASA will incur if customers increase their activity; or
   - **avoidable costs** - the existing costs that ASA will avoid if customers reduce their activity.
2. recover non incremental/non-avoidable costs in the least distortionary manner.

Pricing on the basis of incremental/avoidable costs sends the signal to users that they should only undertake (or continue to undertake) a certain activity if they value that activity at more than the costs that it imposes on ASA.

However, not all costs are incremental/avoidable. Some costs must be incurred irrespective of the level of activity and other costs will continue to be incurred for all feasible levels of activity. For example, the capital costs associated with existing fire-stations are sunk and will not be avoided even if activity at all airports fell to zero. Similarly while the total costs of providing ARFF at Sydney Airport are hypothetically avoidable if category 6 and above landings cease, they are not avoidable for any feasible change in activity.

In order to recover unavoidable costs it is likely that ASA will have to set a price that exceeds incremental/avoidable cost for many users. This will inevitably send 'too strong' a signal to customers that they should reduce their activity levels (i.e. a price signal in excess of incremental/avoidable cost).

Efficiency requires that the distortions to activity associated with pricing above incremental/avoidable cost be minimised. ASA understands that the established economic

16 That is, airports that have little prospect of falling below the 300,000 passenger threshold for the removal of ARFF services.

theory suggests that this is achieved by setting prices equal to incremental cost plus a margin where the magnitude of that margin is in inverse proportion to the price sensitivity of demand for that product.

In its Preliminary View paper, the ACCC refers to this pricing rule as ' Ramsey-Boiteux efficient' pricing in relation to the recovery of common costs (which are a type of non-incremental/non-avoidable costs).

> *"The Ramsey-Boiteux method of cost allocation involves allocating common costs between users with the objective of maximising efficiency. In circumstances where demands for services produced by a multi-product monopolist are independent (i.e. where the cross-price elasticities of demand are zero), allocating common costs in inverse proportion to various users' price elasticities of demand will maximise economic welfare. See J Vickers, 'Regulation, Competition and the Structure of Prices', Oxford Review of Economic Policy, Vol 1.*[17]

One of the implications of this rule is that, if demand for all services has the same price sensitivity then all costs that are not recovered from incremental/avoidable cost based pricing are most efficiently recovered through a constant absolute mark-up over incremental/avoidable cost.

In the same paper,[18] the ACCC referred to a Productivity Commission report that argued large airports may have demand that is less price sensitive than smaller airports. However, as ASA is unaware of any robust evidence that this is the case, and as noted above, even if this is the case, what magnitude of differences there might be across airports.

Zero incremental/avoidable costs

Within the feasible range of variation, most activity at airports with ARFF services imposes a zero incremental/avoidable cost on ASA.

Consider a category 9 airport such as Sydney with around six million tonnes of category 9 aircraft landing per annum and around seven million tonnes of category 8 and below tonnes landing. Even if 100 per cent of the category 8 and below traffic disappeared ASA would still be required to provide a category 9 service at Sydney and there would be little or no avoided cost as a result. That is, at Sydney Airport the incremental and avoidable costs of variations in category 8 and below landings is close to zero.

Moreover, even variations in category 9 landings will, within a feasible range, have little or no impact on ASA's costs. Increases in category 9 landings will not cause ASA to upgrade its ARFF service to category 10 and, therefore, the *incremental* cost to ASA is negligible. The only way there could be any *avoidable* costs of category 9 activity to ASA would be if category 9 landings fell below 700 per annum. It would be inefficient to signal hypothetically avoidable costs associated with a given scenario if, as in this case, that scenario is not realistic.

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17 Australian Competition and Consumer Commission, Preliminary View: Airservices Australia Draft Price Notification, November 2004, p. 77, footnote 33,

18 See page 77.

The only feasible variation in activity that that will impose material incremental/avoidable costs on ASA would be the landing of category 10 aircraft at Sydney Airport which would require ASA to upgrade ARFF services to category 10. In other words and as previously discussed, it will be more efficient to signal the incremental cost of increased category 9 landings (i.e. zero) rather than the hypothetically possible, but in reality inconceivable, avoidable costs associated with Sydney becoming a category 8 airport.

Unlike most businesses, ARFF's costs are not strongly linked to overall volumes; rather, ARFF's costs are determined by the regulatory need to provide a category of service driven by only the highest category of aircraft landing at an airport. More generally, around 60 per cent of tonnes landed at all airports are associated with aircraft that have a lower category than the category of the airport. Changes in the number of these aircraft landing will have no effect on the category of ARFF services provided at that airport and, as such, impose no incremental/avoidable cost to ASA. Moreover, as discussed in relation to Sydney Airport, even many of the highest category landings at an airport will often impose zero incremental/avoidable costs on ASA for realistic potential variations in activity.

However, at a small number of airports there may be significant non-zero avoidable/incremental costs associated with changes in activity. For example, take Coolangatta Airport which is a category 8 airport but with only a very small number of category 8 and 9 aircraft landing. At this airport it may be feasible that a small reduction in category 8 and 9 aircraft landing could result in ASA being able to downgrade the ARFF service to category 7, potentially saving upwards of $1m per annum. In this context, it may well be efficient to set the price for category 8 and 9 landings at Coolangatta Airport at well above the cost of other landings (both at Coolangatta and at other airports).

The same could also be true if an airport was very close to the passenger threshold where ARFF services could be removed in their entirety. However, in this case avoidable costs will tend to be less than total location specific costs. This is because some location specific costs are unavoidable (e.g. sunk costs at fire stations) and because there are also incremental costs to ASA of ceasing to provide a service (e.g. redundancies).

Impact on contestability

It is currently Government policy that, where efficient and feasible, contestable supply of ARFF services should be introduced. The important issue for Government is whether any particular form of ARFF pricing creates an unacceptable conflict with Government policy.

There are though a number of different models under which contestability can be achieved and depending on how it is introduced may or may not lead to adjustment mechanisms being required.

Transparency, equity and simplicity

Fairness in pricing can mean different things to different people - especially if they are paying the prices themselves. An often discussed concept of fairness in pricing is the concept of “user pays”. This could be applied to ARFF pricing by arguing that only the users of ARFF services at a particular airport should pay for the costs of providing ARFF services at that airport.

On the other hand, it could be argued that the use of ARFF services does not arise out of an explicit voluntary demand by users at a particular location. Rather, ASA's incursion of ARFF costs is determined by government regulations. In this context, it may be argued that a user pays concept of equity has less weight.

It is also possible to argue that fairness involves pricing in a broadly similar fashion unless there are material differences in the costs associated with landing an additional aircraft at a particular airport. That is, it may be argued that fairness requires that price differences only reflect marginal cost differences *per aircraft rather than* average cost differences *at airports*. For example, an extra category 6 aircraft landing at Sydney imposes approximately the same cost on ASA as a category 6 aircraft landing in Darwin (i.e. zero). It could be argued that equity requires that these landings be charged the same price even though the average cost, due to volume, at Darwin is about 11 times the average cost at Sydney.

It is also important that any pricing methodology be transparent, easily understood by stakeholders and easy to administer. If this is not the case and if there is room for material discretion in the setting of prices then it will be more difficult for stakeholders to understand and contribute to the process. Moreover, there is greater likelihood of disputes between ASA, the ACCC and stakeholders.

8. The Charging Options

The following models cover what can be considered the full charging spectrum – from location specific; combination of location specific and category; to a full category based methodology.

As noted at the start of this options paper no-one option is preferred by ASA and the options have been presented here in order to create genuine debate about an appropriate charging methodology that is accepted by industry and addresses the ACCC’s concerns.

The methodologies have been developed using 2004/05 historical activity data based on all movements at a location by aircraft type and tonnes. For the purpose of this paper the methodologies have been modelled using either the tonnage or category (or both) for aircraft with a maximum takeoff weight (MTOW) greater then 15.1 tonnes i.e. for the purpose of modelling the chargeable tonnage between 5.7 – 15.1 tonnes has been ignored and all prices are GST inclusive.

Category aircraft, as the basis of charging, has been modelled for purpose of comparison.

Hamilton Island and Avalon Airports have also been included in the models as both have either surpassed or are approaching the 350,000 passenger throughput threshold at which point they too will require, based on the current regulations, an ARFF service. The pricing for these has been built on desktop operating and capital expense budget estimates (using as noted above 04/05 activity data), the final price for these will be further refined prior to the Draft Price Notification to be lodged by 30 September 2005 and therefore should only be considered as rough estimates at this stage.

Location-specific Pricing

Location-specific pricing is the basis of pricing today at each port location and is calculated by deriving the allowable revenue for a port location (using the building block model – a short description of which is at Attachment E and dividing it by the location forecast tonnes.

The basis of charging under this model today is tonnes though could be passengers or category of aircraft, the location-specific variants below model tonnes and category.

The basis for charging under location-specific pricing, for ARFF, was a major concern for the ACCC particularly as it related to aircraft that are not regular passenger transport (RPT) as an ARFF charge was applied to all aircraft by tonne above the threshold tonnes of 2.5 tonnes.

Their concerns though may be addressed not through necessarily changing the charging methodology i.e. location-specific or by changing the basis of charging i.e. tonnes - but rather by the appropriate application of the charging basis, which is explored in the subsequent section "Charging Basis".

Essentially, location-specific pricing as is determined today could remain but the application of the basis of charging i.e. tonnes can be reviewed such that the pricing methodology has less effect on the smaller or the non passenger carrying aircraft.

This could include the further development of the weight based threshold that was proposed in the interim pricing arrangements; with the fundamental question being should all aircraft pay for an ARFF service, this is discussed further under "today's" model below.

The two location-specific models priced up below include the current pricing model and a location-specific price that distinguishes between the incremental costs of different category aircraft.

Given that the models have been built on the latest activity data and only include tonnes greater than 15.1 you will note that there are some small increases in price over the existing location specific price (Attachment A). Where prices have decreased this is reflective of increased activity, where they have increased dramatically this is due to decreased activity, this is most apparent at Yulara.

(1) Single Location Specific Price

Under the first approach it is noted that the price per tonne is the lowest at Sydney, Melbourne and Brisbane as these three are the highest volume ports with more than three times the passenger activity than the next closest port of Perth (based on 2003/04 statistics). The passenger profile at these locations (Sydney, Melbourne and Brisbane combined) is 28% international, 68% domestic and 5% regional inbound/outbound passenger movements.

Location Specific Price

ARFF Location	Price Per Tonne		Price Per Tonne Currently	
ADELAIDE	$	3.65	$	3.35
ALICE SPRINGS	$	9.88	$	8.75
AVALON	$	21.62		n/a
BRISBANE	$	1.69	$	1.76
CAIRNS	$	4.68	$	4.31
CANBERRA	$	4.82	$	4.60
COOLANGATTA	$	4.65	$	5.09
DARWIN	$	9.96	$	9.28
HAMILTON ISLAND	$	27.67		n/a
HOBART	$	7.53	$	10.16
LAUNCESTON	$	8.60	$	11.95
MACKAY	$	12.05	$	12.83
MAROOCHYDORE	$	17.70	$	16.82
MELBOURNE	$	1.34	$	1.40
PERTH	$	2.82	$	2.74
ROCKHAMPTON	$	10.98	$	12.32
SYDNEY	$	0.89	$	0.88
TOWNSVILLE	$	10.77	$	10.37
YULARA	$	30.89	$	8.75

The application of the weight threshold and the question as to whether all aircraft should pay for ARFF could be addressed in the following way/s.

Continue to apply a 15.1 tonne threshold and charge all aircraft above that the location-specific price based on tonnes and operators with aircraft below 15.1 tonnes could;

- be asked by ASA if they carry passengers or are licensed to carry passengers and would then be charged on a tonnes basis with all other operators incurring no cost; or

- be asked by ASA if they carry passengers or are licensed to carry passengers and would then be charged on a tonnes basis with all other operators paying a nominal fee of say 0.50 cents per tonne; or

- be asked by ASA if they carry passengers or are licensed to carry passengers and would then be charged on a tonnes basis with all other operators paying a flat call out fee of say $1,000 if ARFF had to respond to one of their aircraft.

The impact of location-specific pricing on regional airlines and start-up airports could also be obviated through its application within a risk sharing framework and the associated use of activity triggers and “transitional pricing”.

The use of local activity triggers is explored in the section on “Risk Share Arrangements” below; transitional pricing within the context of an airport negotiation could see ASA charging a reduced price per tonne for a start-up period at a location with such under recovery being addressed through higher pricing in subsequent years.

Transitional pricing could be adopted under either this or the location-specific incremental category based approach detailed below *(2)*, and would avoid the dislocating impact of introducing a new service, a phased approach to recovering the capital and up front operating and establishment costs as well as return on capital could be adopted for the more price sensitive users i.e. low category aircraft operators or aerodromes.

Taking into account the price sensitivity of different operators, this solution provides that, at a minimum, all 'cash' operating costs are recovered from the first year of operation. However, the recovery of depreciation and Airservices' return on capital could be phased in over a period of time, up to 5 years in respect of the most price sensitive of customers.

The benefits of this option are that it is sufficiently flexible to ameliorate the dislocating impact that lumpy investments can have on an operator's business.

(2) Location-specific, Incremental Cost, Aircraft Category Charge

This second approach is a location specific price that differentiates on station category based on incremental cost and it has been modelled below on both a tonnes and category basis.

They attribute the incremental cost of a higher level of service to the category of aircraft causing the increased cost. At Alice Springs for example, as it's a category 6 port all aircraft would be charged $9.88 per tonne landed.

Where as in Perth (a category 9 aerodrome) category 6 aircraft would pay $0.80 per tonne landed and category 9 aircraft would pay $6.31 per tonne landed.

Location Specific, Incremental Cost, Aircraft Category Charge

ARFF Location	Price Per Tonne Aircraft Category			
	9	8	7	6
ADELAIDE	$ 10.44	$ 10.44	$ 3.41	$ 1.85
ALICE SPRINGS	$ 9.88	$ 9.88	$ 9.88	$ 9.88
AVALON	$ 21.62	$ 21.62	$ 21.62	$ 21.62
BRISBANE	$ 3.80	$ 1.40	$ 0.79	$ 0.48
CAIRNS	$ 6.27	$ 6.27	$ 3.77	$ 2.37
CANBERRA	$ 4.82	$ 4.82	$ 4.82	$ 4.82
COOLANGATTA	$ 21.49	$ 21.49	$ 4.98	$ 2.35
DARWIN	$ 11.63	$ 11.63	$ 11.63	$ 7.00
HAMILTON ISLAND	$ 27.67	$ 27.67	$ 27.67	$ 27.67
HOBART	$ 12.24	$ 12.24	$ 12.24	$ 5.30
LAUNCESTON	$ 8.60	$ 8.60	$ 8.60	$ 8.60
MACKAY	$ 12.05	$ 12.05	$ 12.05	$ 12.05
MAROOCHYDORE	$ 17.70	$ 17.70	$ 17.70	$ 17.70
MELBOURNE	$ 2.74	$ 0.97	$ 0.59	$ 0.38
PERTH	$ 6.31	$ 2.09	$ 1.27	$ 0.80
ROCKHAMPTON	$ 10.98	$ 10.98	$ 10.98	$ 10.98
SYDNEY	$ 1.44	$ 0.59	$ 0.38	$ 0.25
TOWNSVILLE	$ 17.78	$ 17.78	$ 17.78	$ 7.57
YULARA	$ 30.89	$ 30.89	$ 30.89	$ 30.89

Location Specific, Incremental Cost, Aircraft Category Charge

ARFF Location	Price Per Landing Aircraft Category			
	9	8	7	6
ADELAIDE	$ 2,067	$ 2,067	$ 298	$ 144
ALICE SPRINGS	$ 587	$ 587	$ 587	$ 587
AVALON	$ 1,528	$ 1,528	$ 1,528	$ 1,528
BRISBANE	$ 972	$ 243	$ 88	$ 44
CAIRNS	$ 841	$ 841	$ 387	$ 197
CANBERRA	$ 229	$ 229	$ 229	$ 229
COOLANGATTA	$ 2,766	$ 2,766	$ 386	$ 160
DARWIN	$ 1,007	$ 1,007	$ 1,007	$ 500
HAMILTON ISLAND	$ 1,547	$ 1,547	$ 1,547	$ 1,547
HOBART	$ 889	$ 889	$ 889	$ 337
LAUNCESTON	$ 546	$ 546	$ 546	$ 546
MACKAY	$ 530	$ 530	$ 530	$ 530
MAROOCHYDORE	$ 1,139	$ 1,139	$ 1,139	$ 1,139
MELBOURNE	$ 731	$ 165	$ 74	$ 41
PERTH	$ 1,471	$ 333	$ 146	$ 72
ROCKHAMPTON	$ 431	$ 431	$ 431	$ 431
SYDNEY	$ 401	$ 109	$ 56	$ 31
TOWNSVILLE	$ 1,218	$ 1,218	$ 1,218	$ 379
YULARA	$ 1,760	$ 1,760	$ 1,760	$ 1,760

Efficiency Assessment

As already discussed, the per tonne basis of pricing is justifiable given that increases in ARFF prices *per landing* have a smaller impact on demand to land heavier aircraft than lighter aircraft, which would be consistent with the efficient recovery of non-incremental avoidable costs at *a particular airport*.

While a weight based charge does set a higher price for the largest category aircraft landing at that airport, this higher charge is justified on the basis that they are less price responsive (as described above). [19]

In order to properly signal the fact that higher category aircraft *also* require ASA to invest in higher category services, the price per tonne for these aircraft should also be higher than for other aircraft. For example, at Coolangatta, the averaging of prices across categories means that a category 9 aircraft pays the same as a category 8 aircraft ($21.49 per tonne). However, because Coolangatta is just on the threshold of being category 8 airport, category 8 aircraft have around $16 per tonne more avoidable costs than a category 7 and below aircraft. That is, a small reduction in category 8 aircraft landing would result in Coolangatta Airport being downgraded to category 7 airport - which means that the avoidable cost per category 8 aircraft

19 This is because their higher passenger carrying capacity means that they can spread the cost over more end customers which means that they are likely to be less price responsive to increases in the cost *per landing* than smaller aircraft.

landing is high. This higher cost of category 8 aircraft landings is better signalled under the second option described above where category 8 aircraft pay $21.49.

Across airports though the same efficient recovery may not exist. Compare the ARFF price paid by a category 6 aircraft landing at Darwin ($9.96 or $7.00 per tonne) with the price paid for the same aircraft landing at Sydney ($0.89 or $0.25 per tonne). In both cases the incremental/avoidable costs to ASA associated with landing category 6 aircraft at each airport are zero. However, at Sydney the mark-up on incremental/avoidable costs is $0.89 (or $0.25) while at Darwin it is $9.96 (or $7.00). This differential mark-up over incremental/avoidable costs is only efficient if demand to land aircraft at Darwin is at least 11 (9.96/0.89) times less price responsive than at Sydney, which does not seem likely.

In summary, there are approaches to location-specific pricing that will be sympathetic to new airlines or airports and the category model suggested recognises that higher category aircraft require ASA to invest in higher category services i.e. more costly.

Equity, Transparency and Administrative Simplicity

Fairness in pricing can mean different things to different people - especially if they are actually paying the prices themselves. The above pricing principle has the property that all costs at each airport are recovered from users of that airport. This may be regarded as being consistent with a “user pays" concept of equity. That is, charging category 6 planes $9.96 per tonne in Darwin and $0.89 per tonne in Sydney may be viewed as equitable/fair on the basis that the *average* cost per landing in Darwin is higher.

On the other hand, it could be argued that the use of ARFF services does not arise out of an explicit voluntary demand by users at a particular location. Rather, ASA's incursion of ARFF costs is determined by government regulations. In this context, it may be argued that a user pays concept of equity has less weight. That is, passengers into Darwin do not choose to use ARFF services at a cost of $9.96 per tonne, but have that choice forced on them by government regulation.

The above pricing methodology is highly transparent with little or no role for ASA to exercise discretion once the pricing methodology is accepted, it is also very easy for ASA to administer.

Location-specific and Category Pricing

There are a variety of ways in which location-specific pricing could be modified in order to address some of the pricing anomalies that are caused by low volume activity.

The following are two models developed using a combination of both location-specific and category based pricing deriving a price by location by aircraft category (i.e. length).

(1) Location-specific for ports with >6 million passenger movements

This assumes that location-specific pricing is maintained for those airports that have a volume of passenger throughput that supports location-specific pricing (thought to be 6 million passenger movements) and the remainder are priced on a full category basis, reviewed on both a tonnes and category charging basis.

The category price, under this approach, has been determined for each category of aircraft by each category funding the incremental cost increase over the base cost of a category 6 fire station, which assumes that larger aircraft drive more of the cost.

It can be seen that pricing in Brisbane, Melbourne and Sydney is maintained, though category 6 aircraft flying into a category 6 station such as Maroochydore would now pay $4.51 p/tonne as against $17.70 p/tonne under location-specific pricing.

Additionally, a further variance to the models would be to adjust the location-specific price for the >6 million passenger movement ports to an incremental aircraft category as described in the location-specific model above.

Location Specific Charge for > 6 Million Passengers
Incremental Aircraft Category Charge for < 6 Million Passengers

ARFF Location	<> 6m Pax	Price Per Tonne Aircraft Category			
		9	8	7	6
BRISBANE	> 6m	$ 1.69	$ 1.69	$ 1.69	$ 1.69
MELBOURNE	> 6m	$ 1.34	$ 1.34	$ 1.34	$ 1.34
SYDNEY	> 6m	$ 0.89	$ 0.89	$ 0.89	$ 0.89
ALL OTHER LOCATIONS	< 6m	$ 10.10	$ 8.47	$ 6.15	$ 4.51

Location Specific Charge for > 6 Million Passengers
Aircraft Category Charge for < 6 Million Passengers

ARFF Location	<> 6m Pax	Price Per Flight Aircraft Category			
		9	8	7	6
BRISBANE	> 6m	$ 155	$ 155	$ 155	$ 155
MELBOURNE	> 6m	$ 145	$ 145	$ 145	$ 145
SYDNEY	> 6m	$ 110	$ 110	$ 110	$ 110
ALL OTHER LOCATIONS	< 6m	$ 1,416	$ 997	$ 512	$ 317

Efficiency Assessment

This approach is essentially an application of two different pricing models to two different groups of airports.

Relative to the other models presented in the paper this model tends to accentuate the difference in prices between the largest airports and all other airports. To the extent that this does not reflect differences in incremental/avoidable costs, it is likely to be inefficient. To the extent that it fails to signal location specific category costs at the smaller airport it is also probably less efficient than the next hybrid model.

By not applying full location specific pricing at small airports (often category 6) this model ensures that extremely high per tonne prices are not charged at the smallest airports (e.g. $21.62 at Avalon). This may be efficient if charging those prices would over signal avoidable costs due to the existence of sunk costs and the cost to ASA of actually removing a service.

Equity, Transparency and Administrative Simplicity

There does not appear to be a strong equity argument vis-à-vis different airports for applying a different pricing model to small and large airports. However, there may be equity arguments surrounding the desirability of avoiding setting very high prices at the smallest regional airports.

The above pricing methodology lacks transparency in that a somewhat arbitrary line is drawn between the three largest airports and all other airports though it is likely to be easy for ASA to administer.

(2) Base level service charge plus incremental category cost charge

This second approach (modelled using tonnes only) is that the basic level of service i.e. category 6 is funded by all aircraft, with location-specific costs above this maintained and directed at the direct users that directly contribute to the current station category.

Under this model, all airports would apply a $1.45 per tonne to all category 6 and below aircraft. However, the prices for higher category aircraft landing at higher category ports would include a location specific charge to reflect the incremental/avoidable cost of higher category landings at that port.

For example, category six aircraft landing at Sydney and Coolangatta would both pay $1.45 per tonne. However, category 9 aircraft landing at Sydney would pay $2.70 per tonne whereas category 9 aircraft landing at Coolangatta would pay $13.94 per tonne. This reflects the fact that the larger number of category 9 aircraft landing at Sydney involves a smaller avoidable cost per tonne than at Coolangatta.

This pricing option combines the potentially attractive elements of location-specific pricing and full category pricing (detailed below). On the one hand it charges a common 'base price' for base level (category 6) ARFF services but charges location specific increments to reflect the location specific costs of higher category services at higher category airports.

Base Level Service Charge plus Incremental Category Cost Charge

ARFF Location	Station Category	Price Per Tonne Aircraft Category 9	8	7	6
ADELAIDE	8	$ 10.44	$ 10.44	$ 3.09	$ 1.45
ALICE SPRINGS	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
AVALON	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
BRISBANE	9	$ 4.73	$ 2.36	$ 1.76	$ 1.45
CAIRNS	8	$ 6.04	$ 6.04	$ 3.10	$ 1.45
CANBERRA	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
COOLANGATTA	8	$ 13.94	$ 13.94	$ 3.17	$ 1.45
DARWIN	7	$ 7.90	$ 7.90	$ 7.90	$ 1.45
HAMILTON ISLAND	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
HOBART	7	$ 5.88	$ 5.88	$ 5.88	$ 1.45
LAUNCESTON	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
MACKAY	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
MAROOCHYDORE	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
MELBOURNE	9	$ 3.91	$ 2.07	$ 1.67	$ 1.45
PERTH	9	$ 6.25	$ 2.57	$ 1.86	$ 1.45
ROCKHAMPTON	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45
SYDNEY	9	$ 2.70	$ 1.81	$ 1.59	$ 1.45
TOWNSVILLE	7	$ 9.95	$ 9.95	$ 9.95	$ 1.45
YULARA	6	$ 1.45	$ 1.45	$ 1.45	$ 1.45

<u>Efficiency Assessment</u>

This pricing model ensures that very large differences between locations are reduced (e.g. the maximum differential between Darwin and Sydney is only 5 times instead of 11 times). Reducing this differential may have useful efficiency properties if it is the case that incremental/avoidable costs are largely the same at both locations.

On the other hand, it still accurately signals differences in location specific incremental/avoidable costs of providing higher category services. For example, at Coolangatta the price rises sharply from $3.17 at category 7 to $13.94 at category 8/9 to reflect the fact that a relatively small reduction in category 8/9 landings would allow ASA to downgrade that service to a category 7 ARFF service.

However, no location specific costs are signalled at category 6 airports (as all prices are the same at these airports). This may have some efficiency costs if:

- setting full location specific prices would cause passenger throughput at that airport to fall below 300,000 - allowing ASA to remove ARFF services; and
- full location specific pricing reflects avoidable cost (i.e. there are few sunk costs in providing ARFF services).

On the other hand, if neither of these is the case then charging the same price for category 6 (and below) landings across airports is likely to be an efficient reflection of both avoidable costs and the need to recover non-avoidable costs in the least distortionary manner.

Equity, Transparency and Administrative Simplicity

This option involves a “half way” option between full cost spreading and location specific pricing. As such, it may provide a compromise between competing interpretations of fairness.

For an aircraft of any particular category, the price per tonne at Sydney is higher than it would be under full location specific pricing but is still lower than, or equal to, the price charged at other airports of the same category.

The above pricing methodology is transparent with little or no role for ASA to exercise discretion once the pricing methodology is accepted and once set would be relatively easy to administer.

Category Pricing

The following model is based on a full category pricing model which recovers ASA’s estimate of the cost of providing category 6 services at all ARFF airports from all tonnes landed (excluding aircraft of less than 15.1 tonnes). The additional costs of providing category 7 services at some ARFF airports are recovered only from category 7+ aircraft (wherever they land). The additional costs of providing category 8 services at some airports are recovered only from category 8+ aircraft and so on.

Only the incremental cost category model is presented below.

Here it can be seen that costs of category 6 aircraft flying into Maroochydore would pay $1.45 p/tonne (as opposed to $17.70 p/tonne under location-specific pricing) and those category 9 aircraft flying into Sydney would pay $4.00 p/tonne (as opposed to $1.44 p/tonne under location-specific category pricing).

Incremental Cost Category Charge (Tonnes)

ARFF Location	Price Per Tonne Aircraft Category			
	9	8	7	6
ALL LOCATIONS	$ 4.00	$ 2.50	$ 1.92	$ 1.45

Incremental Cost Category Charge (Flights)

ARFF Location	Price Per Flight Aircraft Category			
	9	8	7	6
ALL LOCATIONS	$ 836	$ 355	$ 211	$ 139

Efficiency Assessment

This pricing option differs from today's pricing methodology in two important ways. Firstly, it is not location specific as the same price is paid no matter where an aircraft lands. Secondly, the price per tonne increases as the category of aircraft landing increases (for category 7 aircraft and above).

ASA believes that the second property is likely to be efficiency enhancing. That is, increased landings of higher category aircraft impose incremental costs on ASA in the form of the regulatory requirement that ASA increases the category of ARFF services supplied. As such, ASA considers that this aspect of the pricing model tends to provide efficient signals on average.[20]

The move away from location specific pricing has both positive and negative efficiency implications. On the positive side, setting a single price per category tends to promote efficiency because ASA's incremental/avoidable costs associated with most aircraft landings are the same (i.e. zero). Setting the same price for services with the same cost is economically efficient unless there are material differences in the elasticity of demand. As already discussed, ASA is unconvinced that pricing on the basis of estimates of different passenger elasticity of demand is feasible.

The potential efficiency benefits can be seen by again noting that the previous pricing model had the price for a category 6 aircraft landing at Darwin 11 times higher than the price for a category 6 aircraft landing at Sydney. This model would have the same price of $1.45 at both locations - which would likely more accurately reflect both: a) their incremental cost to ASA of zero; and b) the relative price responsiveness of demand to land those aircraft at Darwin and Sydney.

However, at some airports and in some circumstances there may be material incremental/avoidable costs as a result of a change in activity. This is because the averaging of prices across locations may disguise differences in incremental/avoidable costs across airports. In fact, the move to non-location specific category based pricing will cause higher category prices to fall at some airports when efficiency suggests that they should rise. For example, Coolangatta airport's category 8 price falls from $21.49 per tonne to $2.50 per tonne when an accurate reflection of avoidable costs should probably result in prices rising.

The same may be true of other airports where there is a realistic possibility of the airport ceasing to have ARFF services supplied. For example, Avalon would have a price of $21.62 per tonne once ARFF services are established under the first location specific model but have a price of only $1.45 per tonne under this model. If the full $21.62 represented realistically avoidable costs then it would be efficient to charge this price at Avalon.

20 However, it should be noted that this is not a perfect signal of incremental/avoidable 'category costs'. This is because category 7 aircraft landing at category 9 airports will have to pay higher prices per tonne than category 6 aircraft landing at the same airport - despite the fact that, in reality, both aircraft landings impose close to zero incremental cost while the airport remains a category 9 airport.

However, ASA cannot charge for ARFF services until it has sunk substantial costs in actually providing them. In this context, charging full location specific prices may actually be inefficient. For example, imagine that ASA introduces a $21.62 charge at Avalon and, as a result, an airline ceases to operate from that airport with the effect that ARFF services are removed. This would be an efficient outcome *if* the whole $21.62 represented avoided costs to ASA. However, if, say, only $5 represented avoided costs then it may actually be an inefficient outcome. The most efficient outcome would have been for ASA to charge $21.62 *before* establishing the ARFF service at Avalon, i.e. signalling the cost of establishing a fire station before it was actually built. While this option would also deter landings, it would do so before costs are sunk.

However, this option is not available to ASA.

In summary, ASA believes that in the majority of circumstances it will be efficient to charge the same category of aircraft the same price to land irrespective of location. However, in some circumstances this may not be the case and the costs associated with sending incorrect signals in those circumstances may potentially be high.

<u>Equity, Transparency and Administrative Simplicity</u>

Charging higher category aircraft more per tonne is likely to be considered more equitable as higher category aircraft tend to impose higher costs on ASA.

The other obvious equity consideration is whether it is fair to charge the same price at different locations despite the average cost being different at those locations. As already discussed, ASA believes there are equity arguments for and against doing so.

The above pricing methodology is transparent with little or no role for ASA to exercise discretion once the pricing methodology is accepted; it is also likely to be easy for ASA to administer.

Full Network Pricing

A full network price whilst the simplest in many ways; as it establishes one price regardless of location or avoidable cost has been discounted by the ACCC in the past and as such is not considered further in this paper

Concerns previously raised were that it was unlikely to advance either efficient or equitable outcomes and that it would likely exacerbate productive inefficiency because the costs of providing services would not be targeted directly to those using the service. Additionally, equity issues were raised against customers paying more than the cost of providing the service to them.

Under this model ASA's total allowable revenue for all locations would be determined and divided by total tonnes or total landings to derive a per tonne or per landing price. Under this approach the price for all aircraft would be $2.55 per tonne regardless of location and would be applied to all category aircraft above say 15.1 tonnes regardless of where they land.

9. Basis of charging

In reviewing the basis of charging there are two questions that need to be addressed: what is an appropriate driver; and should all aircraft pay for an ARFF service.

There are three drivers (i.e. the basis for charging) that ASA has identified and discussed above and these include tonnes (using the maximum take-off weight of an aircraft); passenger numbers; and aircraft category.

The basis for charging, for ARFF, was a major concern for the ACCC particularly as it related to aircraft that are not regular passenger transport (RPT) as an ARFF charge was applied to all aircraft by tonne above the threshold tonnes of 2.5 tonnes.

Whilst there is a correlation between maximum take off weight (MTOW) and RPT passengers it is clear that there are aircraft up to 15.1 tonnes that don't carry passengers. This was recognised by ASA in the development of its temporary price notification in June 2005, where the starting point for charging was lifted to 5.7 tonnes; aircraft between 5.7 tonnes and 15.1 tonnes pay the existing price; and those above 15.1 tonnes pay the new price.

Possible options for addressing the ACCC's concerns were addressed under the discussion on location-specific pricing and involved setting a tonne threshold above which it is clear that those aircraft provide an RPT service, below that ASA could determine by enquiry with each airline who is registered to provide or does provide some form of regular passenger service and a charge both groups using the same basis and under the same charging model.

Another option might be that due to issues of price elasticity of demand and concepts of capacity to pay that ASA price discriminate between such user groups and establish only one tonne threshold say 15.1 tonnes, below which no charge is imposed regardless of whether they are RPT, which would be supported by the tonnage and customer demographic data. This could be justified on simplicity grounds and on the grounds that the price elasticity of aircraft below 15.1 tonnes is higher than above 15.1 tonnes and, therefore, charging small aircraft is more likely to distort their usage patterns.

It should also be recognised that even small aircraft benefit from having the service available to them, though this may not be obvious until it is required. A nominal fee could be applied to these aircraft (and other passenger carrying aircraft below a set threshold) thereby ensuring that they continue to make some contribution towards the cost of the service.

The following is a short analysis of each approach:

Tonnes of an aircraft (based on maximum take off weight)
Tonnes (MTOW) is a proven, generally accepted, accurate and easily validated basis of charging as ASA captures the landing data by aircraft type through its tower operations and each plane has a published and agreed MTOW.

There is a strong correlation between MTOW and RPT passengers and ASA currently doesn't charge for maintenance or regular cargo transport, the correlation works on the basis that the MTOW is used as a proxy for the number of persons (passengers) on board.

The correlation between persons-on-board and an aircrafts landed weight, with 92.5% MTOW figures indicating approximately 90% persons-on-board.

Accordingly, a per tonne charge is, in effect, a proxy for a per passenger charge and, consequently, tends to charge a higher price *per landing* for aircraft that carry more passengers. This is likely to be consistent with efficient recovery of non-incremental/non-avoidable costs – as compared to a flat landing charge as it is less likely to distort landings by small aircraft vis-à-vis large aircraft.

Category of an aircraft
Given that the provision of an ARFF service is triggered by passenger throughput while the actual service required is driven by the category of aircraft flying into that location, category of aircraft could be used as a basis of charging.

However, as an aircraft's category is based on length and width there are significant MTOW differences within each category.

Accordingly, in shifting to a category based approach, it might be the case that the correlation between MTOW and passengers is broken and that smaller aircraft within each category would inherently incur a higher cost per passenger. This problem can be ameliorated by continuing to charge on a per tonne basis but charging different prices depending on the category of the aircraft.

Number of passengers carried
Passenger based charging has been reviewed by ASA in the past but has been considered inherently problematic due to the range of issues that could not be resolved with any certainty in order to progress the matter further.

The issues identified have included:

- availability and integrity of relevant passenger and load factor information particularly for smaller regional airlines that must rely on less sophisticated systems;
- logistical issues around data collection and data upload and as a consequence an increased cost of administration to ASA which would need to be recovered;
- passenger perception of a tax;
- how to appropriately charge for a passenger – did it include airline staff relocating; and
- complexity in applying an appropriate rate when passengers may have a number of stops through different category ports on the same trip.

However, this basis of charging would though provide a comparative pricing base between smaller regional operators and the larger airlines.

Finally, ASA has consulted with customers and industry on the difference between tonnes and passengers in order to establish which is the more appropriate basis for charging. Those customers that contribute 95% of the revenue base have generally supported a tonnes based approach, and internationally, ICAO has indicated its preference for MTOW style charging.

10. Risk Share Arrangements

The current regulatory arrangements involve establishing per unit prices at each airport for 5 years based on an assessment of location specific costs and location specific volumes - with unit prices essentially being the former divided by the latter.

The current arrangements also allow for the level of prices to be adjusted if total volumes differ from forecast by more than 5% per annum in the aggregate. However, it is important to understand that this adjustment to prices is not carried out by adjusting prices at each airport to reflect variations from forecast volumes at that airport.

Rather, the adjustment results in the same percentage change in prices at *all* airports. In effect, the adjustment serves to ensure that Airservices' total revenues do not vary materially from estimates of its total costs as a result of volume forecasting errors. The adjustment does not ensure that revenues at each airport do not vary significantly from estimates of costs at that airport.

A consequence of the current arrangements is that (airlines landing at) individual airports face the “risk” that errors in the volume forecast for their facility will not be reflected in price changes until the beginning of the next regulatory price review. This risk is greatest for small airports which comprise a small percentage of the fluctuations in volumes without giving rise to large price adjustments at the aggregate level (or, indeed, any adjustment at the aggregate level if aggregate volumes vary less than 5%).

The concept of “risk sharing” was raised by the ACCC as a potential strategy for dealing with the volatility of activity at individual airports and ASA is open to exploring this concept further with both airlines and airports.

Risks associated with changes in activity; supply and operating costs; technology obsolescence; and changes to the legislative and regulatory environment are inherent in any commercial environment. In an unregulated environment purchasers (and sellers) that rely on key services and strategically important supply arrangements will try to enter contractual arrangements such that these risks are borne by the party best able to manage the risks.

For example, a new gas pipeline will generally not be built until the pipeline owner has struck “take-or-pay” contracts with gas shippers that guarantee a minimum annual payment by the shippers irrespective of the volume they actually transport on the pipeline. Relative to a single unit price contract with no minimum payment guarantee, this shifts volume risks to those best able to manage and control those risks (i.e. those demanding the volume). This form of contracting is common in all industries where large fixed and long lived investments are required that can not be avoided when demand for services is low (i.e. large fixed and sunk investments).

In addition to the volume triggers, during the long term price notification process ASA provided a 5 year pricing plan that provided certainty for users and contained elements of risk share based on activity or performance in delivery of infrastructure. Prices can be reviewed and adjusted should:

- ☐ new regulatory or customer requirements call for a change in service levels

which result in a net change in costs;
- ☐ actual capex as a result of revised priorities and/or timing is anticipated to differ from the forecast level by 50 per cent or more within a single year, or by 25 per cent cumulatively i.e. less than a 75 per cent performance against program;
- ☐ aggregate activity levels deviate above or below forecast levels by 10 per cent or more within a 60-day period and/or 5 per cent in a financial year.

At an aggregate level, Airservices regards the above risk sharing between itself and industry to be reasonable. However, Airservices recognises that, when examined in the context of prices paid at individual airports, there is a view that more volume risk should be shifted to users at that airport. That is, average prices paid at a particular location should fluctuate more with fluctuations of volumes at that airport than is currently the case.

In the draft price notification in November 2004 and the more recent temporary price notification in June 2005, the ACCC supported the opportunity for ASA to further explore the notion of risk share.

There are at least three options for greater devolution of risk to individual locations that could be considered, these include **location specific volume adjustments for all ports; a direct contract with individual airports; and a direct contract with an airline.**

Initial advice from the ACCC has been sought as to how they might, from a regulatory perspective, wish to be involved in these last two options i.e. direct contracts with an airport or airline operator.

In relation to a contract with an airport given that airports are not declared persons in relation to the provision of such services, the ACCC considers that it may have no prices oversight role in relation to the charges imposed by an airport for such on selling. Where the airport concerned has a significant degree of market power in the provision of such a service, the lack of regulatory oversight of such prices raises broader policy concerns which may need to be addressed though.

In relation to a directly negotiated price, for example, with an airline, it would appear that the contract would still be subject to the prices notification provisions and Airservices would be required to notify the ACCC of any proposal for an increase in prices.

Additionally, in performing its powers under the prices notification provisions, the ACCC may be concerned to assess the structure of such arrangements (with regard to fixed and variable components) if such proposed charges were notified to it under those provisions.

It is also worth noting that the risk share arrangements may also differ by airport location as the risk share model that may be suitable for a regional or developing (new entrant) airport may be different to a capital city airport and their perspective on the importance of being able to control cost of service at that location and therefore their desire to enter into a risk share arrangement will also be different.

It is apparent that the notion of risk share and its associated application particularly when looking at the breadth of services and customers can become complex quickly.

Accordingly, whilst ASA is open to exploring the concept of risk sharing arrangements further with both airlines and airports we would only want to consider such arrangements to the extent that they:

- won't distort prices for non-contracted purchasers;
- simplify administration arrangements; and
- where they provide a true risk share.

The following are a range of different approaches under each of the risk share options identified above:

Location specific volume adjustments – for all ARFF services

The current regulatory framework allows Airservices to adjust prices if aggregate volumes deviate materially from forecast. This protects Airservices' return on its (legislatively required/non discretionary) investments from variations in volumes which it has little or no ability to control.

However, location specific volume triggers could be introduced as an alternative or as a complementary measure to the current volume correction adjustment. This would ensure that actual revenues from specific locations did not vary materially from forecast revenues.

Whether or not location specific adjustments should completely replace, or be introduced as a complement to, the current adjustment mechanism is an open question. In this regard there are several options:

- retain the current aggregate adjustment triggers of 5/10% but when this trigger is passed to reset prices at all ARFF locations based on the most recent activity levels;
- replace the current aggregate adjustment triggers with location specific adjustment triggers; and
- **i**ntroduce location specific triggers in addition to the current aggregate triggers. Under this scenario, location specific triggers would be set at such a level to only be triggered when actual volumes were very much higher than forecast (say, 20%).

Directly negotiated contracts with airports

A contract for the provision of service at a port could be entered into by ASA for the provision of service at a port with the airport owner/operator in one of the following ways:

(1) A fixed and variable charge

Under this model rather than charging airlines ASA would charge airports directly for ARFF services. This would allow the introduction of both fixed and variable charges, i.e., a 'two part' tariff for ARFF services at a specific airport. Under this pricing structure Airservices would receive a guaranteed annual payment plus revenues from per unit charges - where per unit charges would be reduced to reflect the fact that Airservices would have an alternative fixed revenue stream.

The higher the fixed charge the lower the variable price charged by Airservices. This means that individual payments to Airservices would be less affected by volume fluctuations (as the per unit price is lower).

It would also allow airports greater flexibility not to pass this cost onto their customers (airlines) in aeronautical charges if they believed that they would benefit from higher volumes as a result. If the airport believes that demand at that location is very price sensitive then it may decide not to pass on the total amount in aeronautical prices in order to avoid discouraging activity from which it benefits (including through aeronautical charges and non-aeronautical revenues).

(2) Floating lump sum and fixed variable

An airport may wish to enter into a reduced lump sum contract with ASA for the provision of ARFF services with any maximum revenue differential to ASA being achieved by reduced unit charging to airlines using the facility. For example:

- ☐ Airservices Australia has an approved revenue stream of $1,500,000 dollars for 2006/2007 for ARFF services at an airport.
- ☐ Activity estimates agreed by the Industry Steering Committee are for 500,000 tonnes landed for the period.
- ☐ The Airport Operator estimates activity at 700,000 and objects to the industry agreed activity estimate.
- ☐ Using the approved revenue stream and the industry agreed activity; the price would be $3.00 per tonne.
- ☐ Using the approved revenue stream and the airports activity estimate, the price would be $2.14 per tonne.

ASA enters into an agreement with the Airport Operator which caps the price at $2.14 for the period and ASA retains its direct contract with flying customers for the provision of services.

The agreement between ASA and the Airport Operator binds the Airport Operator to a payment to ASA in the event that the revenue stream agreed in the long term pricing plan is not achieved. By way of example, the outcome could be as follows:

Airports estimate of activity	(tonnes)	700,000
Activity actually achieved	(tonnes)	600,000
Price cap agreed in ‘Risk Sharing Agreement’		$2.14
Revenue from flying customers at capped price ($2.14)		$1,284,000
Allowable revenue approved in the long term pricing plan		$1,500,000
Payment required by the Airport Operator to meet allowable revenue		$216,000

The agreement would also include a provision that ASA would not recover any shortfall in activity below the industry agreed estimate from the Airport Operator. These shortfalls could be subject to the same trigger mechanisms that apply across the full long term pricing plan.

Directly negotiated contracts with airlines

An alternative to negotiating with airports could be for ASA to negotiate directly with Airlines.

If both the airline and ASA agree that an alternative pricing structure is more efficient (involves superior economic incentives and/or allocation of risks) then the airline could choose to pay according to the mutually agreed pricing structure for an agreed period in the following way:

(1) Single fixed charge or Single fixed charge plus a uniform price

Airline ABC and Airservices could agree that rather than paying the current regulated prices it would be more efficient if it paid:

- a fixed annual charge of $20m; and/or
- a uniform price per tonne at all locations which is substantially lower than the current average per tonne charge.

Such a pricing structure may be more attractive to both parties because:

- Airline ABC would have an increased incentive to land at all airports and especially at smaller regional airports where ARFF charges per tonne are high (where the marginal cost to ASA of an extra landing is close to zero);
- Airservices' revenues will have less exposure to volume variations as its per tonne prices would be lower (although it would face the risk that Airline ABC took market share from other airlines resulting in a loss of revenue to ASA equal to the difference in the regulated and negotiated per tonne charge).

It is also possible that, rather than negotiating an Australia wide agreement, an airline may also negotiate prices at a particular location (or set of locations).

Given that 95% of ASA's ARFF revenue is generated from only 39 customers, representing 1.5% of the customer base a direct contractual arrangement based on a lump sum fee would appear to be very efficient.

11. Overall Revenue

The maximum allowable revenue (MAR) was assessed by the ACCC within the context of its 2004 assessment of Airservices' long-term pricing proposal. At that time it accepted that the overall amount of revenue that Airservices sought to recover from these services was appropriate.

Accordingly, whilst ASA appreciate that industry will be concerned to ensure that ASA addresses its overall revenue since the new prices were established, the long term charging methodology for ARFF establishes the basis of charging.

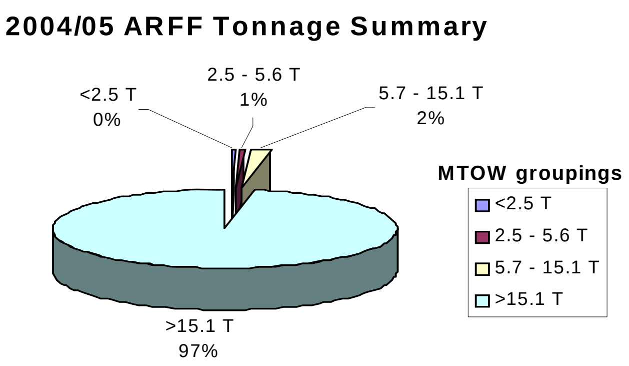
As such the focus therefore is on agreeing a long term charging methodology, its application and associated commercial arrangements including elements of risk share, not on the total amount of revenue or the agreed return both of which have been previously agreed under the long term price notification in November 2004.

12. Location and Customer Demographics

The following provides a short summary of some of the key location and customer demographic data that has been developed through analysing flight activity and tonnes landed in the last financial year (i.e. 2004/05).

Aircraft

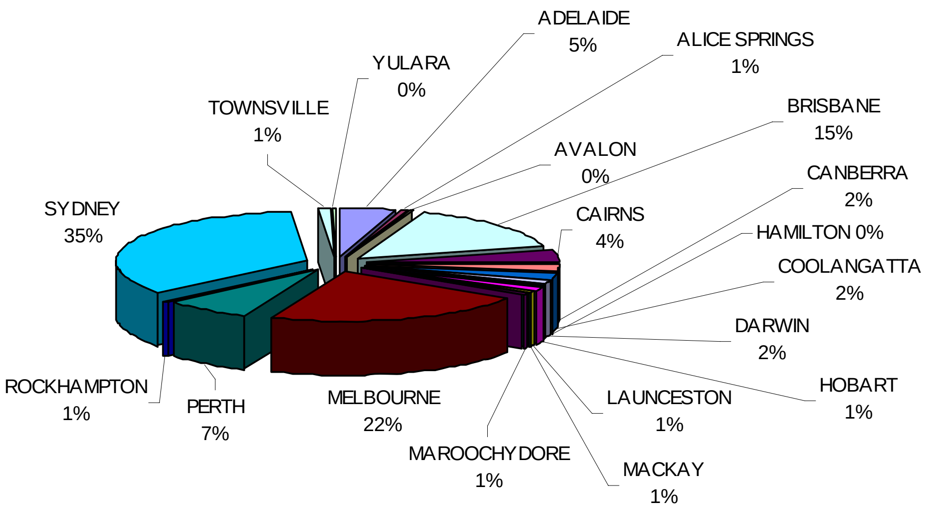
95% of all tonnes landed were comprised of 23 different aircraft types. Of the 23 different aircraft types, 91% (or 21 aircraft types) had an MTOW heavier than 15.1 tonnes. Out of all the aircraft which arrived at ports with an ARFF presence (or prospective service) during last financial year 97.2% of those aircraft exceed a Maximum Take-Off Weight (MTOW) of 15.1 tonnes.



During 2004-05, the aircraft with the highest frequency of arrivals and greatest sum of tonnes landed at ARFF locations was a Boeing 737-800 series aircraft.

Boeing 747-400 series arrivals ranked 11th and whilst surpassed by ten other aircraft types, had the second greatest sum of tonnes landed. Interestingly, the tonnes landed for both the B737-800 and B747-400 accounted for 50% of the overall tonnes landed during the period.

2004/05 ARFF Tonnage Summary by location



Customers
95% of the chargeable tonnes landed comprised of 39 customers, representing 1.5% of the customer base.

Of these 39 customers, 74% were customers within the international operator segment and accounted for 38.4 million tonnes or almost 40% of the top 39 customer tonnes.

Locations
Although Sydney had the highest frequency of arrivals, the three radar locations of Brisbane, Melbourne and Sydney combined represented 72% of the overall tonnes landed around the ARFF service network.

Revenue
In the last financial year, the majority of the $65 million received for ARFF regulated services was derived from 39 customers. The remaining portion of revenue was collected from 2,957 customer/operators.

2004/05 ARFF Summary of Revenue Derived from Aircraft

Aircraft Type	% of Revenue	Aircraft Type	% of Revenue
B738	20.3%	B733	2.6%
B763	11.7%	A320	2.5%
B737	11.1%	DH8C	2.2%
B734	9.0%	B462	1.5%
B744	8.0%	B743	1.1%
B712	7.6%	B463	1.0%
A333	3.3%	B773	1.0%
B772	3.0%	A343	1.0%
A332	2.7%	Other Types	10.3%
			100.0%

Aircraft Category
During 2004/05, 31% of the overall tonnes landed at ARFF locations related to category 9 aircraft (i.e. B747s, B777s, A340s and the like) closely followed by category 6 aircraft. Both category 9 and 6 tonnes landed amounted to almost 23 million tonnes for the period (or 57% of total tonnes landed).

Attachment A
Current Interim ARFF Prices
1 July 2005 – 31 December 2005

	Interim Prices Agreed by ACCC Aircraft with an MTOW:			Pre July 2005 Prices	Prices Proposed November 2004
Airport Location	**Less than 5.7 tonnes**	**Between 5.7 and 15.1 tonnes**	**Above 15.1 tonnes**	**Aircraft with MTOW > 2.5 tonnes**	**Aircraft with MTOW > 2.5 tonnes**
Adelaide	Nil	$2.69	$3.35	$2.69	$3.35
Alice Springs	Nil	$6.81	$8.75	$6.81	$8.75
Ayers Rock	Nil	$13.09	$16.82	$13.09	$16.82
Brisbane	Nil	$1.46	$1.76	$1.46	$1.76
Cairns	Nil	$3.83	$4.31	$3.83	$4.31
Canberra	Nil	$3.58	$4.60	$3.58	$4.60
Coolangatta	Nil	$4.24	$5.09	$4.24	$5.09
Darwin	Nil	$7.23	$9.28	$7.23	$9.28
Hobart	Nil	$8.46	$10.16	$8.46	$10.16
Launceston	Nil	$9.30	$11.95	$9.30	$11.95
Mackay	Nil	$9.98	$12.83	$9.98	$12.83
Maroochydore	Nil	Nil	$16.82	Nil	$16.82
Melbourne	Nil	$1.09	$1.40	$1.09	$1.40
Perth	Nil	$2.40	$2.74	$2.40	$2.74
Rockhampton	Nil	$9.59	$12.32	$9.59	$12.32
Sydney	Nil	$0.69	$0.88	$0.69	$0.88
Townsville	Nil	Nil	$10.37	Nil	$10.37

Attachment B

The proposed timetable is as follows:

Key Deliverable	Date
Charging Methodology Options Paper (Options Paper) delivered to the ACCC, customers and stakeholders	19 August 2005
ACCC to provide an "Issues Paper" on the "Options Paper" for consultation purposes to key stakeholders	26 August 2005
Onsite Consultation conducted by Airservices Australia	5 September – 9 September 2005
ACCC to receive submissions from key stakeholders on the Options and Issues Papers	16 September 2005
Draft Price Notification submitted to ACCC	30 September 2005
ACCC to issue preliminary view on Draft Price Notification	9 November 2005
ACCC to receive submissions on preliminary view	30 November 2005
Final Price Notification submitted to ACCC	5 December 2005
Final Decision from ACCC	21 December 2005

Attachment C
Category of Aerodromes

Category	Aerodrome
Category 9	Brisbane Melbourne Perth Sydney
Category 8	Adelaide Cairns Coolangatta
Category 7	Darwin Hobart Townsville
Category 6	Alice Springs Avalon (yet to be established) Canberra Hamilton Island (yet established) Launceston Mackay Maroochydore Rockhampton Yulara

Attachment D
Summary of Responses – Aircraft/Non-Aircraft related

Response Type	Total	
Aircraft - Aborted Landing or Take Off	262	Aircraft Responses
Aircraft - Aux. Power Unit	6	
Aircraft - Bird Strike	1	
Aircraft - Cargo Hold	2	
Aircraft - Crash	7	
Aircraft - Engine Fire	8	
Aircraft - Hazard material	1	
Aircraft - Hot Refuel	32	
Aircraft - Other	54	
Aircraft - Smoke smell/fumes	22	
Aircraft - Smokey Wheel	2	
Aircraft - Undercarriage Obs	7	
Aircraft - Wheel Fire	7	**411**
Fire Alarm	2355	Non-aircraft Responses
Fire Alarm - Fire Response	9	
Fire Non-aircraft	92	
First Aid	2049	
Fuel Spillage	146	
Grass Fire	1	
Hazard material	34	
Mutal Aid Call - Fire	12	
Mutual Aid Call	28	
Motor vehicle accident	49	
Special Service	290	
Total	**5476**	**5065**

Attachment E
Building Block Formula

As part of the Long Term Pricing Project to set a 5 year pricing path across Airservices' enroute, terminal navigation and ARFF services, it was agreed with industry that the ACCC's Building Block formula, be applied to determine the level of revenue that Airservices was entitled to recoup.

The Building Block methodology essentially allows Airservices to recoup its running costs plus an element of profit based on a weighted average cost of capital associated with its infrastructure, with minor adjustments made for gearing and taxation imputation purposes.

The formula is as follows:

Allowable Revenue = A x B + C + ((A x B - A x D x E) x (F+F^2+F^3+F^4+ F^5))

Where:

A = Average Written Down Value of Assets, based on a depreciated optimised replacement value
B = Weighted Average Cost of Capital
C = Costs
D = Gearing %
E = Interest
F = Tax Rate (Including Imputation)

In essence, a price is derived by dividing a locations activity (tonnes) into the locations' allowable revenue.

Attachment F
Example Calculation for Models and Formula

Location Specific Price Models

Location Specific Price

The price per tonne of maximum take-off weight (MTOW) is calculated according to the following formula:

$$P_A = \frac{MAR_A}{FT_A}$$

Where:

- P_A is the price per tonne of MTOW for all aircraft landing at airport A (excluding those aircraft weighing less than 15.1 tonnes);
- MAR_A is the currently estimated maximum allowable revenue (MAR) at airport A which is also equal to location specific costs plus an allocation of ARFF costs that are common across airports; and
- FT_A is the forecast tonnes landed at airport A (excluding aircraft weighing less than 15.1 tonnes).

Simple Illustration -

If the maximum allowable revenue at airport A is \$1 million and the forecast tonnes landed at airport A are 500,000, then the price per tonne of MTOW at airport A is calculated as follows:

$$P_A = \frac{MAR_A}{FT_A}$$

$$P_A = \frac{\$1 million}{500{,}000}$$

$$P_A = \$2$$

Similarly, if the maximum allowable revenue at airport B is \$1.5 million and forecast tonnes landed at airport B is 1 million, then the price per tonne of MTOW at airport B is \$1.50.

Location Specific, Incremental Cost, Aircraft Category Charge

The prices per tonne of MTOW are calculated according to the following formulae:

$$P_{6A} = \frac{Cat_{6A}Costs}{FT_{1+A}}$$

Where:

- P_{6A} is the price per tonne of MTOW for all category 6 (and below) aircraft landing at airport A;
- Cat_{6A}Costs is ASA's estimate of the incremental cost of providing category 6 services rather than no service at airport A. This is calculated as per the table below; and
- FT_{1+A} is the total forecast tonnes landed at airport A (excluding those aircraft weighing less than 15.1 tonnes), i.e. the forecast tonnes landed for all category '1+' aircraft.

$$P_{7A} = \frac{Cat_{7A}Costs}{FT_{7+A}} + P_{6A}$$

Where:

- P_{7A} is the price per tonne of MTOW for all category 7 aircraft landing at airport A;
- $Cat_{7A}Costs$ is ASA's estimate of the incremental cost of providing category 7 services rather than category 6 services at airport A. This is calculated as per table below; and
- FT_{7+A} is the forecast tonnes landed of all category 7 and above aircraft at airport A (excluding aircraft weighing less than 15.1 tonnes).

$$P_{8A} = \frac{Cat_{8A}Costs}{FT_{8+A}} + P_{7A}$$

Where:

- P_{8A} is the price per tonne of MTOW for all category 8 aircraft landing at airport A;
- $Cat_{8A}Costs$ is ASA's estimate of the incremental cost of providing category 8 services rather than category 7 services at airport A. This is calculated as per table below; and
- FT_{8+A} is the forecast tonnes landed of all category 8 and above aircraft at airport A (excluding aircraft weighing less than 15.1 tonnes).

$$P_{9A} = \frac{Cat_{9A}Costs}{FT_{9+A}} + P_{8A}$$

Where:

- P_{9A} is the price per tonne of MTOW for all category 9 aircraft landing at airport A;
- $Cat_{9A}Costs$ is ASA's estimate of the incremental cost of providing category 9 services rather than category 8 services at airport A. This is calculated as per table below; and
- FT_{9+A} is the forecast tonnes landed of all category 9 and above aircraft at airport A (excluding aircraft weighing less than 15.1 tonnes).

If Airport A is a Category 9 Station	
Incremental cost of providing category 9 services (rather than category 8 services) ($Cat_{9A}Costs$)	**Incremental cost of providing category 8 services (rather than category 7 services) ($Cat_{8A}Costs$)**
$MAR_A \times \left[\frac{AverageMAR_9 - AverageMAR_8}{AverageMAR_9}\right]$	$MAR_A \times \left[\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_9}\right]$
Incremental cost of providing category 7 services (rather than category 6 services) ($Cat_{7A}Costs$)	**Incremental cost of providing category 6 services (rather than no services) ($Cat_{6A}Costs$)**
$MAR_A \times \left[\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_9}\right]$	$MAR_A \times \left[\frac{AverageMAR_6}{AverageMAR_9}\right]$
If Airport A is a Category 8 Station	
Incremental cost of providing category 9 services (rather than category 8 services) ($Cat_{9A}Costs$)	**Incremental cost of providing category 8 services (rather than category 7 services) ($Cat_{8A}Costs$)**
Nil	$MAR_A \times \left[\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_8}\right]$
Incremental cost of providing category 7 services (rather than category 6 services) ($Cat_{7A}Costs$)	**Incremental cost of providing category 6 services (rather than no services) ($Cat_{6A}Costs$)**
$MAR_A \times \left[\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_8}\right]$	$MAR_A \times \left[\frac{AverageMAR_6}{AverageMAR_8}\right]$
If Airport A is a Category 7 Station	
Incremental cost of providing category 9 services (rather than category 8 services) ($Cat_{9A}Costs$)	**Incremental cost of providing category 8 services (rather than category 7 services) ($Cat_{8A}Costs$)**
Nil	Nil
Incremental cost of providing category 7 services (rather than category 6 services) ($Cat_{7A}Costs$)	**Incremental cost of providing category 6 services (rather than no services) ($Cat_{6A}Costs$)**
$MAR_A \times \left[\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_7}\right]$	$MAR_A \times \left[\frac{AverageMAR_6}{AverageMAR_7}\right]$
If Airport A is a Category 6 Station	
Incremental cost of providing category 9 services (rather than category 8 services) ($Cat_{9A}Costs$)	**Incremental cost of providing category 8 services (rather than category 7 services) ($Cat_{8A}Costs$)**
Nil	Nil
Incremental cost of providing category 7 services (rather than category 6 services) ($Cat_{7A}Costs$)	**Incremental cost of providing category 6 services (rather than no services) ($Cat_{6A}Costs$)**
Nil	$MAR_A \times \left[\frac{AverageMAR_6}{AverageMAR_6}\right] = MAR_A$

Where:

$$AverageMAR_6 = \frac{\text{Total MAR of all Category 6 Stations}}{\text{Number of Category 6 Stations}}$$
$$AverageMAR_7 = \frac{\text{Total MAR of all Category 7 Stations}}{\text{Number of Category 7 Stations}}$$
$$AverageMAR_8 = \frac{\text{Total MAR of all Category 8 Stations}}{\text{Number of Category 8 Stations}}$$
$$AverageMAR_9 = \frac{\text{Total MAR of all Category 9 Stations}}{\text{Number of Category 9 Stations}}$$

Simple Illustration -

Suppose airport A is a category 8 station with the following characteristics:

Maximum Allowable Revenue at Airport A (MAR_A)	Forecast tonnes landed (Category 6 and below Aircraft)	Forecast tonnes landed (Category 7 Aircraft)	Forecast tonnes landed (Category 8 Aircraft)	Forecast tonnes landed (Category 9 Aircraft)
$3 million	200,000	150,000	100,000	50,000

Firstly, we calculate the relevant incremental costs of providing category 6, 7, 8 and 9 services (given that airport A is a category 8 station). These are calculated according to the formulas in the table and the calculations are set out below:

$Cat_{6A}Costs$ = incremental cost of providing category 6 services rather than no services

$$= MAR_A \times \left[\frac{AverageMAR_6}{AverageMAR_8}\right]$$

= $3million × 0.4[21]
= $1.2 million

$Cat_{7A}Costs$ = incremental cost of providing category 7 services rather than category 6 services

$$= MAR_A \times \left[\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_8}\right]$$

= $3million × 0.25
= $0.75 million

21 Each of the proportions has been assumed for the purposes of this illustration rather than explicitly calculated. Note, however that they add to 1 (i.e. 0.4 + 0.25 + 0.35 + 0 = 1).

$Cat_{8A}Costs$ = incremental cost of providing category 8 services rather than category 7 services

$$= MAR_A \times \left[\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_8} \right]$$

= \$3million × 0.35
= \$1.05 million

$Cat_{9A}Costs$ = incremental cost of providing category 9 services rather than category 8 services
= \$3million × 0
= \$0 million

The price per tonne of MTOW for category 6 aircraft at airport A is calculated by dividing $Cat_{6A}Costs$ by the total forecast tonnes landed of all category 1 and above aircraft landing at airport A (excluding aircraft weighing less than 15.1 tonnes) (FT_{1+A}):

$$P_{6A} = \frac{Cat_{6A}Costs}{FT_{1+A}}$$

$$P_{6A} = \frac{\$1.2million}{500{,}000}$$

$$P_{6A} = \$2.40$$

The price per tonne of MTOW for category 7 aircraft at airport A is calculated by dividing $Cat_{7A}Costs$ by the total forecast tonnes landed of all category 7 and above aircraft landing at airport A (excluding aircraft weighing less than 15.1 tonnes) (FT_{7+A}). This is then added to P_{6A}:

$$P_{7A} = \frac{Cat_{7A}Costs}{FT_{7+A}} + P_{6A}$$

$$P_{7A} = \frac{0.75million}{300{,}000} + \$2.40$$

$$P_{7A} = \$4.90$$

The price per tonne of MTOW for category 8 aircraft at airport A is calculated by dividing $Cat_{8A}Costs$ by the total forecast tonnes landed of all category 8 and above aircraft at airport A (excluding aircraft weighing less than 15.1 tonnes) (FT_{8+A}).

This is then added to P_{7A}:

$$P_{8A} = \frac{Cat_{8A}Costs}{FT_{8+A}} + P_{7A}$$

$$P_{8A} = \frac{1.05 million}{150{,}000} + \$4.90$$

$$P_{8A} = \$11.90$$

The price per tonne of MTOW for category 9 aircraft at airport A is calculated by dividing $Cat_{9A}Cost$ by the total forecast tonnes landed of all category 9 and above aircraft at airport A (excluding aircraft weighing less than 15.1 tonnes) (FT_{9+A}). This is then added to P_{8A}:

$$P_{9_A} = \frac{Cat_{9A}Costs}{FT_{9+A}} + P_{8A}$$

$$P_{9A} = \frac{0}{50{,}000} + \$11.90$$

$$P_{9+A} = \$11.90$$

Location Specific and Category Pricing Models

Location-specific for ports with >6 million passengers, incremental aircraft category charge for < 6 million passengers

For all airports with forecast passenger movements (in and out) of greater than 6 million (in a 12 month period) ("busy" airports), the price per tonne of MTOW is calculated in the same way as location specific pricing. That is, it is calculated according to the following formula:

$$P_{A\,BUSY} = \frac{MAR_{ABUSY}}{FT_{ABUSY}}$$

Where:

- P_{ABUSY} is the price per tonne of MTOW at airport A (excluding those aircraft weighing less than 15.1 tonnes)
- MAR_{ABUSY} is the MAR at airport A
- FT_{ABUSY} is the forecast tonnes landed at airport A (excluding aircraft weighing less than 15.1 tonnes)

For all other airports, the price per tonne of MTOW is different for each category of aircraft (but applies to all airports) and is calculated according to the following formulae:

$$P_6 = \frac{Cat_6 Pool}{FT_{1+}}$$

Where:

- P_6 is the price per tonne of MTOW for all category 6 (and below) aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_6Pool is equal to the sum of all MARs at category 6 airports plus the allocated portions of category 6 costs in category 7, 8 and 9 stations (excluding stations at the "busy" airports) calculated as follows (see below for an explanation of how the formula components are calculated):

  Cat_6Pool = (Total MAR_9 × Proportion of Category 6 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 6 MAR in Category 8 stations) + (Total MAR_7 × Proportion of Category 6 MAR in Category 7 stations) + (Total MAR_6 × 100%)

- FT_{1+} is the forecast tonnes landed of all category 1 and above aircraft (excluding tonnes landed at the "busy" airports and aircraft weighing less than 15.1 tonnes)

$$P_7 = \frac{Cat_7 Pool}{FT_{7+}} + P_6$$

Where:

- P_7 is the price per tonne of MTOW for all category 7 aircraft (excluding those aircraft weighing less than 15.1 tonnes);
- Cat_7Pool is the total of the allocated portions of category 7 costs in category 7, 8 and 9 stations (excluding stations at the "busy" airports) and is calculated as follows (see below for an explanation of how the formula components are calculated):

  Cat_7Pool = (Total MAR_9 × Proportion of Category 7 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 7 MAR in Category 8 stations) + (Total MAR_7 × Proportion of Category 7 MAR in Category 7 stations)

- FT_{7+} is the forecast tonnes landed of all category 7 and above aircraft (excluding tonnes landed at the "busy" airports and aircraft weighing less than 15.1 tonnes)

$$P_8 = \frac{Cat_8 Pool}{FT_{8+}} + P_7$$

Where:

- P_8 is the price per tonne of MTOW for all category 8 aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_8Pool is the total of the allocated portions of category 8 costs in category 8 and 9 stations (excluding stations at the "busy" airports) and is calculated as follows (see below for an explanation of how the formula components are calculated):

  Cat_8Pool = (Total MAR_9 × Proportion of Category 8 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 8 MAR in Category 8 stations)
- FT_{8+} is the forecast tonnes landed of all category 8 and above aircraft (excluding tonnes landed at the "busy" airports and aircraft weighing less than 15.1 tonnes)

$$P_9 = \frac{Cat_9Pool}{FT_{9+}} + P_8$$

Where:

- P_9 is the price per tonne of MTOW for all category 9 and above aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_9Pool is the total of the allocated portions of category 9 costs in category 9 stations (excluding stations at the "busy" airports) and is calculated as follows (see table for an explanation of how the formula components are calculated):

  Cat_9Pool = Total MAR_9 × Proportion of Category 9 MAR in Category 9 stations
- FT_9 is the forecast tonnes landed of all category 9 and above aircraft (excluding tonnes landed at the "busy" airports and aircraft weighing less than 15.1 tonnes)

Simple Illustration -

See the illustrations for "location specific pricing" and "full category pricing". Note that:

- the "location specific pricing" illustration applies only to "busy" airports; and
- the "full category pricing" illustration does not apply to "busy" airports (and excludes their associated MAR and forecast tonnes from the calculations).

Base level service charge plus incremental location specific category cost charge

Base Level Component -

The following price applies to all aircraft landing at category 6 airports. It is also the price that applies to all category 6 (and below) aircraft landing at category 7 and above airports:

$$P_6 = \frac{Cat_6 Pool}{FT_{1+}}$$

Where:

- P_6 is the price per tonne of MTOW for all aircraft landing at category 6 airports. It is also the price applying to category 6 and below aircraft landing at category 7 and above airports. In each case it excludes those aircraft weighing less than 15.1 tonnes;
- Cat_6Pool is the total of the allocated portions of category 6 costs in category 6, 7, 8 and 9 stations and is calculated as follows (see table for an explanation of how the formula components are calculated):

  Cat_6Pool = (Total MAR_9 × Proportion of Category 6 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 6 MAR in Category 8 stations) + (Total MAR_7 × Proportion of Category 6 MAR in Category 7 stations) + (Total MAR_6 × 100%)
- FT_{1+} is the forecast tonnes landed of all category 1 and above aircraft (excluding aircraft weighing less than 15.1 tonnes)

For categories 7 and above aircraft at category 7 and above airports, the prices per tonne of MTOW (for each category of aircraft at each airport) are calculated according to the following formulae.

Location Specific Incremental Category Cost Component -

Under this component the price for higher than category 6 services at each airport depends on:

- the total costs at that airport in excess of average category 6 costs – i.e. location specific costs incremental to the provision of category 6 services;
- ASA’s estimate of the proportion of that cost attributable to providing each higher category of service at that airport; and
- the number of landings of each category at that airport.

The prices for each category of aircraft at each airport are calculated according to the following formulae:

$$P_{7A}* = \frac{Cat_{7A} * Costs}{FT_{7+A}} + P_6$$

Where:

- $P_{7A}*$ is the price per tonne of MTOW for all category 7 aircraft at airport A;
- $Cat_{7A}*Costs$ is ASA's estimate of the incremental cost (in excess of category 6 costs) of providing category 7 services rather than category 6 services at airport A. This is calculated as per the table below; and
- FT_{7+A} is the forecast tonnes landed of all category 7 and above aircraft at airport A.

$$P_{8A}* = \frac{Cat_{8A}*Costs}{FT_{8+A}} + P_{7A}*$$

- $P_{8A}*$ is the price per tonne of MTOW for all category 8 aircraft at airport A;
- $Cat_{8A}*Costs$ is ASA's estimate of the incremental cost (in excess of category 6 costs) of providing category 8 services rather than category 7 services at airport A. This is calculated as per the table below; and
- FT_{8+A} is the forecast tonnes landed of all category 8 and above aircraft at airport A.

$$P_{9A}* = \frac{Cat_{9A}*Costs}{FT_{9+A}} + P_{8A}*$$

- $P_{9A}*$ is the price per tonne of MTOW for all category 9 aircraft at airport A;
- $Cat_{9A}*Costs$ is ASA's estimate of the incremental cost (in excess of category 6 costs) of providing category 9 services rather than category 8 services at airport A. This is calculated as per the table below; and
- FT_{9+A} is the forecast tonnes landed of all category 9 and above aircraft at airport A.

ASA's Estimate of the Incremental Cost (in excess of Average Category 6 Station Costs) of providing Each Category of Service at Each Airport

If Airport A is a Category 9 Station		
Incremental costs (in excess of average category 6 station costs) attributable to providing category 9 services **Cat_{9A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 8 services** **Cat_{8A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 7 services** **Cat_{7A}*Costs**
$(MAR_A - AverageMAR_6)\times\left(\frac{AverageMAR_9 - AverageMAR_8}{AverageMAR_9 - AverageMAR_6}\right)$	$(MAR_A - AverageMAR_6)\times\left(\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_9 - AverageMAR_6}\right)$	$(MAR_A - AverageMAR_6)\times\left(\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_9 - AverageMAR_6}\right)$
If Airport A is a Category 8 Station		
Incremental costs (in excess of average category 6 costs) attributable to providing category 9 services **Cat_{9A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 8 services** **Cat_{8A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 7 services** **Cat_{7A}*Costs**
Nil	$(MAR_A - AverageMAR_6)\times\left(\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_8 - AverageMAR_6}\right)$	$(MAR_A - AverageMAR_6)\times\left(\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_8 - AverageMAR_6}\right)$
If Airport A is a Category 7 Station		
Incremental costs (in excess of average category 6 costs) attributable to providing category 9 services **Cat_{9A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 8 services** **Cat_{8A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 7 services** **Cat_{7A}*Costs**
Nil	Nil	$MAR_A - AverageMAR_6$
If Airport A is a Category 6 Station		
Incremental costs (in excess of average category 6 costs) attributable to providing category 9 services **Cat_{9A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 8 services** **Cat_{8A}*Costs**	**Incremental costs (in excess of average category 6 station costs) attributable to providing category 7 services** **Cat_{7A}*Costs**
Nil	Nil	Nil

Where:

$$AverageMAR_6 = \frac{\text{Total MAR of all Category 6 Stations}}{\text{Number of Category 6 Stations}}$$

$$AverageMAR_7 = \frac{\text{Total MAR of all Category 7 Stations}}{\text{Number of Category 7 Stations}}$$

$$AverageMAR_8 = \frac{\text{Total MAR of all Category 8 Stations}}{\text{Number of Category 8 Stations}}$$

$$AverageMAR_9 = \frac{\text{Total MAR of all Category 9 Stations}}{\text{Number of Category 9 Stations}}$$

Simple Illustration -

Suppose we are trying to work out the prices to apply at airport A which has a category 8 station. We do so as follows.

Category 6 Price at Airport A

The prices to apply to category 6 aircraft flying into airport A will be the same as those applying to category 6 aircraft flying into all other airports. Suppose there are two category 8 stations (one of which is airport A), two category 7 stations and three category 6 stations. The characteristics of each is set out below:

Airport	Station Category	Maximum Allowable Revenue (MAR)	Total Forecast tonnes landed
A	8	$4 million	500,000
B	8	$3.5 million	250,000
	Sub-total	*$7.5 million*	*750,000*
C	7	$2 million	300,000
D	7	$3 million	400,000
	Sub-total	*$5 million*	*700,000*
E	6	$1.5 million	210,000
F	6	$1 million	120,000
G	6	$1 million	130,000
	Sub-total	*$3.5 million*	*460,000*
	TOTAL (Cat 6, 7 & 8)	**$16 million**	**1.91 million**

In addition, airport A's total forecast tonnes (i.e. 500,000) are split between the categories of aircraft landing at that airport as follows:

- category 6 (and below aircraft) = 200,000 tonnes

- category 7 aircraft = 100,000 tonnes
- category 8 aircraft = 150,000 tonnes
- category 9 aircraft = 50,000 tonnes

The total MAR of category 8 stations is \$7.5 million and the average MAR is \$3.75 million (i.e. \$7.5million/2). The total MAR of category 7 stations is \$5 million and the average MAR is \$2.5 million (i.e. \$5 million/2). The total MAR of category 6 stations is \$3.5 million and the average MAR is \$1.17 million (i.e. \$3.5 million/3).

The proportion of total maximum allowable revenue (of category 6, 7 and 8 stations) comprising of category 6 costs is calculated in the following table.

Station Category	Total MAR	Average MAR	Proportion of Category 6 MAR
8	\$7.5 million	\$3.75 million	$\frac{\$1.17m}{\$3.75m} = 0.312$
7	\$5 million	\$2.5 million	$\frac{\$1.17m}{\$2.5m} = 0.468$
6	\$3.5 million	\$1.17 million	$\frac{\$1.17m}{\$1.17m} = 1$

The category 6 pool of costs (Cat_6Pool) to allocate is then calculated in the following way:

Cat_6Pool
= (Total $MAR_8 \times$ Proportion of Category 6 MAR in Category 8 stations) +
+ (Total $MAR_7 \times$ Proportion of Category 6 MAR in Category 7 stations) +
+ (Total $MAR_6 \times 100\%$)
= (\$7.5 million × 0.312) + (\$5 million × 0.468) + (\$3.5 million × 1)
= **\$8.18 million**

The price per tonne of MTOW for category 6 aircraft is then calculated by dividing *Cat_6Pool* by the total forecast tonnes landed of all category 1 and above aircraft (excluding aircraft weighing less than 15.1 tonnes) (FT_{1+}):

$$P_6{*} = \frac{Cat_6Pool}{FT_{1+}}$$

$$P_6{*} = \frac{\$8.18 million}{1.91 million}$$

$$P_6{*} = \$4.28$$

Category 7 Price at Airport A

Unlike category 6 prices, the price applying to category 7 aircraft flying into airport A will be different from those applying to category 7 aircraft flying into other airports. To calculate this price, we firstly find the incremental cost (in excess of category 6 costs) of providing category 7 services rather than category 6 services at airport A (given that airport A is a category 8 station). This is calculated in the following table:

Maximum Allowable Revenue at Airport A (MAR_A)	**Average Maximum Allowable Revenue of Category 6 Stations ($AverageMAR_6$)**	**Incremental cost (in excess of category 6 costs) of providing category 7 services rather than category 6 services ($Cat_{7A}*Costs$)**
\$4 million	\$1.17 million	$\left[MAR_A - AverageMAR_6\right]\times\left[\frac{AverageMAR_7 - AverageMAR_6}{AverageMAR_8 - AverageMAR_6}\right]$ $= \left[\$4m - \$1.17m\right]\times\left[\frac{\$2.5m - \$1.17}{\$3.75m - \$1.17}\right]$ = \$1.46 million

$Cat_{7A}*Costs$ are then divided by the total forecast tonnes landed of all category 7 and above aircraft (excluding aircraft weighing less than 15.1 tonnes) at airport A (FT_{7+A}). This is then added to the base category 6 price:

$$P_{7A}* = \frac{Cat_{7A}*Costs}{FT_{7+A}} + P_6*$$

$$P_{7A}* = \frac{\$1.46million}{300,000} + \$4.28$$

$$P_{7A}* = \$9.15$$

Category 8 Price at Airport A

To calculate the category 8 price, we firstly find the incremental cost (in excess of category 6 costs) of providing category 8 services rather than category 7 services at airport A (given that airport A is a category 8 station). This is calculated in the following table:

Maximum Allowable Revenue at Airport A (MAR_A)	**Average Maximum Allowable Revenue of Category 6 Stations ($AverageMAR_6$)**	**Incremental cost (in excess of category 6 costs) of providing category 8 services rather than category 7 services (Cat_{8A}*Costs)**
\$4 million	\$1.17 million	$\left[MAR_A - AverageMAR_6\right] \times \left[\frac{AverageMAR_8 - AverageMAR_7}{AverageMAR_8 - AverageMAR_6}\right]$ $= \left[\$4m - \$1.17m\right] \times \left[\frac{\$3.75m - \$2.5m}{\$3.75m - \$1.17m}\right]$ = \$1.37 million

Cat_{8A}*Costs* are then divided by the total forecast tonnes landed of all category 8 and above aircraft (excluding aircraft weighing less than 15.1 tonnes) at airport A (FT_{8+A}). This is then added to P_{7A}*:

$$P_{8A}^* = \frac{Cat_{8A}{}^*Costs}{FT_{8+A}} + P_{7A}^*$$

$$P_{8A}^* = \frac{\$1.37m}{200{,}000} + \$9.15$$

$$P_{8A}^* = \$16.00$$

Category 9 Price at Airport A

The price per tonne of MTOW for category 9 (and above) aircraft is the same as the price for category 8 aircraft because there is no portion of category 9 costs in a category 8 station. This is shown as follows:

$$P_{9A}* \ = \frac{Cat_{9A} * Costs}{FT_{9+A}} + P_{8A} *$$

$$P_{9A}* = \frac{0}{50{,}000} + \$16.00$$

$$P_{9A}* = \$16.00$$

Full Category Pricing

Full Category Pricing

The price per tonne of MTOW (for each category of aircraft) is calculated according to the following formulae:

$$P_6 = \frac{Cat_6 Pool}{FT_{1+}}$$

Where:

- P_6 is the price per tonne of MTOW for all category 6 (and below) aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_6Pool is the total of the allocated portions of category 6 costs in category 6, 7, 8 and 9 stations and is calculated as follows:

  Cat_6Pool = (Total MAR_9 × Proportion of Category 6 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 6 MAR in Category 8 stations) + (Total MAR_7 × Proportion of Category 6 MAR in Category 7 stations) + (Total MAR_6 × Proportion of Category 6 MAR in Category 6 stations)

- FT_{1+} is the forecast tonnes landed of all category 1 and above aircraft (excluding aircraft weighing less than 15.1 tonnes)

$$P_7 = \frac{Cat_7 Pool}{FT_{7+}} + P_6$$

Where:

- P_7 is the price per tonne of MTOW for all category 7 aircraft (above 15.1 tonnes)
- Cat_7Pool is the total of the allocated portions of category 7 costs in category 7, 8 and 9 stations and is calculated as follows:

  Cat_7Pool = (Total MAR_9 × Proportion of Category 7 MAR in Category 9 stations) + (Total MAR_8 × Proportion of Category 7 MAR in Category 8 stations) + (Total MAR_7 × Proportion of Category 7 MAR in Category 7 stations)
- FT_{7+} is the forecast tonnes landed of all category 7 and above aircraft (excluding aircraft less than 15.1 tonnes)

$$P_8 = \frac{Cat_8Pool}{FT_{8+}} + P_7$$

Where:

- P_8 is the price per tonne of MTOW for all category 8 aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_8Pool is the total of the allocated portions of category 8 costs in category 8 and 9 stations and is calculated as follows:

  Cat_8Pool = (Total MAR_9 × Percentage of Category 8 MAR in Category 9 stations) + (Total MAR_8 × Percentage of Category 8 MAR in Category 8 stations)
- FT_{8+} is the forecast tonnes landed of all category 8 and above aircraft (excluding aircraft weighing less than 15.1 tonnes)

$$P_9 = \frac{Cat_9Pool}{FT_{9+}} + P_8$$

Where:

- P_9 is the price per tonne of MTOW for all category 9 and above aircraft (excluding those aircraft weighing less than 15.1 tonnes)
- Cat_9Pool is the total of the allocated portions of category 9 costs in category 9 stations and is calculated as follows:

  Cat_9Pool = (Total MAR_9 × Percentage of Category 9 MAR in Category 9 stations)
- FT_{9+} is the forecast tonnes landed of all category 9 and above aircraft (excluding aircraft weighing less than 15.1 tonnes)

Simple Illustration -

Suppose there are two category 7 stations and three category 6 stations. The characteristics of each are set out below:

Airport	Station Category	Maximum Allowable Revenue (MAR)	Forecast tonnes landed
A	7	$2 million	300,000
B	7	$3 million	400,000
	Sub-total	*$5 million*	*700,000*
C	6	$1.5 million	210,000
D	6	$1 million	120,000
E	6	$1 million	130,000
	Sub-total	*$3.5 million*	*460,000*
	TOTAL (Cat 6 and 7)	**$8.5 million**	**1.16 million**

The total forecast tonnes landed (1.16 million) is split as follows:

- category 6 aircraft contribute 500,000 tonnes;
- category 7 aircraft contribute 400,000 tonnes;
- category 8 aircraft contribute 160,000 tonnes; and
- category 9 aircraft contribute 100,000 tonnes.

The total MAR of category 7 stations is $5 million and the average MAR is $2.5 million (i.e., $5 million/2). The total MAR of category 6 stations is $3.5 million and the average MAR is $1.17 million (i.e., $3.5 million/3).

The respective category 6 and category 7 proportions of total MAR are calculated in the following table:

Station Category	Total MAR	Average MAR	Proportion of Category 7 MAR	Proportion of Category 6 MAR
7	$5 million	$2.5 million	$1-0.468=0.532$	$\frac{\$1.17m}{\$2.5m}=0.468$
6	$3.5 million	$1.17 million	-	$\frac{\$1.17m}{\$1.17m}=1$

The category 6 pool of costs (Cat_6Pool) are then calculated as follows:

Cat_6Pool
= [Proportion of Category 6 MAR (of the Average Category 7 Station) × Total MAR of Category 7 Stations] +
[Proportion of Category 6 MAR (of the Average Category 6 Station) × Total MAR of Category

6 Stations]
= (0.468 × \$5 million) + (1 × \$3.5 million)
= **\$5.84 million**

The category 7 pool of costs (*Cat_7Pool*) are calculated as follows:

Cat_7Pool
= [Proportion of Category 7 MAR (of the Average Category 7 Station) × Total MAR of Category 7 Stations] +
[Proportion of Category 7 MAR (of the Average Category 6 Station) × Total MAR of Category 6 Stations]

= (0.532 × \$5 million) + (0 × \$3.5 million)
= **\$2.66 million**

The price per tonne of MTOW for category 6 aircraft is then calculated by dividing *Cat_6Pool* by the total forecast tonnes landed of all category 1 and above aircraft (excluding aircraft weighing less than 15.1 tonnes) (FT_{1+}):

$$P_6 = \frac{Cat_6Pool}{FT_{1+}}$$

$$P_6 = \frac{\$5.84 million}{1.16 million}$$

$$P_6 = \$5.03$$

The price per tonne of MTOW for category 7 aircraft is calculated by dividing *Cat_7Pool* by the total forecast tonnes landed of all category 7 and above aircraft (excluding aircraft weighing less than 15.1 tonnes) (FT_{7+}):

$$P_7 = \frac{Cat_7Pool}{FT_{7+}} + P_6$$

$$P_7 = \frac{\$2.66 million}{660{,}000} + \$5.03$$

$$P_7 = \$9.06$$

As there are no category 8 or 9 stations in this example, there are no category 8 or 9 incremental costs to apportion to these higher category aircraft. Therefore:

$$P_9 = P_8 = P_7 = \$9.06$$