Appendix A.8.16

The occupancy and breeding status of Peregrine falcon in quarries within the survey area for the proposed N6 Galway City Ring Road

A.8.16 - Part 1

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The occupancy and breeding status of Peregrine Falcon *(Falco peregrinus)* in quarries within the survey area for the proposed N6 Galway City Ring Road 2016

Prepared for Scott Cawley

By
John Lusby

BirdWatch Ireland

TABLE OF CONTENTS

LIST OF FIGURES

1. BACKGROUND

The Peregrine Falcon *Falco peregrinus* is an Annex I species listed on the EU Birds Directive (2009/147/EEC) and is protected nationally under the Wildlife Act 1976 and Amendment Act 2000.

Peregrine Falcon populations suffered extensive declines in Ireland and Britain throughout the 1950s and 1960s due to the widespread use of organo-chlorine pesticides (Ratcliffe 1993, Crick & Ratcliffe 1995). These organo-chlorine compounds including DDT and HEOD are persistent in the environment and accumulate in sub-lethal levels in prey species taken by Peregrine, causing egg shell thinning and breakage resulting in reduced productivity, as well as infertility and mortality in adults (Newton 1979, Crick & Ratcliffe, 1995). The Peregrine population in Ireland reached an all-time low of fourteen recorded breeding pairs in 1970 (Temple-Lang 1970). After restrictions on the use of organo-chlorine pesticides, the Peregrine population slowly recovered and since the 1970s have increased in range and numbers. In 1981 the first national survey of Peregrine Falcons in the Republic of Ireland recorded a total of 225 occupied territories (based on approximately 50% coverage of the breeding range in 15 representative areas) (Norriss *et al.* 1983). The third and most recent national survey of breeding Peregrine in the Republic of Ireland in 2002 estimated 390 occupied breeding territories (Madden *et al.* 2009). A marked range expansion in recent years has also been documented by the Breeding Bird Atlas of 2007–11 (Balmer *et al.* 2013), which recorded 'confirmed' or 'probable' breeding for Peregrine in 217 10km squares in Ireland, representing an increase of 343% and 119% since 1968-1972 and 1988-1991 respectively (Gibbons *et al.* 1993, Sharrock 1976). In the Birds Directive Article 12 analysis and reporting Peregrine is listed as increasing in Ireland as a breeding species for both long-term (1981 – 2012) and short-term (2002 – 2012) trends (NPWS 2013). The conservation status of the Peregrine Falcon is currently considered to be favourable in Ireland and as such they are green-listed on the Birds of Conservation Concern in Ireland (Colhoun & Cummins 2013).

Peregrines have traditionally used a range of natural nest sites including coastal cliffs, rock faces and rocky outcrops which provide suitable ledges for nesting (Ratcliffe 1993, Norriss *et al.* 1983, Hardey *et al.* 2009). Alongside the increase in range and numbers in recent decades in Ireland (Balmer *et al.* 2013) there has been a documented increase in the use of quarries and man-made structures for nesting. The national survey of Peregrines in the Republic of Ireland in 2002 demonstrated that the number of occupied territories on natural cliff sites remained virtually stable over the previous ten years, however the number of pairs nesting in quarries increased over the same period with almost one quarter of the recorded occupied breeding territories in quarries in 2002 (Madden *et al.* 2009). Recent evidence indicates that use of buildings has also increased dramatically. The 2002 national survey recorded breeding pairs on 11 buildings, however over three times this number of breeding sites on man-made structures were known in 2013 (J Lusby, pers comm), which is in the absence of a nationwide survey or specific monitoring focus (Madden *et al.* 2009, NPWS 2013).

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(Ratcliffe 1993, Hardey *et al.* 2009). Peregrines will lay repeat clutches if the first clutch is lost or deserted early on, with the likelihood of relaying decreasing the later in the breeding cycle that the pair fails (Ratcliffe 1993). Ratcliffe (1993) estimates that a second clutch is usually completed 24-25 days after the loss of the first.

1.1 *Range of available survey methods for the species*

Survey methods employed by the national survey of breeding Peregrines in the Republic of Ireland in 2002 involved two site visits. The first visit in spring (between 18th March and 8th April 2002) aimed to determine if the territory was occupied. A territory was confirmed as occupied if a pair or single bird was observed on the first visit. A second visit between 15th to 30th June 2002 aimed to assess breeding success (Madden *et al.* 2009).

Hardey *et al.* (2009) recommends four visits from March to early July to establish occupancy and the presence of a breeding pair as outlined below. If there is no evidence of occupation on the first two visits, then further visits to that home range can be omitted. As eyries can be used by Peregrine over consecutive years, Hardey *et al.* (2009) recommends collating available information on Peregrine occupancy and nesting locations within an area to inform survey work. First visits to potential nesting territories should be carried out in March or early April to check for occupation. Survey work should focus on recording observations of birds or signs of occupation including active roosts, fresh kills and moulted feathers. Suspected nesting territories should be scanned from distance before being approached. Peregrine behaviour including courtship display, defensive behaviour, food passes etc. can indicate breeding activity and help determine the nest location. For large cliffs or nesting areas, watches should be carried out to determine activity. Subsequent visits aim to determine nest location and success, which incorporate a combination of sign searching and watches depending on the site and level of detail known from previous visits. Hardey *et al.* (2009) regards evidence of occupancy as the presence of a single bird or a pair, or of fresh signs of occupation that can definitely be attributed to Peregrine in a known or potential nesting territory during the breeding season.

1.2 *Nest site selection and success in quarries*

Raptors can be sensitive to a range of activities and may desert their nests in response to disturbances (Newton 1979). Different species and individuals within species may respond differently to human related disturbance. Birds which are frequently exposed to human activities may become more accustomed and tolerant of certain activities compared to those which do not regularly encounter human activities (Newton 1979). Peregrines have been documented nesting in densely populated urban environments and in close proximity to human activities in active quarries. Ratcliffe (1993) observed quarry nesting Peregrines which ignored frequent rock blasting within the quarry. In a survey of Peregrines in quarries in nine eastern counties in the Republic of Ireland, Moore *et al.* (1997) showed that Peregrines were equally likely to nest in active or disused quarries. Of the three occupied quarry sites recorded by this study for the proposed road development, one quarry was active during the monitoring period, which was also the only site to successfully fledge young. Peregrines have also been recorded to nest in close proximity to major roads, as is the case in an active quarry which held a breeding pair approximately 300m from the M6 motorway in 2016 (John Lusby, pers comm). Therefore, in certain situations Peregrines will tolerate and can successfully nest where there is human activity. Nevertheless, the impact of disturbance will vary according to many factors including the level and type of disturbance, the tolerance of an individual or pair to disturbance, the stage of breeding cycle in which the disturbance occurs, the proximity of the disturbance or human activity to the nest, and can also be influenced by additional stresses on the individual or pair (e.g. weather, food supply etc). Even at sites where birds tolerate regular human activity, an unusual or new activity has the potential to cause disturbance with the potential for negative impacts to breeding.

In addition to direct disturbance, physical works have the potential to alter the suitability and availability of nest sites which may also negatively affect Peregrine. Peregrines may prepare more than one nest each year and may switch from one to the other before laying (Newton 1979), however without close inspection of a site it is not possible to ascertain the suitability and availability of nesting ledges. Where suitable nesting sites do not exist, it is possible to artificially create or enhance nesting opportunities for Peregrine within quarries. Artificial works have been carried out at quarries in the US to enhance sites for breeding Peregrine, including adding substrate and removing sharp objects from existing ledges. Explosives were used to increase the size and nesting potential of a traditional Peregrine eyrie in northern California, which was subsequently successfully used by breeding Peregrine (Pagel 1989). Specific cliff features to encourage nesting Peregrine have been incorporated within a quarry re-habilitation project in Hong Kong (CSI Quarry Rehabilitation Guidelines).

1.3 *Peregrine use of quarries in the survey area for the proposed road development*

Peregrine Falcon are known to use several quarry sites within proximity to Galway City as confirmed by survey work for the proposed road development in 2014 and 2015, in addition to records collated from an independent monitoring study of Peregrines in County Galway coordinated by the National Parks and Wildlife Service (O'Brien, 2015). Five quarry sites were identified within a 5km radius of the route of the proposed road development where Peregrine activity has been previously recorded which has included a breeding pair or single bird. These sites were identified as priority for monitoring in 2016 to determine occupation and activity status of Peregrine. Breeding activity of Peregrine was not assessed at other sites within 5km of the route of the proposed road development during the course of survey work for the proposed road development.

2. INTRODUCTION

The objective of this study is to determine Peregrine occupancy, breeding status and nest site locations within identified quarry sites within the defined survey area to inform the environmental impact assessment of the proposed N6 Galway City Ring Road. This study did not attempt to undertake a complete survey to determine Peregrine distribution and abundance within the survey area in 2016.

As Peregrine may be sensitive to human related disturbance and persecution (NPWS 2013a), site locations were kept confidential by assigning each site a letter in alphabetical order from the most northerly (see Figure 2.1). An exception was made for nest sites which were within 200m of the proposed road development, which were named and location documented. The highest level of information on site and nest location were provided to the local authority and design team to inform the planning of the proposed road development.

The survey area for this study was defined by drawing a buffer of a radius of 5km from the proposed road development, which covers an area of 225km^2. Quarries were identified based on previous evidence through bird survey work for the proposed road development in addition to collation of available records of Peregrine Falcon occupation between 2014 and 2015 (see Figure 2.1). The centre point of the location of quarry sites as displayed are offset at random in relation to direction (360^0) and distance (0 – 800m) to conceal the identity of active sites which may be sensitive to disturbance (NPWS 2013a).

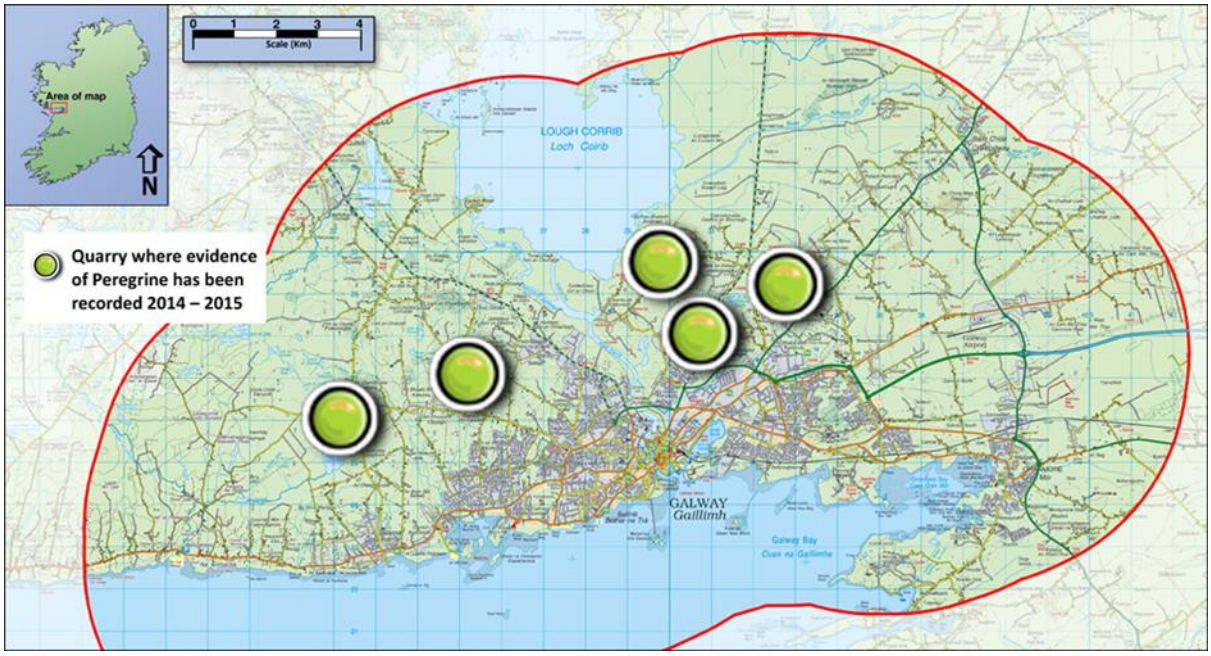

Figure 2.1 *The survey area for the Peregrine survey showing all five quarry sites where evidence of Peregrine was recorded between 2014 and 2015.*

The specific objectives of this study are to:

- Determine occupancy and breeding status of Peregrine in identified quarries within the survey area for the proposed road development
- Identify specific nest site locations of confirmed breeding pairs in quarries

3. METHODS

Prior to conducting survey work, available information on the recent use of the five quarry sites by Peregrine within the survey area was collated through records from survey work for the proposed road development in addition to interviews with National Parks and Wildlife Service (NPWS) and local experts who independently monitor Peregrine populations in County Galway. To conceal the identity and location of quarry sites used by Peregrines, each quarry was assigned a letter in alphabetical order (A – E) from the most northerly to the most southerly.

The survey methods followed best practice survey techniques for Peregrine as defined by Hardey *et al.* (2009) and were adapted for the specific requirements and time scale of this survey.

The survey was initiated on the 12th of May 2016. The first survey visit, to establish occupancy at four quarries (Quarries A, C, D & E) was carried out between the 12th - 24th of May. Communications with quarry staff and National Parks and Wildlife Service staff in May confirmed that a breeding pair was present at Quarry B. As this is an active quarry, it was necessary to arrange access approval in advance of any site visit, and arrangements were made to visit the site in early June 2016, therefore this site was not included in the first survey visits during May 2016.

The first visit to the other four quarries (Quarries A, C, D & E) between the 12th – 24th of May involved a vantage point watch of three hours to record Peregrine activity. Watches were initiated between 06:00 to 10:00 in the morning or 18:00 to 19:00 in the evening and were conducted in suitable weather conditions. A vantage point watch was conducted from an appropriate and discrete position either within or outside the quarry to provide the best view of suitable rock faces. Searches were carried out in accessible areas to locate signs indicating use of the site by Peregrine including fresh kills, moulted feathers, and pellets, with particular attention given to suitable perches and areas where white-wash was observed. Sites were confirmed as occupied if a bird or pair were observed or if fresh signs were confirmed, and unoccupied if no evidence of Peregrine was recorded.

For sites which were confirmed to be occupied on the first visit, further visits were conducted between the 15th of May and the 10th of June 2016 to establish breeding activity, nest site location and breeding success as required. All follow up survey visits employed vantage point watches of between one to three hours to record Peregrine activity to determine breeding status, including defensive behaviour, attending or visiting a nest, food passes, prey deliveries and the presence of young. At sites where breeding was confirmed, the location of the nest was recorded where possible.

Breeding sites were confirmed to be successful if fledged young or young which were close to fledging were recorded. Sites were classed as failed if, based on the evidence it was apparent that a pair was present at the site and a breeding attempt had likely taken place but young were not successfully raised to fledging. Failed breeding attempts can be difficult to confirm, and can require monitoring from the early stages of the breeding cycle. As the survey was initiated after the typical courtship and laying stages for Peregrine (Ratcliffe 1993), the presence and behaviour of birds recorded during the monitoring period, in

addition to knowledge of the breeding status at the site in previous years was used to inform the likelihood that a breeding attempt had taken place.

4. RESULTS

Three of the five quarry sites visited were confirmed to be occupied by Peregrine in May 2016. Quarry A and C were confirmed to be occupied based on observations of a single Peregrine at both sites on the first survey visit. Quarry B was confirmed to be occupied through communications with quarry staff and NPWS in May 2016. No evidence of Peregrine was recorded at Quarry D and E on the first visit and these sites were classed as unoccupied in May 2016.

Follow up visits to the three occupied quarries (A, B & C) confirmed that pairs were present at all sites. A successful breeding pair was recorded at Quarry B based on the observation of young in the nest which were close to fledging. Successful breeding was not recorded at Quarry A and C, and based on evidence collated at both sites in addition to previous knowledge of breeding activity at these sites, both were classed as failed breeding pairs.

The survey findings and breeding status for each occupied site in 2016 is detailed below.

Quarry A:

Survey visit 1 - 12.05.2016
Vantage point watch: 18:15 – 21:15
A single male Peregrine was recorded. The bird arrived into the quarry from the west carrying prey. The bird perched on the rock face on the back wall in the eastern section of the quarry and remained for over 10 minutes before departing to the east over the back wall and out of view carrying the prey.

Visit 2 – 15.05.2016
Vantage point watch: 09:35 – 11:30
A single male Peregrine was recorded. The bird arrived into the quarry (direction not observed), and perched on the back wall and remained for over 30 minutes. No calling was recorded. The bird departed to the south-west.

Visit 3 – 27.05.2016
Vantage point watch: 10:05 – 12:05
A pair of Peregrine were observed on arrival to the quarry perched at the back wall, they remained for over one hour until they both flushed without calling or any indications of defensive behaviour recorded, and did not return within the next hour.

Visit 4 – 01.06.2016
Vantage point watch: 08:20 – 10:20
No Peregrine were recorded.

Site synopsis:
Based on the presence of a pair (27.05.2016), a male recorded delivering prey to the quarry (12.05.2016) and the history of breeding at this site, it is likely that this pair attempted to breed in 2016. It was not possible to determine a specific nest site location used or stage of failure for this pair as they were not recorded attending or visiting a nest site during the monitoring period.

Quarry A held a pair and is classed as a failed breeding site in 2016.

Quarry B:

Visit 1 – 10:06:2016
Vantage point watch: 12:00 – 13:00
A watch was carried on at the nest location, which was a ledge close to the top of the wall and surrounded by vegetation. Well developed young were observed on the nest ledge, and a prey delivery to the nest was recorded.

Site synopsis:
This site was recorded as a successful breeding site based on the confirmation of well - developed young in the nest.

Quarry C (Lackagh Quarry):

Survey visit 1 - 24.05.2016
Vantage point watch: 07:30 – 10:30
A single Peregrine (sex unknown) was recorded flying out of the quarry to the south-east.

Visit 2 – 25.05.2016
Vantage point watch: 07:05 – 10:00
A female was observed within the quarry on arrival. This bird remained in position for over 40 minutes, calling occasionally. A Raven family party came within 70m of this female and there was no obvious reaction observed. A Kestrel also came within 50 - 100m while hunting above the Peregrine without any reaction. A male Peregrine was observed in flight through the quarry and continued out of view to the south-east while the female remained perched on the quarry wall.

Visit 3 – 27.05.2016
Vantage point watch: 08:00 – 09:45
No Peregrine were observed.

Visit 4 – 10.06.2016
Vantage point watch: 07:30 – 10:30
No Peregrine were recorded.

Site synopsis:
Based on the presence of a pair (25.05.2016), the history of breeding at this site and the fact that recorded activity occurred in proximity to the nest location previously used, it is likely that this pair attempted to breed in 2016. It was not possible to determine a nest site location used or stage of failure for this pair as they were not recorded attending or visiting a nest site during the monitoring period.

Lackagh Quarry held a pair and is classed as a failed breeding site in 2016.

The distribution and status of all quarry sites monitored in 2016 is shown below in Figure 3.1 and Table 3.1. The centre point of the location of quarry sites as displayed are offset at random in relation to direction (360^0) and distance (0 – 800m) to conceal the identity of active sites which may be sensitive to disturbance (NPWS 2013a).

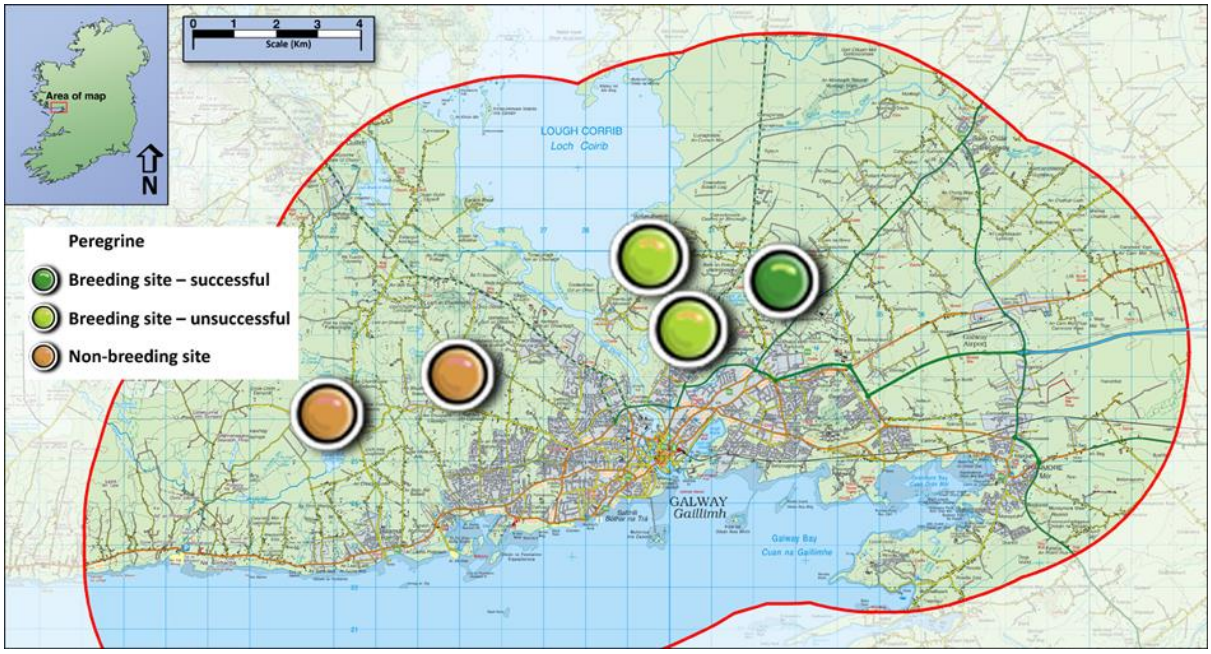

Figure 3.1 *The distribution and status of Peregrine Falcon in quarry sites (n = 5) within the survey area in 2016*

4.1 *Additional records outside the survey area in 2016*
In addition to the quarry sites monitored within the defined survey area, one quarry within 300m of the survey area was also confirmed to be occupied by breeding Peregrine in 2016. An active quarry, just north of the M6 motorway and situated approximately 300m from the eastern boundary of the survey area, was visited on the 31st of May 2016. A nest site with female brooding young was recorded on the north facing wall in the southern section of the quarry.

4.2 *Additional records within the survey area in 2017*
Based on confirmation of a failed pair of Peregrine in Lackagh Quarry and the timing of the survey conducted, it was not possible to identify the specific location the nest ledge in 2016. A portion of the proposed road development traverses through Lackagh Quarry and therefore this site was monitored in 2017 to determine occupancy, breeding status and identify the specific nest location if possible to appropriately inform the environmental impact assessment for the proposed road development.

A three hour watch (06:10 – 09:10) was conducted from a suitable vantage point above the quarry on the 12th of May 2017. A breeding pair was confirmed and the nest location was identified. These results were used to inform the planning of the proposed road development.

5 CONCLUSIONS

This report provides information on Peregrine occupancy and breeding status in five quarry sites in the survey area for the proposed N6 Galway City Ring Road in the breeding season of 2016, with additional information on the nest site location at one site (Lackagh Quarry) in 2017.

Peregrine occupancy was recorded in three quarries in the survey area in May and June 2016, all of which held breeding pairs. One breeding pair was successful (Quarry B), with pairs in two quarries (Quarry A and Lackagh Quarry) failing to raise young. All three quarry sites which held breeding pairs in 2016 were known sites where Peregrine have previously nested and are regarded as traditional nesting sites. The specific nesting location was recorded for the single successful pair (Quarry B) in 2016, for the other occupied quarries (Quarry A and Lackagh) it was not possible to record a nest location in 2016. In 2017, Lackagh Quarry was monitored to determine breeding status and the nest site location, which confirmed a breeding pair and which identified the location of the traditional nest ledge. This information was used to inform the environmental impact assessment for the proposed road development.

ACKNOWLEDGEMENTS

Many thanks to National Parks and Wildlife Service who provided information on Peregrine within the survey area, particularly Irene O'Brien and Aonghus O'Donaill, and to quarry owners who allowed access to sites.

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Hardey *et al.* (2009) recommends four visits from March to early July to establish occupancy and the presence of a breeding pair as outlined below. If there is no evidence of occupation on the first two visits, then further visits to that home range can be omitted. As eyries can be used by Peregrine over consecutive years, Hardey *et al.* (2009) recommends collating available information on Peregrine occupancy and nesting locations within an area to inform survey work. First visits to potential nesting territories should be carried out in March or early April to check for occupation. Survey work should focus on recording observations of birds or signs of occupation including active roosts, fresh kills and moulted feathers. Suspected nesting territories should be scanned from distance before being approached. Peregrine behaviour including courtship display, defensive behaviour, food passes etc. can indicate breeding activity and help determine the nest location. For large cliffs or nesting areas, watches should be carried out to determine activity. Subsequent visits aim to determine nest location and success, which incorporate a combination of sign searching and watches depending on the site and level of detail known from previous visits. Hardey *et al.* (2009) regards evidence of occupancy as the presence of a single bird or a pair, or of fresh signs of occupation that can definitely be attributed to Peregrine in a known or potential nesting territory during the breeding season.

1.2 *Nest site selection and success in quarries*

Raptors can be sensitive to a range of activities and may desert their nests in response to disturbances (Newton 1979). Different species and individuals within species may respond differently to human related disturbance. Birds which are frequently exposed to human activities may become more accustomed and tolerant of certain activities compared to those which do not regularly encounter human activities (Newton 1979). Peregrines have been documented nesting in densely populated urban environments and in close proximity to human activities in active quarries. Ratcliffe (1993) observed quarry nesting Peregrines which ignored frequent rock blasting within the quarry. In a survey of Peregrines in quarries in nine eastern counties in the Republic of Ireland, Moore *et al.* (1997) showed that Peregrines were equally likely to nest in active or disused quarries. Of the three occupied quarry sites recorded by this study for the proposed N6 Galway City Ring Road GCRR, one quarry was active during the monitoring period, which was also the only site to successfully fledge young. Peregrines have also been recorded to nest in close proximity to major roads, as is the case in an active quarry which held a breeding pair approximately 300m from the M6 motorway in 2016 (John Lusby, pers comm). Therefore, in certain situations Peregrines will tolerate and can successfully nest where there is human activity. Nevertheless, the impact of disturbance will vary according to many factors including the level and type of disturbance, the tolerance of an individual or pair to disturbance, the stage of breeding cycle in which the disturbance occurs, the proximity of the disturbance or human activity to the nest, and can also be influenced by additional stresses on the individual or pair (e.g. weather, food

supply etc). Even at sites where birds tolerate regular human activity, an unusual or new activity has the potential to cause disturbance with the potential for negative impacts to breeding.

In addition to direct disturbance, physical works have the potential to alter the suitability and availability of nest sites which may also negatively affect Peregrine. Peregrines may prepare more than one nest each year and may switch from one to the other before laying (Newton 1979), however without close inspection of a site it is not possible to ascertain the suitability and availability of nesting ledges. Where suitable nesting sites do not exist, it is possible to artificially create or enhance nesting opportunities for Peregrine within quarries. Artificial works have been carried out at quarries in the US to enhance sites for breeding Peregrine, including adding substrate and removing sharp objects from existing ledges. Explosives were used to increase the size and nesting potential of a traditional Peregrine eyrie in northern California, which was subsequently successfully used by breeding Peregrine (Pagel 1989). Specific cliff features to encourage nesting Peregrine have been incorporated within a quarry re-habilitation project in Hong Kong (CSI Quarry Rehabilitation Guidelines).

1.3 *Peregrine use of quarries in the survey area for the proposed N6 GCRR*

Peregrine Falcon are known to use several quarry sites within proximity to Galway City as confirmed by survey work for the proposed N6 GCRR in 2014 and 2015, in addition to records collated from an independent monitoring study of Peregrines in County Galway coordinated by the National Parks and Wildlife Service (O'Brien, 2015). Five quarry sites were identified within a 5km radius of the route of the proposed N6 GCRR where Peregrine activity has been previously recorded which has included a breeding pair or single bird. These sites were identified as priority for monitoring in 2016 to determine occupation and activity status of Peregrine. Three occupied quarry sites were confirmed as occupied in 2016, all of which held breeding pairs, of which one pair was successful.

1.4 *Peregrine use of Lackagh Quarry*

In 2016 a pair of Peregrine were confirmed to be present at Lackagh Quarry which failed to breed successfully. Due to the proximity of this site to the proposed N6 GCRR, this site was monitored in 2017, which confirmed a successful breeding pair.

2. INTRODUCTION

The objective of this study is to determine Peregrine occupancy, breeding status and nest site location in Lackagh quarry in 2018 to inform the Environmental Impact Assessment Report for the proposed N6 GCRR, hereafter referred to as the proposed road development.

The specific objectives of this study are to;

- Determine occupancy and breeding status of Peregrine in Lackagh quarry within the survey area for the proposed road development
- Identify the specific nest site location if a confirmed breeding pair are present

3. METHODS

The survey methods followed best practice survey techniques for Peregrine as defined by Hardey *et al.* (2009) and were adapted for the specific requirements and time scale of this survey and based on existing knowledge of use of the site by Peregrine. The survey was initiated on the 30th of May 2018, a vantage point watch was carried out which located nesting activity and subsequent visits on the 20th of June and 5th of July 2018 focused on monitoring the confirmed breeding location.

4. RESULTS

A breeding pair was confirmed in Lackagh quarry on the first visit on the 30th of May 2018, and the nest location was identified. The nest location was different to the nest used in 2017. This pair was successful in fledging young as confirmed by follow up visits.

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