Environmental Statement

Appendix J

Bird Risk Assessment Study

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Bird Risk Assessment Study for the Revised Eastside, Gibraltar Development

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Executive Summary

This initial desk-based study of the Planning Application (based on Masterplan ES.3) for the Eastside, Gibraltar, development highlights the main bird management issues that will need to be considered in order to safeguard RAF Gibraltar against an increased birdstrike risk.

Due to the close proximity of the development to the 27 runway at RAF Gibraltar it is very important that the development does not result in an increased accumulation of hazardous birds in the area. In order to achieve this goal, it is important to design out structures and resources that are attractive to birds wherever possible.

Roof structures and ledges will need to be designed or proofed to deny perching opportunities to hazardous birds. This will have air safety benefits, as well as public health, nuisance and maintenance benefits (in reduced cleaning, gutter repair costs etc.). It will also be necessary to carefully choose an amenity planting palette that will avoid species that provide attractive roosting / breeding habitat for hazardous species. There should not be any exploitable fresh open water habitats created. The provision of open freshwater features will act as magnets to a wide range of birds that are hazardous to aircraft. Rainwater runoff management and irrigation systems will also need to be designed and operated to ensure there is no exploitable freshwater capable of attracting hazardous birds.

A results based Bird Management Plan (BMP) will need to be developed and operated to ensure the development does not attract and support populations of hazardous birds above the current background population levels. The MoD will need assurances that the bird management systems that are in place will be effective in mitigating this risk.

The more attractants that can be designed out of the development, the less onerous the BMP will be. As the BMP will need to be in perpetuity, the balance of design mitigation and BMP mitigation has to be carefully considered. If the development is not designed in such a way as to effectively dissuade usage by hazardous birds, then a BMP may be ineffective in ensuring that the birdstrike risk at the airport is not increased due to the onerous nature of the task. If this were the case, then the airport would have grounds to object to the application on air safety grounds, as the airport could not be satisfied that the mitigation proposed was going to be effective.

If recommendations outlined in this report are included in the design, and a bespoke Bird Management Plan is provided in perpetuity then this development will not increase the birdstrike risk at RAF Gibraltar.

1. Introduction

1.1 Birdstrike Overview

1.1.1 Collisions between aircraft and birds (birdstrikes) constitute a significant hazard to aviation worldwide, causing millions of pounds worth of damage, delays to flights and occasional loss of life. In the UK, around 1500 birdstrikes to civil aircraft are reported to the Civil Aviation Authority (CAA) annually and the Authority requires all airports to take appropriate measures to deter birds on and around airfields. Birdstrikes are one of the major controllable hazards to aviation. Most birdstrikes occur on or near aerodromes but, because birds are very mobile, bird-attractive features far beyond an aerodrome boundary may increase the flight safety hazard.

1.1.2 Hazardous bird species are either large, occur commonly in dense flocks, or both. Some species are more hazardous to aircraft than others, due to their large size and / or flocking behaviour. These are known as 'priority group' species and form the main focus of the birdstrike risk assessment.

The hazardous species that may be attracted to the Eastside development are (in order of significance):
Gulls
Pigeons
Cormorants
Waders

1.1.3 Gulls, and pigeons can congregate in very large overnight roosts and commute daily to favoured feeding / loafing areas. Waders can form large, dense flocks in flight and often fly in close formation, whilst Greater Cormorants are attracted to the coastal fringe. There is only limited scope for taking action on aerodromes to counter these hazards; so safeguarding the area around an aerodrome may be the only effective means of reducing the risk to aircraft in flight.

1.2 The Birdstrike Safeguarding process

1.2.1 Aerodrome Safeguarding exists as part of the planning process to guard against developments that could reduce safety at an aerodrome. The safeguarding process includes developments that have the

potential to cause concentrations and movements of hazardous birds – Birdstrike Safeguarding.

1.2.2 The primary aim of the Birdstrike Safeguarding process is to guard against new or increased hazards caused by development. Important types of development in this respect include the creation of water bodies, landfill sites, flat roofs, amenity planting and any other development that offer exploitable resources to birds hazardous to aircraft.

1.2.3 The creation or modification of areas of water such as harbours, reservoirs, lakes, wetlands and marshes will attract gulls and waterfowl, as well as a wider range of hazardous species. Planting trees and bushes can result in the creation of a bird hazard. The provision of stands of trees can provide attractive breeding / roosting habitat for pigeon species. Therefore the development of woodlands near an aerodrome can increase the birdstrike risk.

1.2.4 In the mid-1970s, a study of bird safeguarding needs by the UK Bird Impact Research & Development Committee (a joint Ministry of Defense, CAA and Ministry of Agriculture Fisheries and Food committee) resulted in the issue of revised safeguarding maps with an 8 statute mile circle around an aerodrome and the inclusion of other developments with the potential to attract birds. The 8-mile (13km) safeguarding circle was developed as a planning guide that identifies the critical airspace where aircraft are low flying (below 2,000ft on take off and descent) and are thus at greatest risk from bird strike (most birdstrikes take place when aircraft are below 2,000ft). UK planning authorities are required to consult the relevant airport before granting planning permission for any development that might endanger the safety of aircraft by attracting hazardous birds within a 13-kilometre radius of an aerodrome.

1.2.5 Safeguarding is an ever-evolving process, which adapts with experience to ensure that best practice is maintained at all times. The latest changes were included in the joint circular from the Office of the Deputy Prime Minister (Circular 1/2003). The circular includes the need for UK local planning authorities to consider not only the individual potential bird attractant features of a proposed development, but also whether the development, when combined with existing land features, will make the safeguarded area, or parts of it, more attractive to birds, or create a hazard such as bird flight lines across aircraft flight paths. This is an important addition, as it ensures

that applications are not judged in isolation; rather they are assessed as part of the wider environment. By adopting a more holistic approach, better assessments of an application's potential to affect the populations of hazardous bird species, alter established flight lines or develop new flight lines can be made.

1.2.6 The above process is recognized as a best practice model and for that reason is being employed to safeguard the current birdstrike risk at RAF Gibraltar.

2. Methodology

2.1 Safeguarding

2.1.1 Development, including construction work, in close proximity to an airfield has the potential to either increase the numbers of birds in the immediate area or to change the behaviour of the existing bird populations and the hazards they pose (i.e. birdstrikes). Accordingly, a major development such as that proposed for Eastside could have serious implications for flight safety at RAF Gibraltar. Safeguarding requires a precautionary approach and therefore a worst-case scenario is used to assess risks associated with any proposed development located close to an airfield.

2.2 Identification of risk

2.2.1 A major development in this location will have the potential to increase in the birdstrike risk at RAF Gibraltar. The Planning Application document for Eastside, Gibraltar, produced by Fender Katsalidis (Masterplan ES.3) provides an overview of the proposed development. It is possible to identify some features that would constitute attractants to 'priority group' species.

2.2.2 The 'priority' groups most likely to be attracted to the site would be Yellow-legged Gulls *Larus michahellis* (hereafter referred to as gulls), pigeons and cormorants and potentially waders. The development of a sheltered beach pool lagoon containing a hub of human activity would provide shelter from weather and exploitable food from human sources for scavenging gull species. In addition the flat or gently sloping roofs of the proposed buildings would be capable of attracting and supporting breeding and roosting gulls. Gulls would be a major problem in the post-fledging period in late summer, as young birds

leave the colony on the rock and make initial foray flights down and around the lower coastal areas. Gibraltar also sees a large passage of migrating gulls in autumn as well as a wintering population of gulls, and it is possible that these birds will also take advantage of the site. Greater Cormorants and Shags are likely to exploit the concrete armour units as perches, as these structures will offer safe elevated perches next to the sea, however these birds are only recorded at Gibraltar in low numbers. Waders are attracted to safe open areas adjacent to the coast (as provided during the construction phases) and may therefore gather in numbers on site.

2.3 Fieldwork

2.3.1 CSL has conducted fieldwork on the Rock as part of other Halcrow projects and as part of an ongoing ornithological consultancy contract that CSL has with the MoD. It has been possible to draw on the data gathered from previous visits to inform this birdstrike risk assessment.

2.3.2 Previous fieldwork comprised field visits in summer 2005, to monitor the numbers and behaviour of the breeding gull colony on Gibraltar itself. This was followed by a second visit in autumn 2005, when an assessment of migration was carried out. Additionally, field visits to potentially comparable estuarine or saltpan environments nearby (in Spain) were made (autumn 2005), to monitor current usage of these habitats by priority group species.

2.3.3 It is difficult to provide detailed comment on the effect of this specific development on the behaviour of the local populations of priority group species due to the uniqueness of the local environment. However, the close proximity of the proposed development to the gull colony on the Rock, and the 27 approach of RAF Gibraltar, will result in the potential for the development to attract and support gulls being significant.

2.4 Risk Assessment

2.4.1 The data gathered by CSL ornithologists can be used to inform the birdstrike risk assessment during both the construction and post-construction phases of the project. The movements and behaviour of moderate numbers of common hazardous species such as gulls in the immediate environment of the airfield, result in the provision of a birdstrike risk. This risk assessment will be used to inform the bird management advice developed to reduce birdstrike risk levels.

2.5 Bird Hazard Mitigation

2.5.1 Mitigation measures including levels and best practice for bird deterrence are outlined below for both the construction and post-construction phases of the project. These are based on the risk assessment arrived at through a desk based analysis of the plans, together with analysis of CSL fieldwork previously carried out in the area for Halcrow; it will take account of the most up-to-date methods and procedures followed in the UK.

3. The Baseline Ornithological Situation

3.1 Migrant birds

3.1.1 The airfield at Gibraltar is located within a high-risk environment for birdstrikes. The geographic location of Gibraltar, at the southern tip of the Iberian Peninsula, results in the area being a bottleneck for millions of Western Palearctic migrating birds. In autumn, large diurnal migrants, reliant on thermals to aid migration across the Straits of Gibraltar, will transit the runway as they head to the Rock to gain height in order to cross safely. Additionally, large numbers of passerine (songbird) species and wading birds migrate over Gibraltar and have the potential to be grounded in adverse weather, compounding the birdstrike risk. This development is unlikely to be a significant attractant for these species and will not increase birdstrike risk at RAF Gibraltar above current levels.

3.2 Yellow-legged Gull *Larus michahellis*

3.2.1 The primary birdstrike risk stems from the breeding colony of gulls on the Rock of Gibraltar itself. As both runway approaches are over the sea, and the airfield is located between the high-density buildings

around the Rock and the Spanish town of La Linea, many of the gulls exploit the airport environment.

3.2.2 Latest data from the Gibraltar Ornithological and Natural History Society (GOHNS) indicates that the breeding colony currently numbers some 3600 pairs (2003 figures), but there are also a large number of gulls present in the area which do not attempt to breed. GONHS estimate that the average total number of gulls in the Gibraltar area at the end of the breeding season (late July – August, when all juvenile birds have fledged) is 16-18,000.

3.2.3 Such a high number of birds in a small area present a serious potential danger to aircraft using the airfield at Gibraltar. Moreover, the behaviour and movement of these gulls around the Gibraltar airspace conflicts with airfield operations, especially in the period when adult birds are provisioning newly-hatched chicks (spring and early summer), and when the young birds are making their first flights. Additionally large numbers of gulls present on and around buildings present a nuisance problem to residents. Gulls are noisy and freely defecate causing health and safety issues.

3.2.4 Adult gulls need to find food for their chicks during the summer. Available food resources are relatively limited on Gibraltar itself; therefore, the majority of birds feed in Spain, at least part of the time. This has severe implications for flight safety at Gibraltar airfield, since large numbers of gulls commuting to Spain will automatically be crossing either the runway or the approaches.

3.2.5 The need to feed their chicks at regular intervals means that adult gulls are more active in early summer than at other times of year. Although one parent may undertake some long-range trips to a particularly rich food source, the majority of foraging is done as close to the nest site as possible. At Gibraltar this usually means a visit to either a beach or refuse site, either on the Rock itself, or more likely in nearby Spain. Gulls are thus over flying the runway at regular intervals throughout the day. The airfield bird control staff need to be particularly vigilant, not only to prevent birds from foraging on or near the runway itself, but also from loafing there briefly before making the flight up to their nest to feed the chicks.

3.2.6 Many of the gulls breeding on the Rock choose to make their nests on the steep north facing slope overlooking the airfield. The cliff provides protection from predators, and also restricts the potential culling

activities of GONHS staff contracted by the Gibraltar Government to reduce gull numbers. When the young birds are ready to leave the nest and make their maiden flight, the majority take advantage of the height of the cliff to set off on a shallow glide down to the ground. Since many nests face north across the airfield, large numbers of newly fledged birds land on the runway and surrounding area (this will include the proposed development area) during June and early July.

3.2.7 The bird control staff at RAF Gibraltar are thus under heavy pressure during this period. The young birds are inexperienced and do not respond well to normal deterrence techniques used to keep the runway clear. The birds are often very tired from their initial flight, and their reluctance to fly again frequently leaves bird control staff with no option but to use lethal control. Well over a hundred juvenile gulls are destroyed each summer within the airfield perimeter.

3.2.8 Fieldwork was conducted at Gibraltar from 18th – 22nd July 2005 primarily to measure the crossing rates of gulls moving around the airfield in order to quantify the current risk level. The fieldwork concentrated on the western half of the Gibraltar runway, and did not take account of movements at the eastern end.

3.2.9 However, incidental observations did identify a smaller, but still well defined gull flight line along the Eastern Beach, which closely mirrored the movements over the western end of the runway. Gulls moved at a height of less than two hundred feet in loose groups of 5 – 10 birds during peak periods (morning and evenings), interspersed with individual movements that continued throughout the day.

3.2.10 Due to the provision of many areas of sheltered open water and flat roofs it was important to look at the effect of the weather on the behaviour of the gull population. The July 2005 fieldwork provided the opportunity to observe a phenomenon that has been noted previously at Gibraltar – the changes in gull roosting behaviour that can be directly related to weather conditions. When the wind is an easterly (a 'Levante'), warm, moist air has to rise quickly to clear the Rock. This often leads to the formation of clouds that cover the top of the Rock, particularly in summer and autumn. The majority of the gulls using the Rock at these times of year prefer not to spend the hours of darkness in cloud, and descend to ground level to roost on warm level surfaces in clear air. Indeed the survey work in July 2005 recorded large numbers of gulls roosting at low levels on the ground and on flat roofs.

3.2.11 Fieldwork in September 2005 highlighted the effect of strong winds on the behaviour and distribution of the resident gulls. In high winds gulls were seen to seek out sheltered areas in order to roost. This resulted in large, dense concentrations of birds in relatively small areas. Clearly flightlines to these areas were concentrating birds in critical airspace and thereby increasing the birdstrike risk.

3.3 Feral Pigeon *Columba livia*

3.3.1 Feral Pigeons are attracted to human settlements and prefer to breed in groups, nesting fairly high above ground under cover in buildings such as public offices, factories, warehouses, and architecturally ornamented structures; also large gabled buildings, especially with turrets, cupolas, angled rain-pipes, ventilators, air-brick spaces, eaves, lofts, and attics.

3.3.2 During fieldwork in September 2005 several flocks of >50 Feral Pigeons were seen in the built-up parts of Gibraltar. Feral Pigeons were seen to fly across the runway with some regularity. These birds were attracted to human activity, as they scavenge very successfully on discarded food waste.

3.4 Greater Cormorant *Phalacrocorax carbo* Shag *Phalacrocorax aristotelis*

Greater Cormorants and Shags are medium-sized to large aquatic birds that are tied to the sub-littoral zone where they feed, mainly by surface diving for fish. They leave water after feeding and rest during day on rocks, posts, etc roosting communally at night in similar situations.

3.4.1 During fieldwork in September 2005 small numbers of Shag and Greater Cormorant were seen on the coast. Birds kept to the coastal fringe and were not seen to cross over the airfield into the sheltered bay.

3.5 Waders *Charadriiformes*

This is a diverse group of small to large birds that are usually closely associated with water; the order includes many long-distance migrants, which pass through Gibraltar during spring and autumn passage times. However, Gibraltar does not offer many wader species with

suitable habitats and therefore relatively few waders are regularly recorded.

3.5.1 During fieldwork in September 2005 small numbers of Kentish Plover *Charadrius alexandrinus* were recorded on hard standings near the airport. Plovers and other coastal waders can congregate on large open areas to roost. During passage periods and during the winter months when waders are most abundant in southern Spain the possibility of concentrations of waders on open areas adjacent to the coast will exist, especially if these areas contain pools of fresh rainwater.

4. Construction Phase Bird Management

4.1.1 The way in which the development is designed, constructed and managed will have a direct affect on the attractiveness of the development to the resident population of hazardous birds. Due to the close proximity of the development to the 27 runway at RAF Gibraltar it is very important that the construction does not result in an increased birdstrike risk for the airport. The Construction Phasing will offer different levels of attraction to priority group species.

4.1.2 Even if it is possible to design out many of the features of the development that are attractive to priority group species, it will still be necessary to develop and operate a Bird Management Plan (BMP). Such a BMP will need to be results based to ensure its efficacy. The management plan will need to ensure that the development does not attract and support populations of priority group species. The MoD will need assurances that the bird management systems that are in place will be effective in mitigating this risk.

4.2 Land remediation

4.2.1 The initial phase provides the main footprint of the development, resulting in the provision of large, new areas of relatively flat, dry land. CSL fieldwork in the area has identified such areas as being preferred pre-roosting areas for large numbers of gulls (with over 3000 gulls roosting on a reclaimed footprint for development at La Linea).

4.2.2 Therefore, it is essential to adopt a BMP that will ensure that no hazardous birds are allowed to gather on site. Active control using a hand-held bird distress call player will prevent the development of pre-roosting and roosting birds. Any active control of birds must be

carried out with the full knowledge of the Bird Control Unit (BCU) at RAF Gibraltar and any control must be reported to the BCU prior to commencement.

Figure 1 Reclaimed land providing gull roosting habitat.

4.2.3 The construction site must - at all times - seek to actively reduce any potential attractants on site. Fresh water, food waste and shelter must be minimised and made inaccessible to birds wherever possible. The removal of attractants will reduce the attractiveness of the site to hazardous birds. Reducing attractants to an absolute minimum will reduce the onerous nature of the BMP, thereby reducing costs.

4.2.4 Freshwater pooling will be highly attractive to waders and gulls. Waders exploit freshwater pools to feed and in a relatively arid area such as Gibraltar, this habitat is at a premium. Gulls will also exploit freshwater pools in order to drink and bathe. Freshwater pooling, set within a flat open area adjacent to large gull populations and the coast, will result in concentrations of hazardous birds, which will increase the birdstrike risk at the airport (as flightlines will develop between the attractants and the mainland). It will therefore be important to profile the footprint to minimise the possibility of rainwater pooling. If areas of standing water develop then action will need to be immediately taken to fill in the depression to remove the attractant. Such preventative action will reduce the onerous nature of the BMP and improve its efficacy.

4.3 Marine works

4.3.1 Whilst the creation of a new sea wall will provide sheltered perches for gulls, and potentially Greater Cormorants and Shags, such provision

will not provide a significant new attractant, as the original coastline has always provided such perching opportunities.

4.3.2 During the marine works phase, the BMP should be maintained and extended to all new built structures. At all stages potential attractants such as the provision of fresh water and food waste should be prevented.

4.4 Building construction phases

4.4.1 These stage involve the construction of the accommodation and public areas. These developments have the potential to provide a more diverse range of bird attractants than the previous two stages.

4.4.2 It will be important to design out structures that are attractive to priority group species where possible. The avoidance of flat / gently sloping roofs, protruding roof structures, and covered ledges will reduce the attractive nature of the development to priority group species. All protrusions, window ledges, decorative ledges etc. should be as narrow as possible to prevent the creation of nesting and roosting sites for Feral Pigeons. Ledges under 100mm wide are too narrow for nesting, and those under 20mm wide are too narrow for use as a perch by Pigeons. Wide ledges under overhangs should be particularly avoided, as these provide shelter as well as perching / nesting sites. Ledges, where essential, can be retrospectively proofed against birds by the use of wires and or spikes, but this will add additional installation and maintenance costs to the project.

4.4.3 Feral Pigeons readily exploit food left by humans and are therefore attracted to thriving developments. The public open spaces, private gardens and the central landscape gardens all provide open areas for people and pigeons. The buildings appear to have many recesses that, depending on the design, could provide nesting and roosting habitat. It is important to ensure that covered platforms are minimised, to ensure that exploitable resources are kept to a minimum. Refuse bins should be fitted with self-closing lids and emptied regularly and a culture of not feeding the birds should be developed over the whole site, again to reduce exploitable resources.

4.4.4 It is important to stress that the more attractants can be designed out of the development, the less onerous the BMP will be. As the BMP will need to be in perpetuity, the balance of design mitigation and BMP mitigation has to be carefully considered. If the development is not

designed in such a way as to effectively dissuade usage by hazardous birds, then a BMP may be ineffective in ensuring that the birdstrike risk at the airport is not increased due to the onerous nature of the task. If this were the case, then the airport would have a strong case to object to the application on air safety grounds; as the airport could not be satisfied that the mitigation proposed was going to be effective.

4.4.5 Many of the roofs are to be open access for residents. As such they will have a relatively high safety wall around them, which will result in the flat roofed areas having an enclosed feel, not preferred by gulls. This together with regular disturbance should result in minimal usage of these roof gardens, unless people regularly feed birds on kitchen waste.

4.4.6 Where there is no public access and the roof provides perching and potentially safe nesting habitat, the roof area should be netted and proofed with spikes and / or wires to prevent access to the roof by birds. This protection will have air safety benefits as well as public health, nuisance and maintenance benefits (in reduced cleaning and gutter repair costs). Gulls freely defecate and shed feathers during their moult periods. This detritus often gathers in guttering and blocks the water management systems, potentially causing damage to buildings.

4.4.7 It will be necessary to carefully choose the amenity planting palette to ensure that there is no development of attractive roosting / breeding or feeding habitat for hazardous species. The avoidance of species that provide elevated dense foliage, planted in close proximity to each other will reduce roosting habitat for many species of bird. Similarly avoiding the planting of large numbers of berry producing species will remove the possibility of providing an exploitable food resource to birds capable of increasing the birdstrike risk on the airfield. It is possible, through careful selection and planting, to achieve aesthetically pleasing, easy to maintain amenity planting that is not attractive to priority group species.

4.4.8 The development of 'green roofs' will need to be critically assessed for their potential to attract hazardous bird species. Pigeon species and smaller passerine (songbird) species can be attracted to green roof habitat in big numbers. The planting palettes for any elevated planting will have to be designed to ensure that attractants are minimised. There should not be any berry-bearing species or evergreen block

planting as these plants will provide both feeding and roosting opportunities for birds.

4.4.9 The irrigation system for the amenity planting needs to be carefully designed, operated and maintained to ensure that it does not provide a regularly exploitable source of fresh water. The amenity planting should be watered via a subterranean pipe work system that ensures that there is no freshwater available to hazardous bird species. Again compliance with this recommendation will reduce the onerous nature of the BMP and reduce water consumption on the site.

4.4.10 There should be no non-chlorinated open water on the site. The availability of fresh water in this area will prove to be a significant attractant for many hazardous birds. Ornamental, fresh water pools, ponds or water features set within amenity planting should not be created, as they will attract priority group species. Swimming pools are less of an attractant, as they contain chlorinated water and have vertical sides with no terrestrial access points.

4.4.11 It will be important to ensure that all waste management facilities have covered lids or self-closing doors to prevent access to any putrescible food waste that is processed. All public waste bins should be fitted with self-closing lids and will need to be emptied regularly enough to ensure that waste is inaccessible to scavenging birds. There should be an ethos of no feeding of wildlife in all public areas, to ensure that scavenging birds are not provided with a regular food supply. There are also many health and safety benefits in ensuring that restaurant areas do not become a magnet for scavenging birds.

4.4.12 There needs to be a seamless transition from the construction phase bird management to the post construction bird management plan. It will be important to review the BMP with the aim of maximising its efficacy and efficiency to result in a BMP that will ensure that the development does not increase the birdstrike risk at RAF Gibraltar.

5. Post Construction Bird Management

5.1 The BMP in operation throughout construction phases will have evolved over time to effectively manage the birdstrike risk from the development. Therefore, on completion of the project the BMP should be in a form that is both effective and efficient. There should not be a need to drastically alter the BMP once all construction has finished

apart from perhaps focusing more on the potential resources provided by both residents and the general public.

6. Opportunities for the creation artificial 'natural' habitats Including lagoons and rock pools

6.1 The creation of a recreational seawater lagoon and rock pool will provide a significant attractant to gregarious species such as gulls for feeding and shelter. These areas are intended to provide high amenity value and this could provide additional feeding opportunities if supplementary bird feeding by the general public is not strictly prohibited. Securely lidded bins should be provided throughout, and putrecsible waste should not be allowed to accumulate in the area. There is the potential that these two areas of open water may provide shelter for gulls during adverse weather conditions. However, numbers are likely to be small as there is adequate shelter throughout the island, and the lagoon and rock pool are in built up areas, which could act as a further deterrent.

6.2 As long as a Bird Management Plan is strictly adhered to, and the feeding of birds in these areas is prohibited, such habitats will not significantly increase the birdstrike risk at RAF Gibraltar.

6.3 The creation of any new freshwater habitat would provide a significant attractant for a wide and diverse range of bird species including priority group species hazardous to aircraft; although it is understood that no such proposals are planned as part of the new development. Flightlines of birds would develop between such wetlands and mainland Spain, crossing the approaches of the airfield. Gulls *Laridae*, Waterfowl *Anatidae*, Herons and Egrets *Ardeinae*, Waders *Charadriiformes* and large concentrations of communal roosting passerines such as Swallows and Martins *Hirundinidae* would be attracted to such habitats.

6.4 CSL therefore recommend that artificial 'natural' habitats are not created as part of the Eastside development, due to the potential of such habitat to significantly increase the birdstrike risk at RAF Gibraltar.

7. Conclusions

If recommendations outlined in this report are included in the design, and a bespoke Bird Management Plan is provided in perpetuity then this development will not increase the birdstrike risk at RAF Gibraltar.

Appendix

Glossary

Background Populations
The number and range of bird species seen to be representative a given area.

Western Palearctic
Bio-geographical area comprising Western Europe, North Africa and the Middle East.

Diurnal Migrants
Birds which migrate during daylight hours, these are often large birds that need the aid of thermals to reduce their energy loss during flight.

Loafing
Resting, preening, bathing.

Putrescible
Biodegradable food waste