MR. BOWEN.

Proposed Airstrip, North Island
Abrolhos F. & W. 131/46.

The report on this topic prepared by myself and Mr Hopkins following our visit to the islands at your request (letter, July 12, 1976) is attached. I apologise for the delay in completion.

Our on site inspection was made over the period 2-4.8.76. This included an overnight stay on North I., and visits to the existing airstrips on Rat and East Wallabi Is. Discussions were also had in Geraldton with Mr Derek Lee of the Main Roads Department on his previous involvement with this matter, and with Mr John von Stanke, Deputy Manager of the Geraldton Fishermen's Co-operative concerning the aircraft being considered for future operations (Mr Connell was overseas at this time)

Further discussions were pursued following our visit to the islands with Mr Kevin St. Jack of the Commonwealth Department of Transport (Air Transport Group), and Mr Goodsell concerning their previous involvement. Discussions were also had with Mr John Wilkinson, Department of Transport (Surface Transport Group) and Mr Norm Griffiths, a senior level engineer of the Commonwealth Department of Housing and Construction involved in airport construction work. We are awaiting some further advice from him on possible stabilization treatments applicable to some soil samples supplied by us.

During our visit to the Islands we utilized both the float plane operated by the Geraldton Fishermen's Co-operative, and the land plane operated by Geraldton Air Charter. During our time on North I. we stayed with Mr Reg Smith. We also spoke briefly to Messrs Frank Hughes, Frank Mead, and Dexter Quain. Most of the fishermen had apparently left the island at the time of our visit, however.

Mr Harry Parker piloted the G.A.C. plane to Rat and East Wallabi Is. We also had a brief discussion with Mrs Walmsley at the time we arranged this flight.

It is our view that construction in the blow-out site would be the most desirable. This would also be in accord with the previous discussions on this subject by the Wildlife Authority. Our reasons for this conclusion are fully set out in the report, but it is noted that this decision could be a matter for debate.

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Necessary conditions applicable to construction are not detailed within the report, as these would be more easily decided following the final decision on the site. The general factors we consider to be important are set out however.

R.I.T. PRINCE
Research Officer.

November 5, 1976.

POLITICAL NOTES

The West Australian provides space each week for political parties to explain their policies.

Government

By R. C. OLD

This week's instalment of Labor's State policy follows a pattern similar to that of the previous three.

In each case many policy points follow the guidelines of programmes already being carried out by the Government.

Last week it was agriculture's turn when Mr H. D. Evans virtually put his seal of approval on the policies the coalition has pursued successfully since it came into office.

But I was disturbed by his apparent lack of knowldge of the progress being made in all spheres . . . particularly in the case of the Agriculture Department and the Ord project.

This week, when Mr A. R. Tonkin issued Labor's environment policy much of the Government's current programme had again been nominated as Labor policy.

In its presentation, he leaned more to emotive issues than to responsible environmental management programmes.

I am surprised that Labor seems to have overlooked the role of the Environmental Protection Authority, which has been responsible for preparing the guidelines for on-going policy.

The Government believes that the authority, a non-political and professional body, is discharging its statutory functions in a responsible and far-sighted manner.

We reject any slur that may be cast by the inferences in Labor's policy.

The Government would retain the EPA in its present form.

VALUABLE

This authority has done valuable and extensive work in the areas nominated by Labor.

For example, it already has published guidelines for a coastal management plan for public comment.

In February, the Government created 145 additional reserves and increases in national parks . . . as recommended by the authority. This week we accepted a further 135 of its recommendations.

Labor also proposes that the EPA be responsible direct to Parliament . . . a proposition which would make its efforts vulnerable to constant interference and delays.

Mr Tonkin made much of his policy for Cockburn Sound. Yet Mr Jones, the Minister for Conservation and Environment, announced a week ago that a multi-disciplinary study was planned for that region, and that $250,000 had been allocated for this.

The study involves industry, local government, recreational interests and government departments.

During the coalition's term of office, it has, under the leadership of Mr Jones, created a National Parks Authority, amended the Wildlife Conservation Act to protect flora and fauna and brought a Waterways Commission Bill before the House.

The Government will continue to pursue an environmental policy which recognises the need for resource development.

But it emphasises that this can be done only within the framework of responsible environmental protection.

Environmental safeguards are now part of the planning process from the very first stage of development of any new industry.

In fact the cost of environmental protection constitutes one of the fixed costs such an industry must take into account, in just the same way as it considers items like labour and material.

Opposition

By COLIN JAMIESON

The decisions we make now about our environment will affect the sort of world our children, and children for generations to come, will live in.

In our lifetimes we will feel the full impact of few of the environmental decisions we make. We are the trustees of the future.

The decisions are not always easy, but they must be made. Labor is prepared to make them.

On Monday my shadow minister for the environment, Arthur Tonkin, announced the most comprehensive environment policy ever put forward by a WA political party. He has provided these notes:

The next State Labor government will attach a high priority to protecting and enhancing the environment, while striking a balance between the demands of conservation and the demands of economic development.

Our policy places heavy emphasis on involving the public in environmental decision-making. Most of the measures we propose provide for submissions and comments from the public before final decisions are reached.

KEY PROPOSAL

A key proposal requires environmental impact statements on all proposed developments likely to significantly affect the environment.

Labor will avoid the traps fallen into in some laces overseas where the statements have become glossy public relations decuments with little real value.

We will ensure the statements are meaningful documents by building into the procedure provisions for public involvement and comment.

Confidential memoranda passing between Government departments are not adequate safeguards.

Labor also wants Perth people to consider how big the city should become.

Will a city double Perth's size be a better place in which to live and bring up children?

Serious constraints are placed on Perth's growth by the availability of water.

There is also strong evidence that big cities experience rapid increases in crime and other social ills out of proportion to their growth.

Increases in rape are a product of over-rapid urbanisation.

Traffic problems, including the continual resumption of rivers and the polluting of the atmosphere, are other factors which must be considered.

There has never been a wide-ranging public debate on Perth's ultimate size, but it is becoming imperative that we have one.

Labor will establish a public inquiry into the optimum population of the Perth metropolitan area.

There are many other urgent tasks to be tackled to protect our world and make it more pleasant.

Labor will get on with the jobs of ensuring the public has access to the coast, cleaning up Cockburn Sound, stopping excessive noise, protecting the Darling scarp, controlling dangerous pesticides, increasing our beautiful parks and conserving our unique flora and fauna.

They are tasks that have largely been ignored.

However, there is one environmental issue which overrides all others and that is protecting West Australians from deadly nuclear wastes which are lethal for thousands of years.

In no circumstances will Labor allow WA to become the world's nuclear garbage dump.

NORTH ISLAND, ABROLHOS

Proposal to establish Airstrip for use by land-based aircraft - File 131/46.

Report on inspection by R.I.T.Prince and A.J.M. Hopkins - 2.8.76 - 4.8.76.

A detailed inspection of the three alternative sites investigated following the earlier discussion of this matter (e.g. folios 222-26, this file, and related correspondence) was made over the above period.

1. The Island

1.1. Physiography

In general, the present appearance of the Island is as described by Storr (1960), but the central plain area is by no means uniform. The levels indicated on the contour map prepared by the Department of Lands and Surveys (Project R43 from Photography 19-xii-75) can be associated with differences in the vegetation, and also with some apparent differences in the outcropping of limestone along ridges (e.g. as in the centre of site 3), or in the exposure of the limestone basement of the Island, (as in the depression located to the south west of the site 3 alignment in the centre of the Island). The ridge between this particular depression and the larger depression to the south (at the north-western end of site 2) appears to be of soil rather than rock, and may be related to aeolian erosional processes working over the fine soil of this central plain area (as noted in the MRD report, all the soils tested from this Island lacked any substantial structural strength; and, while this soil from the central plain had an 'unconfined compressive strength' of 50 lbs/sq.in.* when tested, its fine powdery nature when dry would

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* Normally engineers like materials of around 750 lbs/sq.in for construction of similar works, and are concerned with wet strength. We require materials with strength when dry.

make it most susceptible to wind action if exposed, and particularly if disturbed, in dry weather).

The northern and western sector of the central plain contains a considerable number of small sink-holes (mainly to the west of the northern half of the proposed site 3, but also within the area delineated as this site), while the low-lying area to the southern side of the lake also shows evidence of subsidence in a number of places. This area is also likely to become water logged in the winter (see Storr, 1960, p.60).

The fine sandy soil at the south-eastern end of site 2 is in excess of 50cm depth (*pers. comm.*, D. Lee) and lacks the structural strength even of the soils of the central plain. This site poses potential problems of stabilization if disturbed, and there is no good evidence that vegetation would, in fact, re-establish itself if removed. The evidence of the blowing-out of the high dunes on the east coast to the rear and northwards of the established settlement area following the initial disturbances (see Storr, 1960), pp. 59-60), and the failure of the vegetation to re-establish itself in this area suggests that spontaneous re-establishment on the site 2 area would be unlikely.

The strength of the prevailing winds is most probably the major factor contributing to the continued instability noted above. The in-filling of the north-eastern bay by sand from this blow-out (see Storr, *ibid*) has probably continued since Storr's visit, and this process is probably associated with the present area noted as being a "depression subject to flooding with sea-water" by the M.R.D. (see map). An apparent strand-line of water-worn limestone rocks was observed by us

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on the southernmost edge of this depression, approximately in the position delineated by the 0.1m contour.

1.2. The Terrestrial Fauna

1.2.1 Mammals

No native mammals were observed.

1.2.2 Reptiles

Of the reptiles, *Amphibolurus barbatus* and *Egernia kingii* were common. One carpet snake *(Morelia (Python) spilotes)* was seen. Smaller skinks were also seen but were not pursued.

1.2.3 Land Birds

Brush Bronzewings *(Phaps elegans)* were relatively common, with many of the birds being seen in pairs.

Welcome Swallows *(Hirundo neoxena)* were seen around the huts, but were not counted.

Similarly, a number of small parties of Western Silvereyes *(Zosterops lateralis gouldi)* were sighted at various points.

Pipits *(Anthus novaeseelandiae)* were sighted but did not appear common.

Quail also appeared to be relatively common in the central plain. Correct species identifications could not be confirmed, however. The apparent size and habits of the birds flushed (generally in pairs) suggested that most of these may have been Stubble Quail *(Coturnix pectoralis;* a noted vagrant, G. Storr) rather than the smaller Painted Quail *(Turnix varia)* reputed to have been on the Islands.

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Brown Songlarks, and Kestrels, reported by Storr (1960) were not observed. Two additional species were sighted, however.

A single Willy Wagtail *(Rhipidura leucophrys)* was observed in the company of two pairs of Black-faced Cuckoo-shrikes *(Coracina novaehollandiae)*. These birds were apparently hunting insects when seen.

In addition to these land birds, the Island also serves as a nesting site for at least two pairs of Ospreys *(Pandion haliaetus)*. One pair was incubating a clutch of 2 eggs on a nest situated on the north-western end of airstrip site 2. The second pair were noted investigating a nest on the western edge of the depression surrounding the lake (on the proposed alignment, site 3) at the time of our visit, but were not nesting. A third, abandoned nest site located to the south-west of this latter nest was also found.

2. The Airstrip Proposal

2.1. General considerations

The general dimensions and requirements for Authorised Landing Areas for particular classes of aircraft and types of operation are specified by the Department of Transport. Thus, the dimensions of the area to be affected by the proposed airstrip, and the quality of surface required with respect to the operation of the aircraft are largely dependent on the type of aircraft to be used. Both immediate and long term possibilities must be considered in this case.

The requirements for aircraft operation are not the only factors to be considered, however. The

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inclusion of this Island in Houtman Abrolhos Reserve No. A20253 for Conservation of Flora and Fauna, Tourism, and Fishing indicates the importance attached to the existing and potential uses and activities associated with such Islands (see Report of the Conservation Through Reserves Committee to the Environmental Protection Authority, 1974, pp. 5-12 to 5-16).

North Island currently serves as the base for a large number of professional fishermen (50-60) during the open season for taking of rock lobster (March-August), and also harbours an interesting terrestrial fauna. Tourism is presently of minor importance however, with the few visitors to this, and the other islands, generally having to rely on contacts within the fishing industry in order to arrange transport to, and also accommodation while on the island.

Visits by persons in privately owned boats are apparently rare, no doubt due to the distance of North I. from the port of Geraldton.

Current potential conflicts on North I. in relation to the establishment of an airstrip can therefore be seen to lie between the use of the island by the fishermen, the site requirements of the projected airstrip, and the existing fauna and flora. Future possible conflicts could lie with an expansion of tourist usage, and perhaps some increase in fishing activity.

2.2. Aircraft operation

Aerial services to the Abrolhos group presently are provided by two operators and appear to be adequately catered for by the use of single engined light aircraft (Beechcraft Bonanza 36, Geraldton Air Charter; and Cessna 185 equipped for amphibious operation, Geraldton Fishermen's Co-operative). Enquiries indicated

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that similar types of aircraft were being considered for a land based service to North I. on provision of a suitable airstrip, but it was not envisaged that amphibious aircraft would use such a strip. This latter point is of particular importance, as a much higher quality surface would be needed to allow safe operation of such aircraft.

Night operations have not been considered necessary during the time that the present airstrips on Rat and East Wallabi Is. have been operational and this situation appears unlikely to alter.

The desirability of avoiding cross wind conditions on airstrips has also been mentioned. It can be noted, however, that the airstrips on both the above Islands are aligned almost N - S. Our enquiries concerning the operational problems arising from crosswinds over these strips revealed that strong easterly winds did cause some problems, but it was also stated that there had, so far, (to the time of our inspection) been only two days during the current (1976) fishing season when the service was suspended for this reason. Crosswind conditions may therefore be discounted as imposing major limitations on the potential service available.

The Western Australian Wildlife Authority has, however, been particularly concerned that any airstrips on such islands be located so as to minimize the effects of wind erosion from exposed surfaces. In practice, this is best achieved by locating such strips on crosswind alignments.

In summary, the evidence suggests that, apart from any increase in service demands arising from a possible increase in tourist usage in the future (not presently favoured), the current service demand could be adequately catered for by

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construction of an airstrip suitable for daytime operation of single engined light aircraft of up to 6 seat capacity and that the strip alignment would not be critical in respect to maintenance of service. It is therefore considered that the siting and alignment of the strip to be prepared may be influenced as much by factors related to potential site stability and use conflicts, etc., as by the optimum requirements for aircraft operation.

2.3. Site requirements and surface preparation for proposed airstrip.

Relevant data suggest that a minimum area of 60m x 600m would prove adequate for the preparation of an airstrip suited to the type of operations specified, though the operators would probably prefer a greater length. Sites with a maximum available length of 750m may be considered.

In considering the standard of surface preparation required, it is important to remember that the problem of maintenance of site stability must be considered along with the requirements related to aircraft operations.

It can be noted that the relevant Department of Transport requirements for an Approved Landing Area specify two different zonings within the 60m wide strip site, *viz.*, a central strip of 15m width, and verges of *ca* 22m width on either side of this central strip which caters for landings and take-offs. The side verges are primarily intended to cater for emergency run-offs, and are not normally required to absorb a great deal of use.

The present airstrips on Rat and East Wallabi Is. have been established on sites of dimensions *ca* 60m x 750m, and observations on their condition and use are relevant to further discussion of this topic.

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In each case it appears as though the full width of strip was initially cleared with a scraper blade, and that the exposed surface was subject to little, if any, further treatment.

The strip on East Wallabi I. is located within an area occupied by a low shrubland vegetation. A considerable depth of soil also appears to have been present initially. The vegetation of this area appears to be a very poor colonizer of disturbed ground however, and the soil most susceptible to wind erosion. These factors, combined with the operator's need to periodically regrade the surface available in order to continue operations have resulted in the present strip surface now lying well below the level of the soil surface under the adjacent undisturbed shrubland. The central portion of this strip also appears to have now been incised down to the underlying limestone basement.

Evidence from the abandoned W.W. II airstrip adjacent to the present strip, and the now disused E-W cross-strip constructed illegally by the present operators (see minutes W.A.W.A. Meeting of Mar 31, 1969, Item 5.2, p.2) shows that natural rehabilitation of this area, if the present operations were discontinued, would be extremely slow. At the same time, the present state of this airstrip (established < 10 years) suggests that its future operational life is limited, and it probably does not now conform to A.L.A. standards.

The strip on Rat I. differs in some respects from that on East Wallabi I., in that some of the vegetation on Rat I. appears well suited to colonize disturbed ground . The initial depth of soil over the strip area also appears to have been quite shallow at the time of construction.

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Both of the above factors may be related to the earlier guano workings on this Island.

The soil now remaining on this airstrip appears quite prone to erosion if exposed, and also appears to have limited load bearing capacity, but is readily revegetated when left undisturbed. The colonizing plants do minimize erosion, but their habit, combined with the nature of the underlying soil, results in a surface which is unable to withstand sustained use. Operational problems posed by this surface are presently overcome by the operators of the aircraft apparently utilizing the majority of the designated strip area (including the verges) for take-offs and landings during the course of a fishing season (e.g. the aircraft utilized appear capable of operating normally from an area of as little as 250m x 10m, but the continued wear and tear occasioned by a number of consecutive take-offs and landings soon leads to the particular area being utilized becoming too rough for continued use. The operations are then shifted to a different part of the strip. Periodical regrading also appears necessary to reshape the surface once all the alternative portions of the strip have been utilized).

The lessons to be learnt from these examples are most pertinent to North Island. The shrubby vegetation on this island appears to be poorly adapted to colonization of disturbed ground in the areas where it might be expected to occur, as noted previously (p.2). The evidence available from the track utilized by the amphibious LARK in servicing the navigational beacon located on Northwest Hill (see Storr, 1960, Fig. 1; and map) also suggests an extremely limited ability of the vegetation of the central plain to regenerate after disturbance (this track had been last used on June 30, 1976; with the next most recent use being on January 24, 1976. Prior to 1976 this track was used no more than 4 times per

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year, dating from the time that the beacon was built; *pers. comm.*, J. Wilkinson, Navigational Aids Engineer, Dept. of Transport, Surface Transport Group). Further problems arising from the depth of soil profiles, and the limited load bearing capacity of the particular soils in the various parts of the island have been touched on previously (pp. 1-2).

The discussion above leads us to the conclusion that, even apart from the consideration of normal soil stabilization problems, suitable treatments must be applied in order to stabilize the surface of any airstrip to be constructed if long term problems of environmental deterioration and operational maintenance are to be avoided. The requirement for appropriate treatment of the central 15m wide section*during construction of the proposed airstrip so as to produce a surface capable of withstanding continuous usage would also enable the area to be intensively utilized by the aircraft to be kept to a minimum if the decision to be made was to site the strip in a presently vegetated part of the island.

In this latter respect, preparation of the central 15m strip to the standard suggested could also obviate the need for more intensive preparations of the strip verges. It is suggested that slashing or mowing of the vegetation on the verges in this situation could provide an adequate surface treatment which would, at the same time, avoid any risk of erosion which could arise if a scraper was used.

2.4. Siting of the Proposed Airstrip

Investigations undertaken to date, and the information available, suggest that this Island is generally unsuited to the development of a high quality, low cost airstrip to cater for

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* See page 7.

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present traffic. The decision to allow construction of an airstrip has been made, however, and the choice of a site must be made.

Examination of this Island itself, and comparison with both the existing airstrips sited on Rat and East Wallabi Is., and the abandoned airstrip site on East Wallabi I., has indicated major erosional problems which would be attendant on the construction and maintenance under operational conditions of an unsealed earth strip, particularly on areas with the deeper soils (>25cm).

As noted previously, the site favoured by the Geraldton Fishermen's Co-operative (Site 2) has problems due to differences in soil type, and depth, from one end to the other, and at its easternmost extremity, gives every indication of being the source of further sand drift and erosion from the remaining dunes if the vegetation is removed without application of stabilization treatments to all exposed surfaces. This site thus requires similar treatments to those suggested by the M.R.D. for the existing blow-out area. It also possesses an excessive depth of soil with little load bearing capacity over much of its length, and offers little operational advantage over a more central site. This alignment also coincides with the location of one of the two osprey nests currently utilized. There are therefore sufficient reasons to reject this site. The problem posed is now reduced to a choice between a location on the central plain, or one on the blow-out area in the high dunes on the east coast, adjacent to the existing settlement. The choice between these latter two sites poses some complex questions.

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Some of the conflicts inherent in the possible selection of the blow-out site directly involve the fishing community which desires the improved air service that construction of the airstrip would allow, but which is also indirectly responsible for the present condition of this area (see Storr, 1960).

The area affected by this blow-out is now apparently of minimal value to the majority of the Island's flora and terrestrial fauna, and is still subject to active sand movement. Its location to the rear and northwards of the major part of the settlement, and the apparent net northward movement of sand into the north eastern bay (p.2) suggests that sand drift problems with respect to the comfort of the residents of the settlement may not be as great as those expected with a different orientation of the two. Continuation of erosion in this area will, however, lead to further deterioration of the value of the Island as a nature conservation reserve. It can therefore be argued that the siting of a stabilized airstrip in this area, with additional treatment of the surroundings, would firstly pose no conflict with the present value of the Island as a Nature reserve, and secondly, by controlling the future potential for further erosion, enhance the future quality of the environment from both the human and nature conservation viewpoints.

There are, however, two apparent site constraints associated with construction of an airstrip in the blow-out area. The first of these relates to the limited area available without requiring major earthworks, and the second to the need to relocate some of the existing buildings to conform with air safety regulations if construction proceeds on this site. Of the possible strip alignments available in this area, Site 1 (see map) appears to be least constrained with respect to earthworks required, and the need to relocate buildings, but it does have the least favourable orientation. Unlike the formerly mentioned benefits accruing to this site,

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these constraints may be readily equated with economic costs.

Construction elsewhere will exact further environmental costs however, as well as foregoing the suggested benefits. In this respect, selection of an alternative site would amount to environmental subsidy for those desiring the airstrip as well as a reduction in the direct economic cost of construction. While not imputing attitudes, or actual responsibility to the present occupiers of this Island, it has been pointed out previously, however, that use of the Island by the fishing community has already exacted some environmental toll with respect to nature conservation values (p.2). It can also be noted here that in former times, discussion on the possibility of establishing an airstrip on this island was finally centred on establishment within the eroded (i.e. blow-out) area of the island (Reserves Committee, W.A.W.A., Meeting, January 17, 1972, Item 4.4., p.2).

The alternative to the blow-out location (Site 1) is a location in the central plain in the vicinity of the area denoted as Site 3 (see map). This location has some immediate attractions from the viewpoints of aircraft operation, and of construction, insofar as it possesses a favourable alignment with respect to the prevailing winds during the fishing season, and also has a minimal vegetative cover, a shallow soil, and a rock basement. Inspection has shown that the general alignment suggested for this site probably is the best in relation to the factors noted above, but this particular alignment would be the least desirable from the point of erosion potential. Stabilization of any prepared or disturbed surfaces would be required to obviate this risk.

The inspection has also shown that a translocation

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southward of the suggested site would provide a better proposition overall due to the abundance of sink-holes in the northern half of the suggested location, and the presence of boggy ground near the lake (p.2).

The minimum area to be affected by the proposed airstrip is 3.6 ha (60m x 600m), and construction at or near the suggested Site 3 would affect approximately 15% of the vegetation associations of the northern section of the central depression. The need for an access track across the dunes between the settlement and the nearer end of the airstrip in this instance will also involve disturbance of an additional area which is presently vegetated. In addition to the increased area of disturbance involved, this crossing would constitute a further erosional hazard in the potentially unstable dunes if not carefully sited, and adequately treated.

The actual effects on the island's fauna of an airstrip sited in this northern section of the central depression must largely be a matter of speculation at present, although the presence of an osprey's nest at the northern end of the marked site has been noted (p.5). The ground dwelling quail also appear to be confined to the central plain and to be more common in the northern section. The remains of a nest, most probably utilized by quail in the previous breeding season, was also found among the vegetation fringing the southern edge of the lake.

Specimens for identification have not been taken from North I. however (*pers. comm.*, G. Storr), and it has been suggested earlier (p.3) that some or all of the birds present may be Stubble Quail, rather than the Painted Quail reputed to be on the island. Pending positive identification(s), it may be noted that the normal breeding season of

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the Painted Quail is over the period July - October (Serventy and Whittell, 1962, p.169), while the Stubble Quail would be expected to nest later in the year (September - December; Serventy and Whittell, *ibid.*, p.167). Possible interference with the process of pair formation in either of these species, and also interference with nesting of the Painted Quail in the early part of their normal breeding season can be anticipated. Storr's (1960) comments on the island fauna and the more recent observations suggest that populations of the different species may be subject to large fluctuations in abundance. Continued survival of the quail and the other fauna species may therefore be precariously balanced. Any interference of the nature indicated above could be critical if this is the case.

The possibility of some hazard to aircraft arising from birds utilizing the lake adjacent to this site must also be borne in mind, although the actual risk which could be involved cannot be assessed on present knowledge. Some effects on the lake environment itself arising from the proximity of the proposed airstrip might also be anticipated (e.g. increased siltation).

The possibility of further development and upgrading of any airstrip constructed so as to cater for heavier aircraft and more sophisticated operations has also been raised. This aspect is relevant to either of the two main alternative sites, although it appears that increased tourist usage for recreational purposes which would be the main generating force leading to greater service demands, is not presently favoured (e.g. C.T.R.C., p.5-14; Ministerial letter, 2nd April 1976, to Hon. Minister for Lands). It can be noted here that the central plain offers a greater potential length of strip which could be developed with minimal earth movement.

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Access of construction machinery to either site will also entail further disturbance over and above that arising from the site and access requirements for the particular site chosen. Access to the central plain potentially involves the more significant problems, both in terms of the area to be affected, and the environment in which the disturbance would be necessary.

We note that it has been suggested from the engineering viewpoint that an airstrip located at Site 3 could be utilized without initial surface treatment, in contrast with the stabilization requirements suggested as necessary for either of the other alternative sites. The present condition and apparent future of the existing airstrips on Rat and East Wallabi Is. have been discussed previously however (pp.8-9), and it is clear that rehabilitation of the present East Wallabi I. airstrip, and the additional disturbed areas associated with it (see minutes of meetings, W.A.W.A., January 23, 1969, Item 5.6, pp.3-4; March 31, 1969, Item 5.2, p.2; June 24, 1969, Item 5.7, p.3), to an environmentally acceptable standard, while at the same time providing an operational airstrip more in keeping with the specifications set down for A.L.A.'s by the Department of Transport would now be an extremely costly venture. Even so, the future operational life of the present airstrip appears to be limited without some restorative treatment. We also emphasize the fact that the apparent progressive deterioration of this airstrip site to date appears to have replicated precisely the changes which are evident on the abandoned W.W. II strip located to the west and note that the W.A.W.A. has previously (minutes of meeting, October 18, 1971, Item 7.6, p.11) expressed the view that such evidence should be considered in relation to decisions on the construction of new airstrips similar to the present case.

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In view of the above considerations, and the developments since the initial decision to allow aircraft operations in the Abrolhos Group, we believe there is ample justification for insisting that the surface of the new airstrip to be constructed on North I. should be adequately stabilized so as to be capable of sustained use from the inception of service without leading to deterioration of the site, or its surroundings.

To summarize the situation, it is our view that conditions on North I. do not generally favour the construction and operation of an environmentally acceptable A.L.A. adequate to cater for the predicted service demands without the need for surface stabilization of at least the central 15m section of the strip, whatever its location. This rules out minimal initial cost proposals.

The requirements for stabilization of both the A.L.A. site and the surroundings suggest that the direct costs of stabilization of strips constructed in either of Sites 1 or 2 could be similar. The cost of acceptable stabilization required in association with a strip constructed at, or near, Site 3, could be less than the above, but the problem of stabilization of the access track required, and the possible greater need for restorative treatment following construction of areas disturbed in gaining access to the site, could offset this.

It has been pointed out that the environmental costs would be lowest for Site 1, and that substantial environmental benefits would also flow from construction on this site. This site has the least favourable qualities from the engineering viewpoint, however, in respect of both initial construction and possible future upgrading. The need to move at least some existing structures also imposes a constraint

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unique to this site, which may also be equated with an additional economic cost.

It is considered that, apart from some benefits with respect to aircraft operations, and greater possibilities for upgrading any strip which might be constructed, Site 2 poses in most respects, problems similar to those of Site 1, and that environmental factors provide sufficient grounds for preferring construction on Site 1 rather than Site 2 if the final choice lay in this direction.

An airstrip could be accommodated at Site 3 at considerable environmental cost, and without any apparent benefits, but direct economic costs of construction could be lowest for this site. The environmental costs of construction at this site could be contained however through imposition of appropriate controls and careful supervision.

We recommend that the final decision as to site should be made after consideration of the following points:

1. The decision to allow construction has been made.

2. The future airtraffic demands affecting this island will depend on the type of use allowed.

3. If increased usage which would generate additional airtraffic is to be permitted, it would be advisable to plan for construction of the highest quality strip commensurate with the anticipated demand from the outset.

4. The capacity of the island to absorb more intensive usage does appear to be limited however and it would appear that any increased airtraffic that might arise could be catered

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for by an increased frequency of flights utilizing aircraft similar to those presently utilized.

5. An anticipated increase in frequency of use would warrant a greater expenditure on initial construction costs which could favour an immediate decision to proceed at Site 1.

6. If the decision on future island use was to limit it to its present level by the fishing community, the airstrip required could be limited to that capable of handling current usage, commensurate with maintenance of environmental stability.

7. The site alternatives in the above case are considered to be Site 1, which would entail higher economic and low environmental costs and Site 3, which would involve high environmental costs, but possibly lower construction costs.

8. In making a choice between Sites 1 and 3, the major comparison lies between the excess direct construction costs which are likely to be associated with the choice of Site 1, and the sum of the environmental benefits accruing to this site which would be foregone if construction were to proceed at Site 3, plus the additional environmental costs associated with construction at this latter site.

2.5. Construction of the Airstrip

While the situation in respect of construction and maintenance of airstrips in the Abrolhos Group to date has been that the operators have been required to foot the actual construction and ongoing maintenance costs, they have also been allowed considerable discretion as to the standard of surface prepared initially. It is obvious that

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in the case of East Wallabi I. in particular, this has resulted in minimal expenditure by the operators, and in the development within a very short period of an environmentally unacceptable situation which would now be extremely costly to rectify. It is also clear that if the persons responsible were now required to undertake this work as a condition of their continued permit to operate, that the service would be terminated, leaving the Abrolhos community's expectations in regard to availability of aerial services unsatisfied and the environmental management problem unresolved, unless undertaken at Government expense. This is a most unsatisfactory situation, considering that the main beneficiaries of any cost cutting to date will have been the operators of this particular service, and to a lesser extent, their customers.

It is also pointed out that discretion of the proposed operators was allowed in respect of adherence to conditions laid down at the time permission was given to utilize East Wallabi I. for aerial services, and that these conditions were virtually ignored at that time. A similar situation also appears to have developed with respect to other associated works since then (e.g. maintenance and control of use of the landing on East Wallabi I.).

Following this experience we believe that it is imperative that the initial standards of construction required should be those necessary to both allow continuation of the aerial service to be established, and to protect the long term community interest in the land being utilized. Close supervision during construction also appears vital.

It is considered that a sealed surface would be the minimum standard acceptable, and that it is not unreasonable to expect the proponents of this airstrip to meet whatever costs this may involve,

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both for initial construction, and subsequent maintenance of the site in acceptable condition thereafter, in return for exclusive use as proposed.

Imposition of the above on the Geraldton Fishermen's Cooperative in this case would however constitute a discriminatory economic charge being made relative to the conditions currently applicable to the Geraldton Air Charter operation, but it is our view that this problem cannot be avoided if an environmentally acceptable airstrip is to be established on North I., whatever site is selected.

It is suggested that, if problems of financing construction are considered to be a major problem in achieving the desired objectives, the provision of a State guaranteed long-term loan could be a practical means of ensuring that these are satisfied. Alternatively, costs of construction and maintenance could be borne solely by the Government, and these costs offset later by charging the users rental or landing fees.

3. Conclusion

We are of the view that construction of the proposed airstrip in the blow-out area (Site 1) is most desirable, but this decision rests on our assessment of the relative importance of the environmental factors involved if construction was allowed at Site 3, relative to the direct economic cost differential which would be expected to arise if construction proceeded at Site 1.

The environmental factors mentioned must be regarded as economically intangible in this instance and detailed construction plans for either of these sites are not available. The most probable difference in economic costs for either of these sites must therefore remain a matter of conjecture at present. Further information is being sought on this point. It is noted however that the full cost for construction of a strip to the

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standard we consider necessary could, for Site 1, exceed the figure of $20,000 suggested by the MRD in their letter of April 21, 1976, and that the cost estimate given for Site 3 in the same letter would be a gross underestimate of the expenditure necessary to achieve an acceptable result.

If the immediate economic factors are considered to be more important than the environmental factors however, and Site 3 is chosen, then we recommend that a surface sealed strip be constructed within an area to be designated by us, and that construction should be supervised by one of us, or a nominee fully conversant with the situation, in order to ensure adherence to conditions considered necessary to ensure minimal environmental impact of the proposal.

Necessary conditions can be specified in detail for either site at a later stage, following the final decision on location.

Following from our inspection of the existing airstrips on Rat and East Wallabi Is. in relation to the proposal discussed, we also consider that the condition of the present airstrip on East Wallabi I. should be a matter of great concern. The condition of the airstrip on Rat I. could also be improved, but it poses no great conflict with conservation values.

In view of the conservation value of East Wallabi I., and the apparent trend in the condition of the airstrip, we recommend that steps be taken as a matter of urgency to prevent further deterioration in its condition. We also recommend that this strip be brought up to a standard similar to that considered necessary for the new airstrip to be built on North Island.

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